To what extent does the entry of an Ambulatory Surgical Center affect hospital surgical output and hospital profit?
(Draft Only – Please do not quote)

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Abstract

Economists have examined how hospitals compete with other hospitals along price and non-price dimensions [Zwanziger and Mooney (2005), Abraham, Gaynor, and Vogt (2003)]. These types of papers assume only hospitals produce healthcare services like outpatient surgery and diagnostic imaging. The literature has ignored how Ambulatory Surgical Centers (ASC's) also produce these services and therefore alter the competitive environment of healthcare markets. This paper will explore how competition from ASC's influences outcomes at a hospital. That is, does an ASC opening in a hospital's market influence (1) the number of surgeries the hospital performs and (2) the profitability of the hospital?

Annual data on hospital profit is obtained from the Centers for Medicare & Medicaid Services (CMS) Medicare Cost Report. Information on ASC characteristics is collected from the CMS Provider of Services file. Data on other hospital characteristics comes from the American Hospital Association (AHA) annual survey. I analyze the data using a difference-in-differences regression that examines the change in both hospital profit and the number of surgeries performed for those hospitals that had an ASC enter their market versus those hospitals that did not have an ASC enter their market. Having an ASC enter a hospital's market is associated with a 10% decline in a hospital's outpatient surgeries. However, ASC entry does not seem to be associated with any substantial changes in hospital profit.

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1. Introduction

Many economists have examined how hospitals compete amongst themselves along price and non-price dimensions [Zwanziger and Mooney (2005), Abraham, Gaynor, Vogt (2003)]. However, when defining hospital markets, economists have generally assumed only hospitals produce healthcare services such as outpatient surgery and diagnostic imaging. The literature has ignored how Ambulatory Surgical Centers (ASC's) also produce those services and therefore alter the competitive environment of hospital markets. This paper examines how the entry of ASC's influences hospital output and profit. These two outcome variables are important to examine because ASC entrants could harm the financial health of a hospital by reducing its market share of valuable healthcare services. Hospital administrators often complain that ASC's cherry pick the best patients in their market, leaving the hospital to treat sicker patients or poor patients who may be unable to pay for the hospital's services. An administrator of a Des Peres hospital in St. Louis, MO claimed that in 2005 only 31% of the hospital's revenue came from outpatient services, which tend to be profitable for hospitals.[2] However 5 years earlier, 52% of the hospital's revenue came from outpatient services. The administrator cited a nearby ASC that specialized in orthopedic surgery as a primary reason for the decline. Administrators also contend that when they are forced to treat relatively unhealthy or poor patients, they are unable to subsidize less profitable components of the hospital such as uncompensated care. They argue that they subsidize that kind of care with profits from the lucrative patients they treated prior to ASC entry. William Petasnick, president and CEO of Froedtert hospital and community health system in Milwaukee, WI stated,

> "Central to keeping the balance of services and community access is the issue of cross-subsidization. Full-service hospitals must rely on the ability to use revenues from the more highly reimbursed services to subsidize and sustain low- or no- profit services that are critically needed."[3]

[2] Feldstein, Mary Jo, "As outpatient centers vie with hospitals for income, Patients seem caught in the middle", *St. Louis Post-Dispatch*, April 9, 2006, p. A1.
[3] AHA Trendwatch, "Impact of Limited-service Providers on Communities and Full-service Hospitals," September 2004, Vol. 6. No.2.

Also, the American Hospital Association claims hospital profit margins have declined because of surgery centers.[4] In a study prepared for the AHA, the authors presented four case studies of how physician owned specialty hospitals (which are similar to ASCs) affect general hospitals.[5] The authors found hospitals in Wichita and Oklahoma City that shut down community medical education programs because they could no longer be subsidized by the hospital's profit since they faced competition from nearby physician owned hospitals. The authors also stated in two of their case studies, hospitals were considering cutbacks in other subsidized services for low-income populations. Anecdotal stories like those are common. However, no previous research has analyzed a nation wide sample of hospitals to determine if these stories are the exception or are the rule. This research will shed light on this topic. If hospitals do lose a meaningful number of patients following the entry of an ASC, it is reasonable to expect hospitals may also earn less profit and reduce their provision of unprofitable services like uncompensated care. An appropriate response may be to tax ASC's and earmark the tax to fund unprofitable healthcare services.[6] However, if ASC entry does not cause a reduction in hospital profit, the benefits of ASC's could be substantial. An ASC tends to offer a location where outpatient surgery can be performed at a low cost and in a setting that is more comfortable for the patient. In this case, the government may wish to provide incentives to encourage the construction of new ASC's. Ultimately, while I do find that ASC entry negatively influences a hospital's provision of outpatient surgery, it seems ASC entry has almost no impact on profit. This may be because a hospital's outpatient department offers many services beyond outpatient surgery. A hospital which suffers a reduction in outpatient surgery could increase volume on those other services and still remain profitable. Hospital administrators concerns that ASC's are a detriment to the viability of their hospital seem exaggerated.

1.1 Background

[4] Higgins, Marguerite, "Surgery Centers Thrive", *The Washington Times*, August 8, 2005, p.C11.
[5] McManis Consulting, "The Impact of Physician-owned Limited-service Hospitals: A Summary of Four Case Studies," February 16, 2005.
[6] That is, if a reduction in these unprofitable services are detrimental to the welfare of the community. This may or may not occur.

ASC's differ from hospitals in a number of ways. ASC's are small healthcare facilities that predominately offer outpatient surgeries (that is, surgeries that do not require an overnight stay) and certain high-tech diagnostic tests (such as MRI scans). By specializing in only a few tasks, ASC's likely provide these services at a lower cost than a hospital.[7] As shown in table 1, ASC's are for-profit facilities primarily located in urban areas. One peculiar feature of ASC's is that the physicians who treat patients at an ASC may also be partial owners of that facility. Since a physician acts as an agent for his patients, a physician-owner decides whether to treat his patients at a hospital or the ASC. Amongst their patients, these physicians could cherry pick by treating high revenue-low cost patients at the facilities they own and treat low revenue-high cost patients at a hospital.[8] As mentioned previously, cherry picking is a popular complaint hospitals have against ASC's.[9] The New Jersey Hospital Association (2003) states that because an ASC has "physician investors, they have an unfair edge in referrals from physicians with a financial interest." Other key features of ASC's include their prevalence and safety. It is increasingly common to have an outpatient surgery be performed at an ASC. A survey by Oregon's Health Policy and Research division found that in 2003, Oregon ASC's performed 38% of all outpatient surgeries in that state.[10] ASC's tend to perform surgeries that are low risk and do not result in post-surgical complications. The Indiana State Department of Health found that in 2003, only 1 out of 444,368 (.25 per 100,000) surgeries performed in ASC's resulted in death.[11] Also in that year only 1,941 (4.37 per 1,000) of the patients that underwent those surgeries at Indiana ASC's experienced complications following surgery that required treatment for surgical infections or admission into a hospital. Fleisher, Pasternak, Herbert, and Anderson (2004) studied deaths and readmissions of Medicare beneficiaries following outpatient surgery at

[7] Also, hospitals offer more services, are subject to more regulation and have more staff than ASC's. These factors increase the overall cost of each healthcare service provided by a hospital. Also, ASC's tend to treat healthier patients which reduces their costs.

[8] Physician owners may do this to respond to financial incentives. They are residual claimants to any profit that their ASC earns, but are usually not residual claimants to hospital profit.

[9] See Abelson, Reed, "Barred as Rivals, Doctors See Some Hospitals in Court", *New York Times*, April 13, 2004, p. C1.

[10] Summary of Statistics of Annual Ambulatory Surgical Center Survey: 2003. http://www.oregon.gov/DAS/OHPPR/RSCH/docs/OutptSurgery_SummaryData_2003.pdf

[11] Ambulatory Surgical Centers' Preliminary Utilization Report, Indiana, 2003. http://www.in.gov/isdh/regsvcs/acc/asc/2003.htm

hospitals. 9 out of 360,780 (2.5 per 100,000) surgical procedures resulted in death. The rate of admission into a hospital following surgery was 21 per 1,000 procedures. The higher mortality and readmission rates for the hospital can be explained to some extent by their sample since the authors only examined Medicare patients. The statistics for Indiana used all patients, regardless of insurance status. The higher death and complication rates for hospitals should partially be attributed to ASC's admitting low risk patients or offering only low risk procedures. Regardless, the number of times an outpatient surgery results in an unfavorable outcome is small whether the surgery occurs in a hospital or ASC.

2. Literature Review

Very little work has examined the interactions between ASC's and hospitals. Preliminary research indicates that hospitals which compete against a newly constructed ASC could potentially lose significant revenue, which may reduce a hospital's profitability. Wynn et al (2004) show that older and unhealthier patients (who are more costly to treat) are more likely to be treated at a hospital than at an ASC. Additionally, Plotzke (2005) shows that the most profitable patients in a nationwide sample of Medicare patients have a higher probability of receiving treatment at an ASC compared to a hospital. ASC's not only treat healthier patients than hospitals, but also may greatly reduce the number of outpatient surgeries nearby hospitals perform. Lynk and Longley (2002) present two cases studies involving ASC's and hospitals. They show that in each case, after an ASC opened in the hospital's market, the hospital performed dramatically less outpatient surgery. However, both markets were rural. This paper extends Lynk and Longley's work by measuring the relationship between a hospital's provision of outpatient surgery and the entry of ASC's into its market for a nationwide sample of urban hospitals.

Although competition between ASC's and hospitals has not been deeply explored in the literature, competition between hospitals has. Abraham, Gaynor, and Vogt (2003) use the

empirical strategy of Bresnahan and Reiss (1991) to identify how the number of hospitals in a healthcare market alters the competitive environment. Like Bresnahan and Reiss, Abraham, Gaynor, and Vogt find that a healthcare market needs few hospitals for the competitive outcome to occur. Dranove et al (1992), develop a model that predicts whether a healthcare market will offer certain services based on the level of competition in that market, as measured by the Herfindahl-Hirschman Index (HHI). They found increased competition leads to greater provision of diagnostic and emergency services but more competition had no effect on the provision of other types of services. Slightly more similar to this study, Zwanziger and Mooney (2005) found that following the enactment of a law that encouraged price competition, hospitals in more competitive markets experienced slower growth in revenues and expenses compared to hospitals in less competitive markets.

Other authors have examined the impact specialty hospitals, similar to ASC's, have on general hospitals. Specialty hospitals share related characteristics with ASC's, such as physician ownership and the provision of specialized services, meaning the effects specialty hospitals have on general hospitals to some degree may mirror the effects ASC's have on general hospitals. However, the shared features between ASC's and specialty hospitals are more prevalent in ASC's, meaning the effects of ASC's on general hospitals may be exacerbated compared with specialty hospitals. An ASC is owned by a small number of physicians while specialty hospitals are owned by many physicians, each with a small stake in ownership relative to an ASC owner. The incentive to cherry pick could be much stronger at an ASC for that reason. Also, specialty hospitals are larger than ASC's and have the ability to perform a wider range of services than the ASC, reducing specialization to some degree. Further, researching interactions between ASC's and general hospitals seems more fruitful than research between general hospitals and specialty hospitals due to the greater number of ASC's. Table 1 shows that there were over 3,800 ASC's in 2003. Guteman (2006) states that recent federal reports indicate only 67 physician owned specialty hospitals existed in 2003.

Barro, Huckman, and Kessler (2005) use a difference-in-differences estimator to examine changes in inpatient expenditures, the provision of intensive services, and mortality in those healthcare markets which experienced entry by a cardiac specialty hospital compared to those healthcare markets which did not experience entry. They find that markets with specialty hospitals have patients with lower expenditures for cardiac care without significant changes in mortality. However, they also found that the specialty hospitals treated healthier patients than the general hospitals. This implies after a specialty hospital enters, existing hospitals will be burdened by sicker more costly patients. I use a similar estimation technique as Barro, Huckman, and Kessler to analyze my data. Other authors have found similar results. Greenwald et al (2006) looked at the population of specialty hospitals in the US and found that they treat healthier patients than community hospitals. Stansland and Winter (2006) find when examining profitable cardiac surgeries, markets with physician owned specialty hospitals had only a small increase in those types of surgeries after the specialty hospital entered. However, the increase was statistically insignificant for all but one type of surgery. This paper adds to the literature by providing an analysis of how ASC entry into a hospital's market influences its provision of surgery and its profitability. Although other authors have recently started to look at these issues as they pertain to the entry of specialty hospitals, no previous papers have examined ASC's in this manner.

3. Data

This paper utilizes three data sources. I use the Centers for Medicare & Medicaid Services (CMS) Provider of Services (POS) file, which is published quarterly, for information on every ASC in the US that is certified to treat Medicare patients. I use the following information from the POS: entry date, geographic location, and services offered.[12] I use the end of year POS from 1999 through 2001 and the second quarter POS from 2002 through 2004.[13] I also analyze ASC entry in the year 1997 and 1998 by examining the 1999 POS. Since the POS file reports when an ASC started treating

[12] I examine services offered to drop any ASC's that focus exclusively on plastic surgery.
[13] CMS was not able to provide the end of year POS for the years 2002 through 2004.

patients, I can determine if an ASC entered a market in 1997 or 1998.[14] Next, I use the American Hospital Association (AHA) annual survey, which has information on over 90% of the hospitals in the US. That information includes: geographic location, ownership, teaching status, facility size, services offered, staffing arrangements, and measures of hospital output. I use the 1997 through 2004 AHA survey in my research. I only examine hospitals that are located in an MSA, are classified as a general medical or surgical hospital, and are not federal hospitals.

Additionally, the AHA survey includes the latitude and longitude of most of the hospitals in the sample. I determine the latitude and longitude of the ASC's by using geocoding software and their street address.[15] I then utilize the "great circle" distance formula to determine how far away each ASC is from each hospital. In the next section, I describe how I determine which ASC's are in a hospital's markets.

Finally, I use the CMS Medicare cost report to obtain annual financial data for most US hospitals. I only include hospitals that report an entire year's worth of data. This data includes the costs and charges that hospitals incur from treating patients and is broken down by the hospital's inpatient and outpatient department. I use the cost report to calculate the profit of a hospital's inpatient department (using both all patients and only Medicare patients) and outpatient department (using only Medicare patients).[16]

4. Market Definitions for Outpatient Surgery:

Merely knowing the distance between an ASC and a hospital is not sufficient to determine if the two facilities are in the same market. The ASC and hospital must compete for the same patients in order to be in the same market. No research has measured from what distances ASC's admit their patients. Thus, there is no existing

[14] However, if an ASC entered in 1997 or before and then exited in 1998 or before, I would have no record of that ASC. This should not be a substantial problem since table 1 shows only a small number of ASC's exit each year.
[15] Geocoding software was found at www.ezlocate.com
[16] Details on how variables were constructed from the cost report are located in Appendix A.

guidance on how to define these markets. However, there is a vast literature on how to define the market from which hospitals admit their patients. I assume the common market definitions in that literature are a good approximation of ASC markets.[17]

The easiest way to define hospital markets is with existing geopolitical boundaries, such as counties or Metropolitan Statistical Areas (MSAs). That is, if a hospital and ASC are located in the same MSA [county], they are in the same MSA [county] hospital market. Although they are simple to construct, these definitions may create markets that are too small, too large or may inaccurately describe the market of hospitals located near a border. Researchers have also defined market boundaries using a fixed radius. For this method, researchers assign the same fixed radius to all hospitals in their sample. The radius around each hospital represents the market of that hospital. Therefore, if an ASC is located inside that fixed radius, the ASC is in that hospital's market. This definition provides an inaccurate description of the market size though since different hospitals have different market sizes. Hospitals in sparsely populated regions may admit patients from a larger radius than hospitals in densely populated regions. Gresenz et al (2004) accounted for that problem by constructing a variable-radius measure for hospital markets. The authors calculate the actual radii from which hospitals in nine states admit 75% of their patients and also the radii from which those hospitals admit 90% of their patients.[18] They then regress each hospital's unique radii on several hospital characteristics. The coefficients for these characteristics are then used to predict the 75% and 90% admission radii for the remaining hospitals in the 1997 American Hospital Association (AHA) survey.[19] Here, if an ASC is located inside that variable radius, that ASC is in that hospital's market.

Since researchers can choose from several market definitions to perform their analysis, there is concern that the market definition the researcher picks might drive the result.

[17] Garnick et al (1987) present more detailed explanations of many of the market definitions mentioned in this paper.
[18] The authors use discharge records from the 1997 State Inpatient Database (SID).
[19] For the hospitals in my sample, the average 75% variable radius measure is 23.96 miles with a standard deviation of 14.57 miles. The average 90% variable radius measure is 11.71 miles with a standard deviation of 5.72 miles.

Wong, Zhan, and Mutter (2005) explored this topic and used two different measurements of competition [HHI and the number of hospitals in a market] and seven different market definitions [County, MSA, Health Service Areas, Fixed Radius (15 Mile), Variable Radius (75% of a hospital's patient admissions), Variable Radius (90% of a hospital's patient admissions), and Patient Flow] to test how competition influenced a hospital's total operating expenses. For each market definition, the authors found that as HHI increased costs decreased and as the number of hospitals increased costs increased, implying that their results did not depend on market definition. Although the authors do admit that the magnitude of their coefficient estimates depended on the market definition, the direction of the effect did not depend on market definition. Since this paper measures whether hospitals do or do not suffer a decline in output or profit after an ASC enters, market definition should hopefully not impact my results. However, I still use multiple market definitions as robustness checks. The markets I use in my analysis include: County, MSA, Fixed Radius of 15 Miles, Variable Radius (75% of a hospital's patient admissions), Variable Radius (90% of a hospital's patient admissions).

Some problems arise with those market definitions. Gresenz et al (2004) could only construct the variable radius for a hospital market for those hospitals that completed the 1997 AHA survey. Therefore, I cannot use hospitals that entered after 1997 because I do not know their market radius. This should not pose a problem since looking at the outcomes of established hospitals will provide clearer results. New hospitals may have unique circumstances, unassociated with ASC entry, that influence outcomes and would cause noise in the analysis. Another problem is that Gresenz et al did not construct the variable radius for every hospital that completed the 1997 AHA survey. They primarily focused on non-government non-for profit hospitals and nonfederal public hospitals (county and city hospitals, but not state hospitals).[20] It has some, but not all, investor-owned (for-profit) hospitals and a couple of federal hospitals. Although certain hospitals are not included in the analysis using the variable radius market definitions, they are included in the robustness checks that use the alternative market definitions.

[20] The Gresenz et al (2004) paper itself claims to include only "nonfederal, short-term, general medical/surgical hospitals" however, this does not seem to be entirely true.

5. Empirical Model

This paper uses a differences-in-differences (DID) estimator that examines the change in hospital outcomes over two years, the post-treatment year and the pre-treatment year. The DID estimator attempts to measure the change in the dependent variable caused by ASC entry, controlling for any common trends in the dependent variable caused by omitted variables that were present in both markets with ASC entrants and without ASC entrants. The paper examines the following six periods (for each period the pre-treatment year occurs first and the post-treatment year occurs second): 1997 and 1999, 1998 and 2000, 1999 and 2001, 2000 and 2002, 2001 and 2003, 2002 and 2004. The pre-treatment year always occurs 2 years before the post-treatment year. A hospital is classified as a treatment hospital if at least one ASC enters that hospital's market during one of the two years prior to the post-treatment year. Control hospitals are those which had no ASC entry in either of the two years prior to the post-treatment year. Table 2 shows the number of hospitals labeled as control and treatment for each of the time periods in the analysis. The DID estimator is $\hat{b}_1$ as shown in the below model

Difference-in-Differences (DID) Estimator

$$Y_{it} = b_0 + d_1(entry_i) + a_1(post_t) + l_1(FIVEASCS_{it}) + b_1(entry\_post_{it}) + b_2(entry\_post_{it} * FIVEASCS_{it}) + d_2(entry_i * FIVEASCS_{it}) + a_2(post_t * FIVEASCS_{it}) + h_1(Period) + f(Controls_{it}) + e_{it}$$

Subscript i refers to a particular hospital. Subscript t refers to a particular year

The difference-in-differences estimator measures the change in different measures of hospital output over a two year period (comparing the change in the average outcome in hospital markets with ASC entrants to the change in the average outcome in those markets with no entry). The difference-in-differences estimator is also interacted with a dummy variable for if a hospital has 5 or fewer pre-existing ASCs in its market. Therefore, the difference-in-differences estimator, $\hat{b}_1$, shows the impact of ASC entry on

a hospital with 6 or more ASCs in its market. The difference-in-differences estimator, $\hat{b}_1$, plus the difference-in-differences estimator that is interacted with the dummy for 5 or fewer ASCs, $\hat{b}_2$, shows the effect of ASC entry on a hospital with 5 or fewer ASCs in its market. An f-test is shown at the bottom of each regression table to determine if the sum of $\hat{b}_1 + \hat{b}_2$ is different than 0. The model is setup like this to control for markets that have a large ASC presence where an additional entrant may have minimal impact on a hospital.

All six periods are estimated simultaneously, although results are similar when estimating one period at a time. Using the above model, I examine five dependent variables. I first examine the number of outpatient surgeries a hospital performs in a particular year. If the results of the two case studies that Lynk and Longley (2002) presented hold true for a large sample of urban hospitals, ASC entry should have a negative effect on this variable. Since this does analyze a much larger sample of hospitals, it will also provide a much better estimate of the magnitude of the effect. I then analyze the number of inpatient surgeries a hospital performs in a particular year. ASC entry should have no effect on this variable since ASC's do not perform inpatient surgery, a result that would also mimic Lynk and Longley (2002). However, hospitals that lose outpatients to an ASC may somehow use excess capacity in their outpatient department to treat more inpatients, causing a hospital's provision of inpatient surgery to increase. The last three dependent variables I examine relate to the profit of a hospital. I use both the profit of the hospital's outpatient department (for only Medicare patients) and inpatient department (for all patients and only Medicare patients). I predict that ASC entry has a negative impact on the profit of the outpatient department and has no impact on the profit of the inpatient department. Two factors lead me to predict declines in a hospital outpatient department's profit following ASC entry: (1) the hospital will likely perform fewer outpatient surgeries following the opening of an ASC, and (2) hospital administrators claim that ASC's cherry pick the most profitable patients (shown to some degree in Wynn et al (2004) when they conclude ASC's treat healthier patients than hospitals). However, it is unclear

how the profit of a hospital's inpatient department would be affected, since as explained previously, the effect of opening an ASC on a hospital could be ambiguous.

I measure profit using a hospital's operating margin. First, I estimate a hospital's outpatient Medicare operating margin with this formula[21]:

$$\text{Medicare outpatient margin} = \frac{(\text{Medicare outpatient charges} - \text{Medicare outpatient costs})}{\text{Medicare outpatient charges}}$$

To accurately determine profit, the formula should use Medicare outpatient revenues (the amount Medicare pays the hospital for providing outpatient services) instead of charges (the amount a hospital bills Medicare for providing outpatient services). However, the cost report does not include outpatient revenue. Given that charges can exceed revenue, my estimation of Medicare outpatient margins may be too high. Overestimating the margin is not a problem if a hospital charges are proportional to revenues by the same constant from year to year. If hospitals with ASC entrants reduce their charges compared to hospitals with no entrants, I may estimate that ASC entry has an artificially negative effect on hospital profits. However, after CMS introduced the outpatient prospective payment system in August of 2000, payment rates for outpatient surgeries were established, likely preventing a hospital from reporting charges that greatly differed from a hospital's revenue and reducing the likelihood of that problem.

Finally, I test whether an ASC entrant in a hospital's market impacts the hospital's inpatient margin. Since ASC's perform no inpatient services, an ASC entrant should have no direct effect on a hospital's inpatient financial performance. The Medicare cost report provides slightly better financial information for a hospital's inpatient department, because it details a hospital's total inpatient revenues (not just charges) for all patients. However, to be comparable to the calculations I have made for the outpatient department, I also use as an independent variable that measures inpatient charges using only Medicare

[21] Information on how to calculate Medicare outpatient charges and costs was obtained from Pink et al (2006). See appendix A for where those variables are found in the Medicare cost report.

patients. I calculate a hospital's inpatient operating margins using revenues for all patients with this formula[22]:

$$\text{Inpatient operating margin} = \frac{(\text{Inpatient operating revenue - Inpatient operating costs})}{\text{Inpatient operating revenue}}$$

Finally, I include a number of control variables in my model to account for other factors besides ASC entry that may influence the dependent variables. Since hospitals in more competitive markets may be less profitable, I control for the magnitude of hospital competition using the number of hospitals in the market and a HHI measure that uses the number of hospital admissions in the hospital's market. Since hospital size influences hospital output, for each hospital I control for the number of operating rooms, full time physicians, and include a dummy variable for having at least 100 beds. Additionally, I control for ownership status, whether the hospital is a teaching hospital, and its geographic location using census divisions. To account for demand-side factors, I include controls for the number of people in the county over the age of 65, the percent of people unemployed in the county, number of people in poverty, median income, population, population squared, population density, and population density squared.

6. Results

The difference-in-differences estimators measures the change in different measures of hospital output over a two year period (comparing the average outcome in hospital markets with ASC entrants to the average outcome in those markets with no entry) in both markets with 5 or fewer pre-existing ASCs and those with more than 5 pre-existing ASCs. I estimate the model using OLS. Standard errors are robust to heteroskedasticity and corrected for clustering at the hospital level. In my analysis, I only include general or surgical hospitals located in a MSA either in the pre-treatment or post-treatment year. Also, the hospital must classify itself as a private non-profit, private for-profit, or public

[22] Established definitions of inpatient costs or revenues could not be found. To construct these variables, I carefully examined the Medicare cost report and used the variables that looked appropriate. See appendix A for where the variables are found in the Medicare cost report.

hospital either in the pre-treatment or post-treatment year. Finally, the hospital must have provided a response to the dependent variable and all other control variables for both the pre-treatment and post-treatment year. The last stipulation ensures the panel is balanced.

I report the full results for each dependent variable for the market type variable radius of 75% of a hospital's patient admissions. However, results (in terms of sign, magnitude, and statistical significance) are similar for the other market definitions mentioned in section 4. Table 3 looks at the effect of ASC entry on the number of outpatient surgeries a hospital performs. Table 4 examines how ASC entry influences a hospital's provision of inpatient surgery. Table 5 reports the effect of ASC entry on the operating margin of a hospital's outpatient department (using only Medicare patients). Table 6 shows the effect of ASC entry on the operating margin of a hospital's outpatient department (using only Medicare patients) only considering those hospitals with less than a 10% change in their Medicare outpatient cost to charge ratio from the pre year to the post year. Table 7 takes those same hospitals and looks at the effect of ASC entry on the number of outpatient surgeries performed at a hospital. Tables 8 and 9 show the effect of ASC entry on the operating margin of a hospital's inpatient department (using only Medicare patients and all patients). Each table reports coefficient estimates and below each table there is another set of number showing the difference-in-differences estimate for hospitals with 5 or fewer ASCs that experience ASC entry and an F-test to determine if the estimate is significantly different than 0.

As shown in table 3 and table 4, ASC entry has a noticeable influence on the number of outpatient surgeries a hospital performs while having a less evident effect on the number of inpatient surgeries a hospital performs. ASC entry is associated with a 5.4% decline in outpatient surgery in markets with 6 or more pre-existing ASCs that is significant at the 5% level. ASC entry is associated with a 10.6% decline in outpatient surgery in markets with 5 or fewer pre-existing ASCs that is significant at the 1% level. As expected, ASC entry has no influence on the number of inpatient surgeries a hospital performs. These results confirm that the 2 case studies that Lynk and Longley (2002) presented are not

anomalies. For a large sample of urban hospitals, ASC entry seems to have a sizable negative effect on outpatient surgery while having little influence on inpatient surgery.

Table 5 shows ASC entry is not associated with a significant change in Medicare outpatient margin. It is not surprising that ASC entry has no measurable impact on the Medicare outpatient margin since ASC's only perform outpatient surgery, but hospitals provide other outpatient services besides outpatient surgery. Further, ASC's treat patients besides Medicare patients. Part of the reason that the coefficients are not significantly different from zero is that there may be an unmeasured change in outpatient department margins for those patients without Medicare.[23]

As a robustness check, I ran the above regression on the same dependent variables using a subsample of hospitals which had a 10% or smaller change in their Medicare outpatient cost to charge ratio during the time period that was analyzed. I want to eliminate any hospitals that changed the composition of their outpatient department, adding new services for example, in a way that dramatically influenced margins. Also, I want to eliminate any hospital that substantially changed their charges independent of their costs since that would influence my margin definition (which proxies for the actual margin definition that uses revenues) but not impact the revenues collected. It is possible that hospitals could perform either behavior in response to an ASC entering their market which would cause the estimates to be biased. However, the second concern is not a large problem when examining hospital outcomes after 2000. Starting on August 1, 2000, hospitals billed all Medicare outpatient procedures under a new outpatient prospective payment system.[24] This payment system limited a hospital from determining their own charges for the outpatient treatment of Medicare patients. When using the subsample with a 10% or smaller change in their Medicare outpatient cost to charge ratio (which eliminates half the sample for each time period), the results look similar to the full sample. Table 6 shows the effect of ASC entry on Medicare outpatient margins is insignificant for both markets with 5 or fewer ASCs and markets with 6 or more ASCs.

[23] Oregon's health policy and research division found that in 2003, a third of hospitals charges for hospital outpatient surgery was billed to Medicare. The remaining charges were billed to other payors.
[24] Previously, hospitals billed Medicare using a cost-plus system of reimbursement.

Also, Table 7 shows ASC entry is associated with a significant decline in the number of outpatient surgeries in markets with 5 or more ASCs that is similar to the earlier estimate for the full sample.

Finally, the model examines if ASC entry influences either a hospital's inpatient Medicare margin or a hospital's inpatient margin using all patients. Table 8 shows ASC entry is not associated with an effect on Medicare inpatient margin that is significant at the 5% level. Table 9 shows ASC entry is associated with a 2 percentage point increase on hospital inpatient margin for all patients in markets with 5 or fewer ASCs. There is no significant effect in those markets with 6 more ASCs. The positive significant result is odd given that I earlier estimated that ASC entry has no impact on the provision of inpatient surgery.

7. Conclusion / Ideas for future research

It seems ASC entry into a hospital's market has only some effect on a hospital amongst the outcomes measured in this paper. As mentioned previously, ASC's and hospitals vie for outpatient surgery patients, and it seems that ASC entry reduces a hospital's provision of outpatient surgery. However, hospitals provide other services in their outpatient department besides outpatient surgery. Therefore, it is reasonable that following ASC entry hospital profit for the outpatient department does not change substantially. A potential problem in the analysis is that I only measure outpatient margins for Medicare patients, ignoring outpatient surgical revenue from other payors. It is possible that ASC entry would have a stronger or weaker influence on outpatient margins when all patients are analyzed. Despite this the paper does provide one important finding. Since ASC entry impacts a hospital's provision of outpatient surgery, more research should examine how ASC presence influences the behavior of hospitals. Hospitals have devoted many resources to limiting the competition they face from

specialized healthcare providers like ASC's and specialty hospitals.[25] The fact that hospitals devote resources to stave off competition from ASC's shows the importance of ASC's. If hospitals continue to hinder the construction of new ASC's, patients may lose out on a low cost alternative location to receive outpatient surgery. However, it is unclear whether more or less competition in the healthcare market is beneficial. Increased competition may provide lower prices to consumers. However, even though I was not able to show it here, increased competition may limit a hospital's ability to provide unprofitable services such as healthcare for the poor or uninsured. In the upcoming years, it will be possible to determine if the entry of ASC's causes hospitals to reduce uncompensated care because in 2003 the Medicare cost report started to ask hospitals questions regarding uncompensated care.

This paper has performed a basic analysis of how ASC entry influences hospital behavior. There are several improvements I would like to make in future drafts of this paper. For example, it may be beneficial to implement a method that accounts for the differing treatment effects, since multiple ASC's (not just one) could enter a market in one year. Further, like Barro, Huckman, and Kessler (2005) I want to see if ASC entry has any impact on outpatient expenditures or provision of certain services.

[25] Hospitals will seek to form exclusive contracts with health insurance providers in order to prevent ASC's from treating certain patients. Also in the past several years, hospital groups successfully lobbied for an 18 month moratorium on the construction of new specialty hospitals in order to perform research on whether they were beneficial.

References

AHA Trendwatch, "Impact of Limited-service Providers on Communities and Full-service Hospitals," September 2004, Vol. 6. No.2.

Abelson, Reed, "Barred as Rivals, Doctors See Some Hospitals in Court", *New York Times*, April 13, 2004, p. C1.

Abraham, J.M., Gaynor, M., and Vogt, W.B., "Entry and Competition in Local Hospital Markets" *CMPO Working Paper Series*, No. 03/088 (2003), pp. 1- 21

Barro, J.R., Huckman, R.S., and Kessler, D.P. "The Effects of Cardiac Specialty Hospitals on the Cost and Quality of Medical Care" Forthcoming, *Journal of Health Economics*

Bresnahan, T.F., and Reiss, P.C., "Entry and Competition in Concentrated Markets" *Journal of Political Economy, Vol. 99* (1991), pp. 977-1009

Dranove, D., Shanley, M., and Simon, C. "Is Hospital Competition Wasteful?" *Rand Journal of Economics*, Vol. 23 (1992), pp. 247-262.

Feldstein, Mary Jo, "As outpatient centers vie with hospitals for income, Patients seem caught in the middle", *St. Louis Post-Dispatch*, April 9, 2006, p. A1.

Fleisher, Pasternak, Herbert, and Anderson, "Inpatient Hospital Admission and Death After Outpatient Surgery in Elderly Patients", *Archives of Surgery*, Vol. 139:1 (2004), pp. 67-72.

Gresenz C.R., Rogowski J., and Escarce J.J. "Updated Variable-Radius Measures of Hospital Competition" *Health Services Research*, Vol. 39 (2004), pp.417-430.

Garnick, D.W., Luft, H.S., Robinson, J.C., and Tetreault, J. "Appropriate Measures of Hospital Market Areas" *Health Services Research*, Vol. 22 (1987), pp. 69-89.

Greenwald, L., et al "Specialty Versus Community Hospitals: Refferrals, Quality, and Community Benefits" *Health Affairs*, Vol. 25 (2006), pp. 106-118.

Guteman, S., "Specialty Hospitals: A Problem Or A Symptom?" *Health Affairs*, Vol. 25 (2006), pp. 95-105.

Higgins, Marguerite, "Surgery Centers Thrive", *The Washington Times*, August 8, 2005, p.C11.

Indiana State Department of Health – Regulatory Services, "Ambulatory Surgical Centers' Preliminary Utilization Report, Indiana, 2003" (2004), http://www.in.gov/isdh/regsvcs/acc/asc/2003.htm

Lynk, W.J., Longley C.S., "The effect of physician-owned surgicenters on hospital outpatient surgery" *Health Affairs*, 21:4 (2002), p. 215-221.

McManis Consulting, "The Impact of Physician-owned Limited-service Hospitals: A Summary of Four Case Studies," February 16, 2005.

Medpac, "A Data Book: Healthcare Spending and the Medicare Program," (2005), pg. 141. http://www.medpac.gov/publications/congressional_reports/Jun05DataBook_Entire_report.pdf

Oregon Health Policy and Research, "Summary of Statistics of Annual Ambulatory Surgical Center Survey: 2003" (2004), pg. 1. http://www.oregon.gov/DAS/OHPPR/RSCH/docs/OutptSurgery_SummaryData_2003.pdf

Pink, G.H., Holmes, G.M., D'Alpe, C., Strunk, L.A., McGee, P., Slifkin, R.T., "Financial Indicators for Critical Access Hospitals" *The Journal of Rural Health,* Vol. 22:3 (2006), pp. 229-236(8).

Plotzke, M. "Does Ownership of Ambulatory Surgical Centers Cause Physicians to Behave Opportunistically?" Unpublished. April 2005.

Stensland, J., and Winter, A. "Do Physician-Owned Cardiac Hospitals Increase Utilization?" *Health Affairs,* Vol. 25 (2006), pp. 119-129.

Wong, H.S., Zhan, C., and Mutter, R. "Do Different Measures of Hospital Competition Matter in Empirical Investigations of Hospital Behavior?" *Review of Industrial Organization,* Vol. 26 (2005), pp. 27-60.

Wynn, et al. "Services Provided in Multiple Ambulatory Settings: A Review of the Literature for Selected Procedures" Working Paper, *Rand Health,* November 2004.

Zwanziger, J., Mooney, C., "Has Price Competition Changed Hospital Revenues and Expenses in New York?" *Inquiry*, Vol. 42 (2005), pp. 183-192.

Appendix A: Financial variables found in the Medicare Cost Report

MCRinpatrev: Inpatient revenue for all payers

- Worksheet G-2: Financial Statements
- Column 1: Inpatient
- Line number 16: Total inpatient routine care services

MCRinpatcost2: Inpatient costs for all payers

- Worksheet C Part I: Computation of ratio of costs to charges
- Column 5: Total Costs
- Sum of line numbers 25-36: All these line numbers fall under the heading of Inpatient routine service cost centers

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MCRmedicareinpatchar: Inpatient charges for only Medicare patients

- Worksheet D-4 (Title XVIII, Hospital): Inpatient Ancillary Service cost apportionment
- Column 2: Inpatient Program Charges
- Sum of line numbers 25-31: All these line numbers fall under the heading of Inpatient routine service cost centers.

MCRmedicareinpatcost4: Inpatient costs for only Medicare patients

- Worksheet D-1 Part II (Title XVIII, Hospital): Computation of inpatient operating cost (Hospitals and subproviders only)
- Column 1:
- Line number 41: Total program general inpatient routine service cost

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MCRoutpat_medchar: Outpatient charges for only Medicare patients

Worksheet D, Part V (Title XVIII, Hospital): Apportionment of Medical, Other Health Services, and Vaccine Cost (Apportionment of Medical and Other Health Services Costs) (For years after 2000, only column 5, 5.01, and 5.02 are reported)

- Sum of the following Columns (All under the header Program Charges)
  - Column 2: Outpatient Ambulatory Surgical Center
  - Column 3: Outpatient Radiology
  - Column 4: Other Outpatient Diagnostic
  - Column 5: All Other
  - Column 5.01: PPS Services
  - Column 5.02: All Other
- Line number 104: Net Charges

MCRoutpat_medcost: Outpatient costs for only Medicare patients (For years after 2000, only column 9, 9.01, and 9.02 are reported)

- Worksheet D, Part V (Title XVIII, Hospital): Apportionment of Medical, Other Health Services, and Vaccine Cost (Apportionment of Medical and Other Health Services Costs)
  - Sum of the following Columns (All under the header Program Costs)
    - Column 6: Outpatient Ambulatory Surgical Center
    - Column 7: Outpatient Radiology
    - Column 8: Other Outpatient Diagnostic
    - Column 9: All Other
    - Column 9.01: PPS services
    - Column 9.02: All Other
  - Line number 104: Net Charges

Table 1

National Characteristics of Medicare-certified ambulatory surgical centers, 1997-2004

	1997	1998	1999	2000	2001	2002	2003	2004
Number of Facilities	2462	2644	2786	3028	3371	3597	3887	4136
New Facilities	237	228	162	295	446	309	365	315
Exiting and Merged facilities	40	46	20	53	103	83	75	66
Net percent growth from previous year	8.70%	7.40%	5.40%	8.70%	11.30%	6.70%	8.10%	6.40%
	Percent of all centers							
For profit	93%	94%	94%	94%	94%	95%	95%	96%
Nonprofit	6	6	6	6	5	5	5	4
Freestanding	99%	99%	99%	99%	99%	99%	99%	99%
Hospital Owned and Operated	1	1	1	1	1	1	1	1
Urban	90%	89%	89%	88%	88%	87%	87%	87%
Rural	10	11	11	12	12	13	13	13

Source: MedPAC analysis of provider of services file from CMS

Table 2
Number of treatment hospitals and control hospitals by year (For market type variable radius of 75% of hospital's patient admissions)

	Treatment Hospitals	Control Hospitals
2004 and 2002	635	775
2003 and 2001	658	885
2002 and 2000	576	890
2001 and 1999	626	859
2000 and 1998	586	816
1999 and 1997	501	928

Table 3

OLS Estimates of the Effect of ASC entry on Annual Number of Outpatient Surgeries Performed (Hospital)

Treatment Hospital * Post	**-0.0535** **[0.0212]****	**Full Time Physicians and Dentists (Hospital)**	-0.0001 [0.0001]
Treatment Hospital * Post * Five_ASCs	**-0.0531** **[0.0271]+**	**Outpatient Surgery Hospital**	**0.1426** **[0.0746]+**
Treament Hospital	-0.0121 [0.0317]	**Freestanding operating Center**	**0.1181** **[0.0224]***
Post Dummy Variable	**0.0316** **[0.0190]+**	**Operating Rooms (Hospital)**	**0.052** **[0.0029]***
Treatment Hospital * Five_ASCs	**0.127** **[0.0387]***	**HHI (Hospital)**	**-0.2531** **[0.0571]***
Post * Five_ASCs	0.0136 [0.0198]	**Number of other Hospitals (County)**	**-0.004** **[0.0016]****
Five_ASCs	-0.0025 [0.0420]	**Small Hospital**	**-0.7639** **[0.0440]***
Period 2000	**0.055** **[0.0120]***	**Private Hospital**	**-0.0685** **[0.0339]****
Period 2001	**0.0623** **[0.0120]***	**Public Hospital**	**-0.2316** **[0.0443]***
Period 2002	**0.0805** **[0.0161]***	**Teaching Hospital**	0.0251 [0.0330]
Period 2003	**0.0694** **[0.0180]***	**Population Density (County)**	0.0013 [0.0066]
Period 2004	**0.0852** **[0.0206]***	**Population Density Squared (County)**	0 [0.0001]
Percent Uninsured (County)	**-0.0219** **[0.0058]***	**Constant**	**7.9153** **[0.1521]***
Annual Unemployment Rate (County)	0.0085 [0.0080]	**Observations**	17470
		R-squared	0.594
Differences in Differences (DID) Estimate for Hospitals with 5 or fewer ASCs that experience ASC Entry			-0.1066
P-Value for F-Test to determine if DID estimator is significantly different than 0			0

Also included in this model, but are not reported are controls for Census Divisions, Population, Population Squared, Population over 65, Population in Poverty, and Median Income

Robust standard errors in brackets

+ significant at 10%; ** significant at 5%; * significant at 1%

Table 4

OLS Estimates of the Effect of ASC entry on Annual Number of Inpatient Surgeries Performed (Hospital)

Treatment Hospital * Post	-0.004 [0.0197]	**Full Time Physicians and Dentists (Hospital)**	0.0003 [0.0002]
Treatment Hospital * Post * Five_ASCs	-0.0062 [0.0245]	**Outpatient Surgery Hospital**	-0.0093 [0.0514]
Treament Hospital	-0.0014 [0.0284]	**Freestanding operating Center**	**0.1479** **[0.0212]***
Post Dummy Variable	-0.0145 [0.0184]	**Operating Rooms (Hospital)**	**0.0565** **[0.0030]***
Treatment Hospital * Five_ASCs	**0.1286** **[0.0354]***	**HHI (Hospital)**	**-0.2715** **[0.0519]***
Post * Five_ASCs	0.0016 [0.0190]	**Number of other Hospitals (County)**	0.0004 [0.0011]
Five_ASCs	**-0.0646** **[0.0359]+**	**Small Hospital**	**-1.0595** **[0.0454]***
Period 2000	-0.0123 [0.0121]	**Private Hospital**	**-0.1499** **[0.0358]***
Period 2001	-0.0019 [0.0121]	**Public Hospital**	**-0.1459** **[0.0407]***
Period 2002	0.005 [0.0149]	**Teaching Hospital**	**0.1132** **[0.0317]***
Period 2003	-0.0035 [0.0167]	**Population Density (County)**	**-0.0181** **[0.0062]***
Period 2004	0.0167 [0.0191]	**Population Density Squared (County)**	**0.0002** **[0.0001]+**
Percent Uninsured (County)	**0.0169** **[0.0051]***	**Constant**	**6.8369** **[0.1413]***
Annual Unemployment Rate (County)	-0.0006 [0.0080]	**Observations**	16566
		R-squared	0.718

Differences in Differences (DID) Estimate for Hospitals with 5 or fewer ASCs that experience ASC Entry	-0.0102
P-Value for F-Test to determine if DID estimator is significantly different than 0	0.4673

Also included in this model, but are not reported are controls for Census Divisions, Population, Population Squared, Population over 65, Population in Poverty, and Median Income

Robust standard errors in brackets

+ significant at 10%; ** significant at 5%; * significant at 1%

Table 5

OLS Estimates of the Effect of ASC entry on Medicare Outpatient Margin (Hospital)

Treatment Hospital * Post	-0.0001 [0.0048]	**Full Time Physicians and Dentists (Hospital)**	**-0.0001** **[0.0000]+**
Treatment Hospital * Post * Five_ASCs	0.0006 [0.0056]	**Outpatient Surgery Hospital**	0.0085 [0.0120]
Treament Hospital	**-0.0157** **[0.0090]+**	**Freestanding operating Center**	**-0.0117** **[0.0049]****
Post Dummy Variable	**0.0413** **[0.0046]***	**Operating Rooms (Hospital)**	**0.0009** **[0.0004]****
Treatment Hospital * Five_ASCs	0.0019 [0.0103]	**HHI (Hospital)**	-0.0181 [0.0124]
Post * Five_ASCs	-0.0075 [0.0046]	**Number of other Hospitals (County)**	-0.0002 [0.0003]
Five_ASCs	0.0139 [0.0107]	**Small Hospital**	**-0.0364** **[0.0073]***
Period 2000	**0.012** **[0.0022]***	**Private Hospital**	**0.0963** **[0.0068]***
Period 2001	**0.0339** **[0.0022]***	**Public Hospital**	**-0.0617** **[0.0104]***
Period 2002	**0.0531** **[0.0030]***	**Teaching Hospital**	**-0.0327** **[0.0084]***
Period 2003	**0.0685** **[0.0034]***	**Population Density (County)**	**-0.0092** **[0.0022]***
Period 2004	**0.0873** **[0.0039]***	**Population Density Squared (County)**	**0.0001** **[0.0000]****
Percent Uninsured (County)	**0.0031** **[0.0012]****	**Constant**	**0.5207** **[0.0304]***
Annual Unemployment Rate (County)	**-0.0033** **[0.0015]****	**Observations**	17470
		R-squared	0.287

Differences in Differences (DID) Estimate for Hospitals with 5 or fewer ASCs that experience ASC Entry	0.0005
P-Value for F-Test to determine if DID estimator is significantly different than 0	0.831

Also included in this model, but are not reported are controls for Census Divisions, Population, Population Squared, Population over 65, Population in Poverty, and Median Income

Robust standard errors in brackets

+ significant at 10%; ** significant at 5%; * significant at 1%

Table 6

OLS Estimates of the Effect of ASC entry on Medicare Outpatient Margin (Only hospitals where outpatient cost to charge ratio doesn't change by 10%)

Treatment Hospital * Post	0.0007 [0.0037]	**Full Time Physicians and Dentists (Hospital)**	**-0.0001** **[0.0001]+**
Treatment Hospital * Post * Five_ASCs	0.0002 [0.0048]	**Outpatient Surgery Hospital**	-0.0035 [0.0127]
Treament Hospital	**-0.0214** **[0.0118]+**	**Freestanding operating Center**	-0.0066 [0.0054]
Post Dummy Variable	**0.0114** **[0.0036]***	**Operating Rooms (Hospital)**	0.0005 [0.0005]
Treatment Hospital * Five_ASCs	0.0011 [0.0132]	**HHI (Hospital)**	**-0.0428** **[0.0138]***
Post * Five_ASCs	-0.0009 [0.0036]	**Number of other Hospitals (County)**	-0.0002 [0.0004]
Five_ASCs	0.0107 [0.0131]	**Small Hospital**	**-0.0251** **[0.0073]***
Period 2000	**0.0171** **[0.0046]***	**Private Hospital**	**0.09** **[0.0092]***
Period 2001	**0.0402** **[0.0044]***	**Public Hospital**	**-0.0438** **[0.0108]***
Period 2002	**0.0534** **[0.0053]***	**Teaching Hospital**	**-0.029** **[0.0092]***
Period 2003	**0.067** **[0.0055]***	**Population Density (County)**	**-0.0116** **[0.0027]***
Period 2004	**0.088** **[0.0064]***	**Population Density Squared (County)**	**0.0001** **[0.0000]****
Percent Uninsured (County)	**0.0042** **[0.0013]***	**Constant**	**0.5528** **[0.0332]***
Annual Unemployment Rate (County)	**-0.0031** **[0.0017]+**	**Observations**	8138
		R-squared	0.283

Differences in Differences (DID) Estimate for Hospitals with 5 or fewer ASCs that experience ASC Entry	0.0009
P-Value for F-Test to determine if DID estimator is significantly different than 0	0.6918

Also included in this model, but are not reported are controls for Census Divisions, Population, Population Squared, Population over 65, Population in Poverty, and Median Income

Robust standard errors in brackets

+ significant at 10%; ** significant at 5%; * significant at 1%

Table 7

OLS Estimates of the Effect of ASC entry on Medicare Outpatient Margin (Only hospitals where outpatient cost to charge ratio doesn't change by 10%)

Treatment Hospital * Post	-0.0443 [0.0281]	**Full Time Physicians and Dentists (Hospital)**	0 [0.0001]
Treatment Hospital * Post * Five_ASCs	**-0.0839** **[0.0366]****	**Outpatient Surgery Hospital**	0.0787 [0.0927]
Treament Hospital	-0.0069 [0.0394]	**Freestanding operating Center**	**0.1356** **[0.0259]***
Post Dummy Variable	0.0251 [0.0256]	**Operating Rooms (Hospital)**	**0.0519** **[0.0028]***
Treatment Hospital * Five_ASCs	**0.1109** **[0.0477]****	**HHI (Hospital)**	**-0.2474** **[0.0643]***
Post * Five_ASCs	0.0097 [0.0267]	**Number of other Hospitals (County)**	**-0.0053** **[0.0021]****
Five_ASCs	-0.0003 [0.0498]	**Small Hospital**	**-0.7424** **[0.0488]***
Period 2000	**0.0504** **[0.0258]+**	**Private Hospital**	-0.0435 [0.0419]
Period 2001	**0.0761** **[0.0239]***	**Public Hospital**	**-0.1726** **[0.0517]***
Period 2002	**0.0689** **[0.0270]****	**Teaching Hospital**	0.0391 [0.0352]
Period 2003	**0.062** **[0.0295]****	**Population Density (County)**	0.0042 [0.0078]
Period 2004	**0.0728** **[0.0328]****	**Population Density Squared (County)**	-0.0001 [0.0001]
Percent Uninsured (County)	**-0.0279** **[0.0065]***	**Constant**	**7.9978** **[0.1724]***
Annual Unemployment Rate (County)	0.0083 [0.0096]	**Observations**	8138
		R-squared	0.601

Differences in Differences (DID) Estimate for Hospitals with 5 or fewer ASCs that experience ASC Entry	-0.1282
P-Value for F-Test to determine if DID estimator is significantly different than 0	0

Also included in this model, but are not reported are controls for Census Divisions, Population, Population Squared, Population over 65, Population in Poverty, and Median Income

Robust standard errors in brackets

+ significant at 10%; ** significant at 5%; * significant at 1%

Table 8

OLS Estimates of the Effect of ASC entry on Medicare Inpatient Margin (Hospital)

Treatment Hospital * Post	0.0002 [0.0067]	**Full Time Physicians and Dentists (Hospital)**	0 [0.0000]
Treatment Hospital * Post * Five_ASCs	0.0097 [0.0090]	**Outpatient Surgery Hospital**	-0.0237 [0.0172]
Treament Hospital	**-0.0176** **[0.0106]+**	**Freestanding operating Center**	0.007 [0.0087]
Post Dummy Variable	**0.0294** **[0.0060]***	**Operating Rooms (Hospital)**	**0.0036** **[0.0006]***
Treatment Hospital * Five_ASCs	**0.0232** **[0.0139]+**	**HHI (Hospital)**	**-0.0911** **[0.0210]***
Post * Five_ASCs	**-0.0142** **[0.0064]****	**Number of other Hospitals (County)**	-0.0003 [0.0005]
Five_ASCs	-0.0219 [0.0137]	**Small Hospital**	**-0.1386** **[0.0162]***
Period 2000	0.0045 [0.0044]	**Private Hospital**	**0.0739** **[0.0134]***
Period 2001	**0.0151** **[0.0046]***	**Public Hospital**	**-0.0515** **[0.0163]***
Period 2002	**0.0288** **[0.0059]***	**Teaching Hospital**	**0.033** **[0.0115]***
Period 2003	**0.0458** **[0.0066]***	**Population Density (County)**	-0.0021 [0.0032]
Period 2004	**0.0626** **[0.0075]***	**Population Density Squared (County)**	0 [0.0000]
Percent Uninsured (County)	**0.0172** **[0.0020]***	**Constant**	-0.0343 [0.0522]
Annual Unemployment Rate (County)	**-0.0086** **[0.0030]***	**Observations**	16566
		R-squared	0.374
Differences in Differences (DID) Estimate for Hospitals with 5 or fewer ASCs that experience ASC Entry			0.0099
P-Value for F-Test to determine if DID estimator is significantly different than 0			0.0768

Also included in this model, but are not reported are controls for Census Divisions, Population, Population Squared, Population over 65, Population in Poverty, and Median Income

Robust standard errors in brackets

+ significant at 10%; ** significant at 5%; * significant at 1%

Table 9

OLS Estimate of the Effect of ASC Entry on Inpatient Margin (Hospital)

Treatment Hospital * Post	0.0041 [0.0084]	**Full Time Physicians and Dentists (Hospital)**	0.0001 [0.0000]
Treatment Hospital * Post * Five_ASCs	**0.0209** **[0.0117]+**	**Outpatient Surgery Hospital**	-0.0111 [0.0244]
Treament Hospital	-0.0216 [0.0140]	**Freestanding operating Center**	0.0019 [0.0104]
Post Dummy Variable	**0.0264** **[0.0079]***	**Operating Rooms (Hospital)**	**0.0027** **[0.0007]***
Treatment Hospital * Five_ASCs	0.0181 [0.0173]	**HHI (Hospital)**	**-0.086** **[0.0247]***
Post * Five_ASCs	**-0.0203** **[0.0086]****	**Number of other Hospitals (County)**	-0.0001 [0.0005]
Five_ASCs	-0.0108 [0.0179]	**Small Hospital**	**-0.1398** **[0.0181]***
Period 2000	0.0042 [0.0055]	**Private Hospital**	**0.048** **[0.0168]***
Period 2001	**0.0183** **[0.0054]***	**Public Hospital**	**-0.0396** **[0.0171]****
Period 2002	**0.0277** **[0.0073]***	**Teaching Hospital**	**0.0425** **[0.0138]***
Period 2003	**0.0394** **[0.0084]***	**Population Density (County)**	**0.0064** **[0.0031]****
Period 2004	**0.0518** **[0.0093]***	**Population Density Squared (County)**	**-0.0001** **[0.0000]***
Percent Uninsured (County)	**0.0214** **[0.0025]***	**Constant**	**-0.4727** **[0.0670]***
Annual Unemployment Rate (County)	**-0.0063** **[0.0032]****	**Observations**	16566
		R-squared	0.359

Differences in Differences (DID) Estimate for Hospitals with 5 or fewer ASCs that experience ASC Entry	0.025
P-Value for F-Test to determine if DID estimator is significantly different than 0	0.0015

Also included in this model, but are not reported are controls for Census Divisions, Population, Population Squared, Population over 65, Population in Poverty, and Median Income

Robust standard errors in brackets

+ significant at 10%; ** significant at 5%; * significant at 1%