ISSN 2042-2695

CENTRE for ECONOMIC PERFORMANCE

CEP Discussion Paper No 1523

December 2017

Politics, Hospital Behaviour and Health Care Spending

Zack Cooper
Amanda Kowalski
Eleanor Neff Powell
Jennifer Wu

THE LONDON SCHOOL OF ECONOMICS AND POLITICAL SCIENCE

E·S·R·C ECONOMIC & SOCIAL RESEARCH COUNCIL

Abstract
This paper examines the link between legislative politics, hospital behaviour, and health care spending. When trying to pass sweeping legislation, congressional leaders can attract votes by adding targeted provisions that steer money toward the districts of reluctant legislators. This targeted spending provides tangible local benefits that legislators can highlight when fundraising or running for re-election. We study a provision - Section 508 – that was added to the 2003 Medicare Modernization Act (MMA). Section 508 created a pathway for hospitals to apply to get their Medicare payment rates increased. We find that hospitals represented by members of the House of Representatives who voted 'Yea' on the MMA were significantly more likely to receive a 508 waiver than hospitals represented by members who voted 'Nay.' Following the payment increase generated by the 508 program, recipient hospitals treated more patients, increased payroll, hired nurses, added new technology, raised CEO pay, and ultimately increased their spending by over $100 million annually. Section 508 recipient hospitals formed the Section 508 Hospital Coalition, which spent millions of dollars lobbying Congress to extend the program. After the vote on the MMA and before the vote to reauthorize the 508 program, members of Congress with a 508 hospital in their district received a 22% increase in total campaign contributions and a 65% increase in contributions from individuals working in the health care industry in the members' home states. Our work demonstrates a pathway through which the link between politics and Medicare policy can dramatically affect US health spending.

Key words: health care, US, hospital, politics
JEL: I10; I18; H51; D72; P16

This paper was produced as part of the Centre's Growth Programme. The Centre for Economic Performance is financed by the Economic and Social Research Council.

This work began when all four co-authors were affiliates of the Institution for Social and Policy Studies (ISPS) at Yale University, and we thank ISPS for support. We thank Andrea Harris, David Mayhew, Joshua Gottlieb, and seminar participants at Yale University, the University of British Columbia, Dartmouth College, the National Bureau of Economic Research, and the Federal Trade Commission for helpful feedback. We are also grateful to Leemore Dafny, Jonathan Gruber, and Adam Sacarny for help with data access. Antoine Arnoud, Eugene Larsen-Hallock, and Stuart Craig provided excellent research assistance. All mistakes are our own.

Zack Cooper, Yale University and Centre for Economic Performance, London School of Economics. Amanda Kowalski, Yale University and NBER. Eleanor Neff Powell, University of Wisconsin at Maddison. Jennifer Wu, Yale University.

Published by
Centre for Economic Performance
London School of Economics and Political Science
Houghton Street
London WC2A 2AE

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means without the prior permission in writing of the publisher nor be issued to the public or circulated in any form other than that in which it is published.

Requests for permission to reproduce any article or part of the Working Paper should be sent to the editor at the above address.

© Z. Cooper, A. Kowalski, E. Neff Powell and J. Wu, submitted 2017.

"In the past, decisions on health care delivery were largely professional ones. Now the decisions will be largely political." – John G. Veneman, undersecretary of the Department of Health, Education and Welfare (HEW) in the Nixon administration, quoted in Inglehart (1971) as cited in Starr (1983)

1. Introduction

In 2015, the United States (US) spent $3.2 trillion on health care, just under one third of which was funded by the federal government (Centers for Medicare and Medicaid Services, 2017). Ultimately, the US Congress has significant capacity to influence national health spending, particularly via reforms of the Medicare program. The Medicare program, which accounts for one fifth of US health spending and 15% of the federal budget, provides health insurance to 57 million people age 65 and older and to those with permanent disabilities (Cubanski and Neuman, 2016). Congress votes on the laws that define the scope and structure of the Medicare program, including those dictating how the program reimburses hospitals and physicians. Given the influence Congress has over how such a large share of health care dollars are spent, it should not be surprising that the health care industry spends more on lobbying efforts than is spent by any other industry (The Center for Responsive Politics, 2017). In 2015, hospitals, health service providers, and health professionals spent $257.9 million on lobbying activities (for context, in the same year, defense lobbying totaled $74.6 million) (Center for Responsive Politics, 2017). However, despite the link between legislators and the health care system and the significant lobbying dollars spent by health care providers, there is no empirical work analyzing how political dynamics in the US Congress influence hospital behavior and health care spending.

The level of Medicare spending and the growth in Medicare spending over time represent significant policy challenges in the US (Congressional Budget Office, 2016). Until now, most research analyzing the factors that drive Medicare spending has focused on how provider incentives, the diffusion of new technologies, and differences in patient populations across regions explain spending patterns (for example, see Finkelstein et al., 2016; Chandra and Skinner, 2011; Smith et al., 2009; Cutler et al., 2013). In this paper, we present the first work to formally explore how electoral politics and lobbying influence health care spending in the US. To do so, we study the passage of the Medicare Modernization Act (MMA) of 2003, which created the Medicare Part D program. Whereas most of the literature on the MMA of 2003 has analyzed the impact of the law on individuals who received Part D drug insurance (for example,

see Abaluck and Gruber, 2011, 2016; Joyce et al., 2009), we use the law to examine how the political process necessary to pass sweeping legislation impacts hospital behavior, health spending, and political donations.

In the canonical analysis of legislator behavior, Mayhew (1974) argues that the primary goal of members of Congress is to be reelected. This pressure to be reelected drives members of Congress to pass legislation with direct benefits to their constituents for which the legislators can claim credit (Mayhew, 1974; Weingast et al., 1981; Rocca and Gordon, 2012). The desire to be reelected also dissuades members of Congress from devoting time to forming the coalitions necessary to pass sweeping laws, such as expansions of the Medicare program (Evans, 2004). In general, the benefits of national programs like Medicare are diffuse, and it is difficult for an individual member of Congress to claim credit for the passage of such expansive legislation (Evans, 2004). To push members of Congress to form coalitions, legislative leaders in the US House of Representatives often include provisions with targeted benefits to get reluctant members to vote for sweeping laws (Evans, 2004). These provisions, such as the building of a bridge in a district, are often referred to as 'pork-barrel projects,' 'sweeteners,' 'earmarks,' or 'distributive policies.' The hallmark of a distributive policy is that the benefits are focused (generally geographically within a legislator's district), but the costs are spread across wider groups. Although earmarks are often regarded as critical to passing legislation, Weingast et al. (1981) argue that distributive policies tend to be inefficient because the members of Congress who approve these policies generally focus on the local benefits while ignoring the wider costs, which are borne outside their district.

Medicare was created in 1965, but until the passage of the MMA in 2003, the program did not include prescription drug coverage for seniors. The MMA was a political priority for President George W. Bush and his staff who thought expanding prescription drug coverage for seniors would be helpful in the run-up to his re-election campaign (Oliver et al., 2004). Although the president's party controlled Congress, passing the law proved extremely difficult because many fiscally conservative Republicans were opposed to the large expansion of a government program, and many Democrats were reluctant to support the Republican president's proposal. Likewise, because Medicare is a program that provides benefits to all seniors almost equally, it was politically challenging to build a coalition to fill the gap in coverage because most legislators who voted for the MMA would struggle to claim credit for the benefits of the law in

their districts. Ultimately, avoiding defections by Republican members of Congress was crucial to passing the law (Oliver et al., 2004). With such a challenging vote, champions of the MMA introduced a number of sweeteners in the bill to win support from reluctant legislators (Lee, 2003a). These sweeteners included a specific provision – Section 508 – that ultimately significantly increased Medicare hospital payments for a small group of hospitals.

Most Medicare funds are allocated across the US via formula-based payment programs for physicians and hospitals. The majority of hospitals in the US are paid for treating Medicare patients under the Center for Medicare and Medicaid Services (CMS) prospective payment system (PPS). The PPS reimburses hospitals a fixed amount per case per beneficiary. Medicare payments vary across hospitals in the US by a factor of approximately three and are set to approximate hospital input costs for delivering care (Institute of Medicine, 2012). Ultimately, the key arbiter of what a hospital gets paid per case under the PPS is the hospital's physical location, which determines the hospital's wage index. The wage index is a measure of the labor costs hospitals face. While the PPS program is meant to be technocratic and apolitical, it has been used for political purposes as a tool to narrowly direct funds to specific areas and even specific hospitals (Lee, 2003a).

The Section 508 waiver created a process through which, after the MMA was passed, hospitals could appeal the wage index currently assigned to them and select to be paid based on the wage index of another geographic area. According to the law, the hospitals needed to meet "criteria, such as quality, as the Secretary may specify by instruction or otherwise" (Section 508 of P.L. 108 – 173: Medicare Prescription Drug Improvement, and Modernization Act of 2003). This broad language provided wide latitude for the executive branch to target 508 waivers to specific hospitals as a reward for votes from particular members of Congress. In addition, the broad language meant that some hospitals represented by legislators uninvolved in political bartering could quality for and benefit from the 508 program. Ultimately, of the 4,138 hospitals that received Medicare payments in 2004, 404 hospitals applied for, and 120 were granted a Section 508 waiver. We find evidence that hospitals represented by a member of Congress who voted 'Yea' to the MMA of 2003 were more likely to receive a waiver than hospitals represented by a member of Congress who voted 'Nay' to the law.

We find that the impact of the Section 508 waivers on hospital payments was large. In the three years before the waivers were introduced, hospitals that later received a 508 waiver had

similar trends in Medicare payments as hospitals that did not receive a waiver. Notably, once hospitals received a Section 508 waiver, they experienced an average Medicare payment increase of 6.47% that applied equally to all their Medicare cases. There was, however, substantial variation in the gains hospitals received from their 508 waiver as the legislative language in Section 508 of the MMA afforded the US Department of Health and Human Services (HHS) significant scope after the MMA was passed to influence the size of the gains hospitals received from the 508 program. We find that among hospitals that received a 508 waiver, those represented by a member of Congress who voted 'Yea' received substantially larger increases in Medicare payment rates than did hospitals represented by a member of Congress who voted 'Nay'.

We use the introduction of 508 waivers to test how an increase in Medicare payments affects hospital behavior and health care spending. We utilize a wide range of data sources, including material from a Freedom of Information Act (FOIA) Request, the American Hospital Association (AHA) annual surveys, the Census, Internal Revenue Service (IRS) 990 forms, and the 100% sample of Medicare claims. Because some hospitals received extremely small payment changes from the 508 program, we focus our analysis on 29 hospitals that had the largest payment changes from the program. These 'high 508 recipient hospitals' received average Medicare PPS payment increases of 9.81%.

After these hospitals received an increase in Medicare payments, we find that the high 508 recipient hospitals increased total hospital discharges by 8% per year from 2006 through 2010. We also find that the Medicare payment increase led hospitals to increase their total payroll by 11.9% in 2005 and by 36% per year from 2006 to 2010. The payroll increases were driven, in part, by more than a 66-person increase in full-time equivalent (FTE) nursing staff at each hospital per year and a large increase in the pay of hospital chief executive officers (CEOs). We also find that the Medicare payment increase led hospitals to invest in new technology. These payment changes ultimately led to a large increase in hospital spending in congressional districts that had a hospital that received a Section 508 waiver. We find that each hospital increased its total spending by $103 million in the first year after the Medicare payment increase and by $229 million per year from 2006 through 2010, relative to a base of $796 million in 2004. Indeed, we estimate that the average high 508 recipient had $1.25 billion in additional spending between 2005 and 2010 because of the program.

While payment changes created by the Section 508 program were originally written to expire three years after they were introduced, the hospitals and the wider constituencies that benefitted from the waivers had a considerable interest in seeing the program extended. Indeed, their shared financial interest in the continuance of the program was so great that they joined together to form the Section 508 Hospital Coalition. Using lobbying data from the Center for Responsive Politics, we find that the Section 508 Hospital Coalition spent significant resources lobbying members of Congress to extend the provision. Moreover, the need to extend the 508 program created a significant opportunity for legislators to credit claim with their constituents for maintaining this sizeable increase in hospital funding. Using data on campaign contributions from the Database on Ideology, Money in Politics, and Elections (DIME), we find that in the period after the MMA was passed and before the reauthorization of the 508 program, legislators who had a Section 508 hospital in their district received a 22% increase in total campaign contributions across all their donors and a 65% increase in contributions from individuals working in the health care industry and living in the members' home states.

Ultimately, this paper adds to two current literatures. First, we present some of the first analysis that finds a link between a distributive policy and subsequent political donations. We find that after members of Congress voted to expand benefits to their district and before they voted to extend those benefits, legislators received a substantial increase in political donations. They received an even larger percentage increase in donations from the individuals who directly benefitted from the legislators' efforts (individuals from their home states working in the health care industry). Second, we add some of the strongest causal evidence to the literature assessing how hospitals respond to payment increases (see, for example: Duggan, 2000; Dafny, 2005; Kaestner and Guardado, 2008; Baicker and Staiger, 2005; Wu and Shen, 2014). We show that hospitals respond to the payment increases generated by the 508 program by increasing their activity, hiring new staff, raising CEO pay, and investing in new technology. We also show that increases in Medicare payment rates have spillover effects and can raise hospitals' annual Medicaid discharges. Finally, we offer the first work assessing how political dynamics in the US impact health care spending across the nation. Given that more than one in three hospitals has received some form of Medicare payment exemption and that there are numerous examples of politicians using changes in hospital Medicare payment rates as a form of logrolling to pass sweeping health care legislation, the close link between the political process in the US and

Medicare policy could be a significant driver of health spending variation and growth (Government Accountability Office [GAO], 2013). We illustrate that these types of narrow, targeted funding provisions can lead to large and long-term increases in health care spending.

Going forward, this paper is structured as follows. In Section 2, we provide background on the Medicare program and its link to electoral politics. In Section 3, we describe the Section 508 program and quantify the gains hospitals received from getting a 508 waiver. We analyze the link between votes for the MMA and the receipt of Section 508 waivers in Section 4. In Section 5, we analyze how hospitals responded to the payment increases generated by the 508 program. In Section 6, we explore how hospital payment increases impacted hospital spending. We study the impact of Section 508 waivers on political donations in Section 7. We conclude in Section 8.

2. Background

Medicare is a universal program that provides health insurance coverage to individuals age 65 and older and covers a subset of individuals with disabilities who are under age 65. However, despite being a universal program, Medicare spending per beneficiary varies by a factor of three across geographies in the US (Institute of Medicine, 2013). The prevailing view is that this variation in spending is driven by differences in the amount of health care provided across regions (Institute of Medicine, 2013). The variation in the amount of care delivered across regions is a function of local health needs and heterogeneous provider practice patterns (Finkelstein et al., 2016; Cutler et al., 2013). To the extent that variation in Medicare spending across regions is driven by local health needs or physician practice patterns and not political influence, according to Weingast et al. (1981), the Medicare program could serve as example of a "nondistributive" policy where the gains, "though having geographic incidences, are fashioned with nongeographic constituencies in mind" (pg. 644).

While the Medicare program is broad in scope, the control that Congress has over payment rules allows members to narrowly focus funds toward specific districts and key constituents. For example, within the 1999 federal budget, Representative Rob Portman successfully lobbied for an increase in Medicare payments for brachytherapy, a treatment for prostate cancer in which radioactive seeds are implanted in the prostate (Pear, 1999). The radioactive seeds subject to the funding increase were produced by Indigo Medical, a firm based in Congressman Portman's district. In addition, the 1999 budget increased funding for

radioactive dye used to sharpen the precision of imaging studies (Pear, 1999). The provision for this funding increase was inserted by William Roth, the senator from Delaware, the state where the largest manufacturer of this product is headquartered. Policymakers and journalists have argued that this type of logrolling has been key to passing laws that expanded health care coverage, including the Children's Health Insurance Program, the Affordable Care Act (ACA), and the MMA (Vladick, 1999; Aaron 2015; Pear, 1999; Cohn 2010; Abelson, 2003). These logrolling efforts can involve significant sums of money. Indeed, a recent article on Senate Majority Leader Mitch McConnell's efforts to repeal the ACA and pass the Better Care Reconciliation Act of 2017 (BCRA) stated, "Using a combination of hardball politics, personal persuasion and lots of money – hundreds of billions of dollars were available to pay for more add-ons to the bill in order to get some votes – the Kentucky Republican scrambled to round up 50 Republicans to support the motion to proceed to the bill" (Bresnahan, 2017)

Hospital payment rules, in particular, have been used to steer additional funding to particular districts. Between 1997 and 2012, 16 statutory provisions were introduced that raised hospital reimbursements for small groups of providers (Government Accountability Office, 2013).[1] As a result, by 2012, 37.6% of hospitals received some form of wage index reclassification that raised their reimbursement rate above what was originally set by the PPS formula (GAO, 2013). While some of these changes were merit based, a number of provisions have produced large changes in hospital payments that are often credited to a particular lawmaker or were used to direct funds very narrowly to specific regions or, in some cases, specific hospitals (GAO, 2013).[2] "Lugar counties," for example, authorized and named after Indiana Senator Richard Lugar, were introduced in the Omnibus Reconciliation Act of 1987 and generated 10% increases in hospital payments for providers located in a small number of counties (American Hospital Association, 2010). Likewise, within the 1999 budget, hospitals in districts represented by Representative Tom DeLay, the House Republican Whip and Representative Dennis Hastert, the Speaker of the House, were reclassified into other regions, which significantly increased the hospitals' Medicare payment rates (Pear, 1999). These changes

[1] For a detailed description of the statutory provisions that have increased hospital payments, see the US 2013 Government Accountability Offices report to Congress (GAO, 2013).

[2] For example, because hospital payments are, to a large extent, based on the metropolitan statistical area (MSA) where the hospital is located, hospitals located near one another but on other sides of an MSA border can face substantial differences in payment rates. To address this issue, for example, the Omnibus Budget Reconciliation Act of 1989 created a process for hospitals to apply to have their wage index changed if the hospital was located within a short distance of another hospital that was paid at a substantially higher rate.

resulted in annual increases in hospital funding of $380,000 and $750,000, respectively (Pear, 1999). More recently, in what became popularly known as the 'Bay State Boondoggle," John Kerry, then Senator from Massachusetts, lobbied to prohibit Medicare from paying urban hospitals below the rate paid to the rural hospital with the highest reimbursement rate in the state (Keane, 2013; Jan, 2013). Because the only rural hospital in Massachusetts is located in Nantucket, a wealthy island town, urban hospitals across the state saw a substantial increase in payments from this change.[3] Along the same lines, the ACA created the Frontier States provision, which raised the minimum wage index of hospitals in Montana, Nevada, North Dakota, South Dakota, and Wyoming. This payment change was reported to be a way to win support for the Affordable Care Act from senators in these rural states (Cohn, 2010).

3. The Medicare Modernization Act of 2003 and Gains from Section 508 Waivers

3.1 The Medicare Modernization Act of 2003

On December 8, 2003, President George W. Bush signed the MMA, which, for the first time, provided prescription drug coverage to seniors and created Medicare Part D. The MMA of 2003 was the largest expansion in the Medicare program's 38-year history. The law, which cost approximately $400 billion over 10 years, was a political priority for the George W. Bush White House, who thought the coverage expansion would bolster the senior vote that he had lost to Al Gore in the 2000 presidential election. According to Bruce Bartlett, "George W. Bush strongly supported this effort [to pass Medicare Part D]. Looking ahead to a close re-election in 2004, he thought a new government giveaway to the elderly would increase his vote share among this group" (Bartlett, 2013).

The passage of the MMA of 2003 was politically fraught. The bill was introduced in the US House of Representatives by Speaker Dennis Hastert on June 25, 2003. Early roll call votes in the House indicated that the bill was unlikely to pass. The key vote that moved the bill from the House to the Senate (roll call vote 332) passed by a one-vote margin, 216 to 215, and was split along party lines. Democrats voted 9 'Yea' and 195 'Nay' while Republicans voted 207 'Yea' and 19 'Nay.' This vote, in breach of congressional rules, was kept open for an abnormally

[3] Ironically, in 2016, CMS discovered a mistake in calculating the wage index for Massachusetts that accidently led to higher hospital payments for Nantucket than should have been allowed. When the mistake was discovered and subsequently corrected, because of the 2012 law that linked statewide urban hospital payments to the payment rate for Nantucket, updating Nantucket's hospital payment rate led to cuts in hospital funding across all of Massachusetts that totaled approximately $160 million (Kuhn and Schencker, 2016).

long period during which time Vice President Richard Cheney visited the House floor and there was substantial arm-twisting (Oliver et al., 2004). Ultimately, passage of the law hinged on keeping Republican members of the House from voting against the legislation (Oliver et al., 2004). Section 508 was added immediately after this vote.[4] We focus on this vote and examine whether there are links between how members voted and whether hospitals in the members' districts received 508 waivers.

After the Senate passed the bill, the final vote on the reconciled legislation in the House of Representatives (roll call vote 669) was also extremely close. As was the case during the first House vote, rather than adhering to the standard 15-minute vote period and in contravention of the Rules of the House of Representatives, the vote was kept open for an extended window during which time HSS Secretary Tommy Thompson visited the House floor and President Bush phoned reluctant members of Congress (Oliver et al., 2004). Ultimately, the law passed by a vote of 220 to 215.

Consistent with Evans' (2004) argument that targeted policies can be inserted to garner votes in the passage of sweeping legislation, the MMA contains a number of provisions, in addition to Section 508, that provide targeted benefits in an effort to win over particular legislators (Lee, 2003a; Abelson, 2003). As Christopher Lee wrote in the Washington Post in 2003:

> "The $395 billion Medicare bill passed by the House yesterday, advertised as a way to provide a long-awaited prescription drug benefit for seniors, also has become a vehicle for scores of narrower provisions tailored to benefit special interests. Such measures, dubbed 'rifle shots' for their narrowly targeted effects, are commonly attached to complex, high-profile legislation in the crunch as a way to both build support for the larger bill and to provide an avenue to passage for provisions that likely would not succeed on their own."

Lee (2003) notes a number of specific provisions including a large increase in funding added to the MMA for physicians in Alaska, the home state of Senator Ted Stevens, the chairman of the Senate Appropriations Committee. Another provision, championed by Senator Charles Grassley from Iowa, contains significant funding for trials to determine whether the Medicare program should fund chiropractic services. Iowa is the home of a leading chiropractic educational institution (Lee, 2003).

[4] We spoke to individuals working on the staffs of members of Congress during the passage of the MMA, who indicated that Section 508 waivers were used as sweeteners during roll call vote 332.

3.2 Section 508 of the Medicare Modernization Act of 2003

The 508 program created a process through which, in the months after the MMA was passed, hospitals could appeal their current wage index assignment and receive a time-limited change in their wage index that would increase their PPS payment rate for Medicare episodes. The provision was open to hospitals that were paid using the PPS that did not qualify for other changes in their wage index. According to the Federal Register (2004), "a qualifying hospital…does not qualify for a change in wage index classification under paragraphs (8) or (10) of section 1886(d) of the Act on the basis of requirements relating to distance or commuting" (pg. 7341). The law also stated that a qualifying hospital "meets other criteria, such as quality, as the Secretary may specify by instruction or otherwise." This broad language created flexibility for the executive branch to write rules that favored specific hospitals.[5] The law budgeted $900 million to fund the wage index changes from the 508 waivers, which were to run from April 1, 2004, to March 31, 2007. Ultimately, the program was extended numerous times until it finally expired on March 31, 2012 (GAO, 2013).

In practice, the 508 program relaxed the criteria for hospitals to get their wage index changed. Historically, the Medicare Geographic Classification Review Board, the body responsible for assessing hospital wage index appeals, would allow hospitals to reclassify their wage index to an adjacent region if an urban hospital was within 15 miles of another hospital that was paid substantially more or a rural hospital was within 35 miles of a hospital paid substantially more (Federal Register, 2004). The Section 508 program allowed hospitals that did not meet those standard criteria to get a wage index change based on one of eight new criteria (Federal Register, 2004). These new criteria were quite specific. For example, the program allowed urban hospitals in states with fewer than 10 people per square mile to get a reclassification. Likewise, the program allowed hospitals to change their assigned wage index to a wage index from a region in another state if the hospital's average hourly wages were at least 108% of the average hourly wages at a hospital in the area where the hospital was arguing to be reclassified.[6] While the Section 508 program was written with very specific criteria that allowed benefits to be directed to specific hospitals, other hospitals that were represented by politicians

[5] In 2014, we spoke to officials at CMS when the 508 program was introduced. They described how the program allowed them to write 'rifle shot' provisions to target funds at specific hospitals.

[6] The Federal Register, Volume 69, Number 30, printed on February 13, 2004 includes a detailed description of the quality criteria hospitals had to meet to receive a 508 exemption. Per federal law, the Federal Register also includes justifications for these changes.

who were not part of the logrolling process around the MMA could apply and potentially get a waiver.

3.3 Quantifying the Gains from the 508 Program

We submitted a FOIA request to CMS and asked for the criteria on which hospitals that applied for a 508 waiver were judged, a definitive list of hospitals that applied for and received a 508 waiver, and a list of hospitals that applied for but were rejected for a 508 reclassification. FOIA requests allow individuals to request access to previously unreleased information and documents that are under the control of the federal government.

We begin our analysis with a baseline sample of 88 hospitals that received a 508 waiver in 2004, kept the waiver through 2010, treated patients continuously from 2002 through 2010, and were registered with the AHA during our period of analysis.[7] The size of the payment rate increase that Section 508 recipient hospitals received was a function of where the 508 recipient hospitals were reclassified. We followed the CMS payment rules presented in the Federal Register to construct hospital payments for each inpatient and outpatient case for each hospital in each year from 2002 through 2010.[8] To estimate the scale of the payment increase hospitals received when they were granted a 508 waiver, we calculated hospital payments by year using both the hospital's original wage index and the new wage index they received via the reclassification generated by the 508 program. In Figure 1, we plot the annual hospital base payment rate from the PPS program for hospitals that received a 508 waiver and illustrate their payments with and without the wage index change that was generated by the receipt of a 508 waiver. The base payment rate reflects the amount a hospital is paid by CMS for delivering a

[7] Although 120 hospitals received a 508 waiver in 2004, only 88 hospitals had a waiver and were in our data for all years from 2002 through 2010. Some hospitals received a 508 waiver in 2004 and then did not keep the waiver because, over time, they qualified for a more generous wage adjustment. Other hospitals that received a 508 waiver were not registered with the American Hospital Association. A final group of hospitals either entered or exited the market between 2002 and 2010. Ten hospitals that received a 508 waiver were not registered with the AHA. Twenty-two hospitals are not in the data continuously from 2002 through 2010.

[8] To calculate payments, we followed payment rules outlined each year in the Federal Register. We began by calculating the PPS operating payments and the PPS capital payments, which were adjusted using the hospital operating wage index, non-labor share, operating cost-of-living adjustment, disproportionate share payments, indirect medical education payments, geographic adjustment factors, and capital cost of living adjustments. We then used diagnosis related group (DRG) and ambulatory payment classification (APC) weights to calculate the standard payment amount for each inpatient and outpatient case exclusive of outlier payments. Outlier payments are additional payments made to hospitals if specific cases involve atypically long stays in the hospital.

case of average complexity.[9] As the figure illustrates, the 508 program created a sharp and immediate increase in hospital payments in financial year 2005 that persisted for the next five years. Indeed, the average 508 recipient hospital received a 6.47% increase in their Medicare base payment rate.

The impact of receiving a 508 waiver on hospital finances is a function of both the scale of the Medicare payment increase generated by the program and the volume of Medicare patients treated at each hospital. For example, a hospital that had a sharp payment increase but historically treated very few Medicare patients would not notice a large increase in revenue from the 508 program. As a result, to approximate each hospital's exposure to the 508 program, we simulated the monetary gains a hospital would have received in the first year of the program from obtaining a 508 waiver if the 508 program did not induce any subsequent changes in the quantity of care delivered (e.g., there were no changes in the mix of cases offered or the number of cases delivered after the payment increase took effect). This measure captures potential exposure; it does not estimate the true revenue gains that a hospital received from the Section 508 program. In practice, the 508 waivers increased hospital payments per Medicare case and created an incentive for hospitals to increase Medicare activity (because they were paid more per case), and allowed them to use the added revenue to invest in their facilities, which could potentially further increase demand.

To produce this estimate of exposure to the 508 program, we multiplied the quantity of cases a hospital provided in 2004 (the year before the 508 waivers were introduced) by the associated 2005 Medicare payment rates per case with and without incorporating the wage index change generated by the receipt of a 508 waiver. The difference between these measures of spending captures a hospital's minimum exposure to the 508 program.[10] Results from this analysis are presented in Table 1. There are 29 hospitals that had the largest potential exposure to the Section 508 program. These high 508 recipient hospitals received average increases in their PPS payment rate of 9.81%. Absent changes in the quantity of care they delivered, these high 508 recipient hospitals would have seen a gain in Medicare revenue of between $3.42 and $26.61 million in 2005, which is an average total increase in Medicare revenue of 10.06%. These high 508 recipient hospitals are composed of 28 private, nonprofit facilities and a single government-

[9] An average case has a diagnosis related group weight of 1.
[10] We observed the number of inpatient and outpatient cases each hospital provided in 2004 using data from the 100% Medicare claims database.

owned hospital. In contrast, the 29 medium 508 recipient hospitals had PPS payment increases of 6.34% and had potential quantity fixed Medicare revenue gains of between $1.34 and $3.41 million. The 30 low 508 recipient hospitals received average PPS payment increases of 3.48% and had quantity fixed potential revenue gains of less than $1.27 million.

4. Hospital Receipt of 508 Waivers and the Medicare Modernization Act of 2003

In Table 2, we examine the relationship between the congressional vote on the MMA in the district of each hospital and hospital receipt of a Section 508 waiver. CMS and HHS cannot simply grant a specific group of hospitals a Medicare payment increase. Medicare payment changes, like those generated by the Section 508 program, need to be based on specific criteria that are justified in the Federal Register. While CMS and HHS could set fairly specific criteria for Section 508 waivers, some hospitals represented by members of Congress who did not vote for the law may have met the criteria.

Among the universe of hospitals paid using the PPS in 2004, 3.2% received a Section 508 waiver. In Columns (1) and (2) in Table 2, we find that, among all hospitals in our sample, hospitals represented by a member of Congress who voted 'Yea' to roll call vote 332 on the MMA were more likely to receive a waiver than hospitals represented by a member of Congress who voted 'Nay' (3.5% versus 2.5%; $p < 0.06$). Among hospitals eligible for a Section 508 waiver, 5.8% received a waiver. Eligible hospitals represented by a member of Congress who voted 'Yea' to the MMA were 1.4 times more likely (=5.9%/4.2%) to receive a waiver than those represented by a member of Congress who voted 'Nay' ($p < 0.05$).

The political calculus and electoral risks associated with voting in favor of the legislation varied substantially by party with Republicans choosing between angering fiscal conservatives in their base and opposing a president from their own party, while Democrats who may have liked the policy were loathe to provide legislative support that could help re-elect the Republican president. Therefore, we also split the analysis by the political party of the congressional representative in each hospital district. In Columns (4) and (5) in Table 2, we find that hospitals represented by a Republican member of Congress who voted 'Yea' to the MMA were more likely to receive a 508 waiver than those represented by a Republican member of Congress who voted 'Nay' (3.3% versus 0.5%; $p < 0.05$). Among hospitals eligible to receive a Section 508, those represented by a Republican member of Congress who voted 'Yea' were 7 times more

likely (= 5.6%/0.8%) to receive a waiver than those represented by a Republican member of Congress who voted 'Nay' ($p < 0.05$). Likewise, hospitals represented by a Democratic member of Congress who voted 'Yea' were also more likely to receive a waiver than hospitals represented by a Democratic member who voted 'Nay' ($p < 0.10$).

While the average gain in PPS payments for hospitals that received a 508 waiver was $388.09 relative to a mean PPS payment rate of $5278.32 in 2004, there was significant heterogeneity in the size of the PPS payment gains. According to the MMA, the Secretary of HHS had influence over the size of the gains hospitals could obtain from a 508 waiver. Within the rules for the MMA, the Federal Register (2004) stated, "Under this [508] process, a qualifying hospital may appeal the wage index classification otherwise applicable to the hospital and apply for reclassification to another area of the State in which the hospital is located (or, at the discretion of the Secretary, to an area within a contiguous State)" (pg. 7341). Therefore, the Secretary of HHS was able to decide whether hospitals that received a 508 could be reclassified to areas in other states with higher wage indexes.

In Table 2, we also test whether there were larger PPS payment gains among 508 recipient hospitals represented by members of Congress who voted 'Yea' relative to 'Nay.' In Columns (1) and (2), we show that hospitals that received a 508 waiver received larger gains if they were represented by a member of Congress who voted 'Yea' relative to `Nay' ($395.89 versus $361.03), although the difference is not statistically significant ($p < 0.13$). However, we do see statistically significant differences in PPS gains among 508 recipient hospitals within each party. The lone 508 recipient hospital represented by Republican member of Congress who voted 'Nay' received virtually no increase in PPS payments (the difference in gains between that hospital and the other 508 recipient hospitals represented by members who voted `Yea' is significant at $p < 0.05$). In addition, we also find that hospitals represented by Democratic members of Congress who voted 'Yea' to the MMA received $156.67 more from the program than hospitals represented by Democratic members of Congress who voted 'Nay' ($p< 0.01$).

5. Hospital Response to Section 508 Waivers

In this section, we examine the effect of the Medicare payment change induced by the Section 508 program on hospital activity, staffing, prices, technology adoption, and quality. We focus our analysis on a balanced panel of 2,775 hospitals in the US from 2002 to 2010 that were paid

using the PPS and were registered with the AHA throughout that period.[11] In Appendix Table 1, we compare the characteristics of the 508 recipient hospitals to the universe of AHA-registered hospitals in our sample that did not receive a 508 waiver. On average, hospitals that received a 508 waiver had more Medicare discharges per year and fewer annual Medicaid discharges than hospitals that did not receive a waiver. Section 508 recipient hospitals were more likely to be nonprofit teaching institutions and were more likely to be located in urban counties than hospitals that did not receive a waiver.

Based on our FOIA request, we identified four groups of hospitals. First, 120 hospitals applied for and received a Section 508 waiver in 2004. Ultimately, 88 hospitals that initially received a 508 waiver kept the waiver, continued to treat patients from 2002 through 2010, and remained registered with the AHA during that period.[12] Within the group of 88 hospitals that received a 508 waiver, we focus our analysis on the 29 hospitals had the largest exposure to the 508 program and were in our data from 2002 through 2010. These high 508 recipient hospitals form the treatment group in this analysis.

We compare our high 508 recipient hospitals with three mutually exclusive sets of control hospitals. First, we compare high 508 recipient hospitals to 1,278 hospitals that were eligible but did not apply. Based on language in the MMA, these hospitals were potentially eligible for a 508 waiver because they were not reclassified under paragraph (8) or (10) of section 1886(d) of the Social Security Act (42 USC. 1395) but did not apply for a waiver.[13] Second, we also compare the high 508 recipient hospitals to 1,125 hospitals that were ineligible to apply for a 508 waiver because they were reclassified under paragraph (8) or (10) of section 1886(d) of the Social Security Act (42 USC. 1395) and had already been assigned a new wage index. Third, we also compare the high 508 recipient hospitals to 284 hospitals that applied for but were rejected for a 508 waiver.[14]

---

[11] Some providers, such as critical access hospitals, were not paid using the PPS and instead receive cost-based reimbursement. These hospitals would not be eligible to apply for a Section 508 waiver.

[12] Ten hospitals that received a 508 waiver were not registered with the AHA. Twenty-two hospitals were not in the data continuously from 2002 through 2010.

[13] There are two potential reasons a hospital that was eligible might not apply for a 508 waiver. The first and most likely explanation is that hospitals did not apply because they were not sufficiently close to another hospital that was in a metropolitan statistical area with a higher wage index. A second potential explanation is that hospitals were not aware that this program existed or missed the application deadline.

[14] These numbers are after we apply our sample restrictions.

In our setting, there is no perfect set of control hospitals. Hospitals that applied for a 508 waiver and were rejected could simply be more aggressive in their applications for additional funding.[15] As a result, rather than select a single control group of hospitals, we show that the changes we observe among our high 508 recipient hospitals are robust when we compare them to each of our control groups. For our baseline comparison, in the main tables, we compare outcomes at our high 508 recipient hospitals to hospitals that were potentially eligible to receive a 508 waiver but did not apply to the program.[16] We present comparisons between 508 recipient hospitals and our hospitals in our other control groups in the appendices.

We use difference-in-difference regression to identify the outcomes for the 29 hospitals that had the largest 508 returns relative to the three groups of control hospitals described above, before and after the payment increase generated by the 508 program. Our difference-in-difference specification takes the form:

(2) $Outcome_{h,t} = \beta_1\ High_508_Recipient_h * 2005_t + \beta_2\ High_508_Recipient_h * 2006_2010_t + \vartheta_h + \tau_t + \beta_0 + \varepsilon_{h,t}$

where we measure outcomes, such as total discharges, at hospital h in year t. We interact an indicator for our high 508 recipient hospitals, $High_508_Recipient_h$, with a short-run effect dummy, 2005_t, that takes a value of "1" for the year 2005 (the year after the 508 payment increases took effect), and with 2006_2010_t that takes a value of "1" for the years 2006 through 2010. The β_1 coefficient captures the short-term effect of the Medicare payment increase from the 508 program in 2005; β_2 captures the long-term effect of the 508 payment increase annually from 2006 through 2010.[17] We also include a vector of year fixed effects τ_t and hospital fixed effects ϑ_h, which capture the main effects of each interaction. The standard errors are clustered around hospitals.

In addition to comparing outcomes at our high recipient 508 hospitals to three mutually exclusive sets of control hospitals, we introduce placebo tests in which we change our treatment

[15] Consistent with this possibility, the group of hospitals that applied for a 508 waiver but were rejected includes many well-known, large academic medical centers.
[16] Despite showing one control group in the main results, we are agnostic about which group forms the strongest control group of hospitals.
[17] We chose to report the short- and long-term effects because of what we observed in our year-by-year graphs of hospital responses to the payment increases from the 508 program.

group to the hospitals nearest the 508 hospitals that did not receive a 508 waiver. We use these placebo tests to examine whether neighboring hospitals had any contemporaneous changes in behavior coincident with the introduction of the 508 program. Null coefficients from these placebo tests rule out the influence of local shocks.

5.1 Estimating the Impact of Medicare Payment Increases on Hospital Activity and Prices

To test the impact of the increase in Medicare payments on hospital activity, we utilize data from the annual AHA surveys. We focus on estimating whether the Medicare payment increase driven by the 508 program impacted annual total hospital discharges, Medicare discharges, and Medicaid discharges. We begin by presenting graphical evidence of the effects of the 508 payment increase on hospital outcomes and then summarize the short- and long-term impacts by reporting estimates from Equation (2). The graphs of treatment effects come from a regression of the dependent variables of interest against a vector of hospital fixed effects, year fixed effects, and the interactions between our high 508 recipient hospital indicator and year fixed effects. We normalize our results to 2004, the year before the payment change generated by the 508 program took effect.

In the group of 29 high 508 recipient hospitals, none are for-profit facilities, 28 are private and nonprofit, and one is government owned. Newhouse (1970) has argued that private, nonprofit hospitals maximize output and prestige. If hospitals maximize output, then an increase in Medicare payment rates should generate an increase in the number of Medicare patients treated, assuming Medicare reimbursements are greater than hospital per case marginal costs. It is also possible that hospitals do not explicitly maximize output, but they use 508 funds to invest in technology or raise clinical performance. These investments could also increase demand for 508 hospitals from publicly and privately funded patients.

Panel A in Figure 2 shows hospital discharges over time for high 508 recipient hospitals and hospitals that were potentially eligible but did not apply for a 508 waiver, adjusted by hospital and year fixed effects, and normalized to 2004. Before the 508 payment increase, shown with a vertical line, trends in discharges are similar for the high 508 recipient hospitals and the control hospitals. Immediately after the payment increase took effect, the figure shows a clear and dramatic increase in total discharges for hospitals that had a payment increase. In Column (1) in Table 3, we present estimates of the impact of receiving a 508 waiver on the total number

of hospital discharges per year. We estimate that from 2006 through 2010, relative to hospitals that were eligible but did not apply for a waiver, high 508-recipient hospitals increased their total discharges by 1,577 per year on a base of 19,519 discharges in 2004. This represents an 8.1% increase (= 1,577/19,519) in total discharges per year during this period, which we estimate with precision ($p < 0.05$). These results imply that we were being very conservative when we estimated hospital exposure to the 508 program by assuming the quantities of care delivered did not change after hospitals had their Medicare payment rate increased. These results suggest that increasing hospital payment rates can lead to a large increase in hospital activity.

Panels B and C in Figure 2 present trends in Medicare and Medicaid discharges for hospitals that received a 508 waiver and those that were potentially eligible for a waiver but did not apply to the program. While these graphs are noisier, they show broadly the same trends as we observed for total discharges. In both instances, after the funding increase from the 508 program, there is a large increase in Medicare and Medicaid discharges that persists through 2010. In Columns (2) and (3) in Table 3, we estimate the impact of the 508 payment increase on Medicare and Medicaid discharges. In the 2006 through 2010 period, we find that the 508 payment increase led to an increase in Medicare discharges of 953 (953/8,728 = 10.9%) per year off a base of 8,728 Medicare discharges in 2004 ($p < 0.05$) and an increase in Medicaid discharges of 457 (457/2,790 = 16.4%) per year off of a base of 2,790 discharges in 2004 ($p < 0.05$). Based on the evidence we see of increases in total and Medicaid discharges, this suggests that increasing Medicare payment rates can have spillover effects and lead to increases in private and Medicaid discharges.

As we illustrate in Appendix Table 2, we see similar results when we compare outcomes at the high 508 recipient hospitals to outcomes at hospitals in the two other sets of control groups. Moreover, in Appendix Table 2, we estimate Equation (2) and measure the treatment effect of the 508 program on the nearest neighboring hospital that did not get a 508 payment increase relative to hospitals that were potentially eligible but did not apply for a 508 waiver (the placebo group is a separate group of hospitals). This placebo test shows that there were no observable changes among placebo hospitals from the Medicare payment increase, which illustrates that the main results are picking up the effects of the Medicare payment increases and not local shocks separate from the 508 waivers (which would have impacted these neighboring hospitals).

In Table 3, we also estimate the impact of increasing Medicare payment rates on hospital private payer prices. Hospitals frequently argue that they negotiate high prices with private payers to compensate for low public reimbursement rates (Frakt, 2011). Some hospital CEOs have even argued that they would lower their prices for private insurers if Medicare and Medicaid increased their payment rates (Lee, 2016). However, for cost shifting to occur, hospitals would have had to forgo maximizing profits prior to a Medicare price cut and have sufficient market power in order to be able to raise prices (Dranove et al., 2017). Empirical evidence for cost shifting is mixed. Cutler (1998) found a dollar-for-dollar cost shift from 1985 to 1990 and no evidence of cost shifting from 1990 through 1995. White (2013) analyzed changes in Medicare payments from 1994 to 2009 and found that a 10% reduction in Medicare reimbursements was associated with a 7.74% reduction private payment rates. Dranove et al. (2018) identified how hospitals responded to negative financial shocks from endowment losses created by the 2008 Great Recession. They found that only a small subset of high-quality hospitals responded to financial shortfalls by raising private reimbursement rates.

To analyze hospital prices, we constructed hospital-year private payer prices using data from the Healthcare Cost Report Information System (HCRIS). We built measures following the methodology in Dafny (2009) and Dafny et al (2016). This method involves dividing annual, net non-Medicare inpatient revenues by the number of non-Medicare admissions. While we do not observe the specific negotiated transaction hospital transaction rates, Garmon (2015) found that this measure is highly correlated ($r = 0.90$) with negotiated prices gathered from claims data at the state level.

Panel D in Figure 2 shows changes in private hospital prices for the high 508 recipient hospitals and hospitals that were potentially eligible but did not apply for the program. High 508 recipient hospitals and control hospitals follow similar trends before the Medicare payment increase; after the payment increase, private prices increase slightly for hospitals in the high 508 recipient hospital group. Column (4) in Table 3 shows results from estimates of Equation (2). Following the Medicare payment increase generated by the 508 program, we do not observe any statistically significant short-run or long-run changes in hospital private payer payment rates. In the short run, the confidence intervals range from -0.056 to 0.065, and in the long run, they range from -0.076 to 0.079. Ultimately, we find no evidence to support the hypothesis that changes in hospital Medicare payment rates induce changes in hospitals' private payer prices.

5.2 Estimating the Impact of Medicare Payment Increases on Hospital Staffing

According to CMS, labor accounts for between 60% and 70% of hospital total costs per case (Institute of Medicine, 2011). As a result, the increase in hospital activity we observed in Section 5.1 should be accompanied by increases in hospital staffing. Likewise, Chang and Jacobson (2011) argued that private nonprofit hospitals may maximize perquisite benefits for employees such as salaries. They also found empirical support for that theory. Therefore, given that our sample of high 508 recipient hospitals is primarily composed of private, nonprofit providers, we should also expect Medicare payment increases to result in higher staff salaries.

In this section, we explore the effect of the 508 program on hospital staffing and measure its labor market effect using data from a number of sources. We obtain data on hospital payroll, total FTE employees, FTE physicians, and FTE nurses from the AHA annual survey. In addition, we measured hospital CEOs' annual salary at nonprofit private hospitals using data from IRS forms.[18] Finally, we use county level measures of new hires per year from the Quarterly Workforce Indicators produced by the US Census.

Panel A in Figure 3 presents trends in hospital payroll for our high 508 recipient hospitals and hospitals that were potentially eligible but did not apply for a 508 waiver. Both groups have similar trends in payroll before the Medicare payment increase. However, after the 508 program took effect, there was a sizeable increase in hospital payroll at facilities that received a Medicare payment increase. In Table 4, we present estimates of Equation (2) that quantify the results in Figure 3. As results in Column (1) illustrate, we find that in 2005, the first year hospitals received the payment increase generated by the 508 program, the 508 recipient hospital payroll increased by nearly $16 million (16/135 = 11.9%) off of a mean, annual payroll among high 508 recipient hospitals of $135 million in 2004 ($p < 0.10$). In the long term, hospital payroll increased by $48.91 million (49/135 = 36.3%) per year between 2006 and 2010 ($p < 0.05$). As we discuss later, these gains in payroll represent between 16% and 22% of the gains in total revenue that hospitals received.[19]

[18] We do not have salary information for CEOs at for-profit hospitals; therefore, the control groups only include nonprofit providers.

[19] As we discuss in Section 6, hospitals gained $103.40 million in revenue in 2005 and $228.60 million in revenue each year from 2006 through 2010 from the 508 program (see Table 5). The share of the revenue gains that went to payroll in 2005 is equal to 16/103.40; the share of revenue gains that went to payroll each year from 2006 to 2010 is equal to 49/228.60.

In Panels B, C, and D in Figure 3, we present trends in total hospital FTE, hospital physician FTE, and hospital nurse FTE for hospitals that received a 508 waiver and those that were potentially eligible but did not apply for a waiver. Across all three panels, we show that after the 508 program raised Medicare reimbursements, there was a clear increase in hospital employment. In Columns (2), (3), and (4) in Table 4, we present estimates of Equation (2) and use total hospital FTE, physician FTE, and nurse FTE as dependent variables. While all three show increases in FTE after the payment increase, the lone precisely estimated change is of nurse FTE. There, we observe a 66 FTE increase in nurse staffing in 2005 ($p < 0.05$) (the first year after the 508 program was introduced) and a 110 FTE increase in nurse staffing for each year from 2006 through 2010 ($p < 0.10$) off of a base count of nurse FTE at high 508 recipient hospitals in 2004 of 707. This represents a 9% increase in nurses in 2005 (= 66/707) and a 16% increase in nurses each year from 2006 through 2010 (= 110/707).

In Panel E in Figure 3, we present trends in hiring of health care workers in the counties where the hospitals in our analysis are located. The panel illustrates that in counties with a high 508 recipient hospital, there is an immediate spike in hiring of health care workers the year the 508 program raised Medicare payments relative to what occurred in counties with hospitals that were potentially eligible but that did not apply for 508 waivers. After an immediate spike in hiring in 2005, hiring rates from 2007 onward mirror what we observe in our control counties. In Column (5) of Table 4, we present estimates of Equation (2) and use county hires as a dependent variable. We show that there was an increase of 378 new health care job hires in 2005 ($p < 0.10$) off of a base hiring rate of 2,013 for treated counties in 2004, and no statistically significant difference in hires from 2006 through 2010. This represents an 18.8% (= 378/2,013) increase in hiring in 2005. If each new hire were paid a $50,000 annual salary, then the increase in spending required to fund those jobs ($50,000 x 378 = $18.9 million) would be similar to the $16 million payroll increase we observed in high 508 recipient hospitals in 2005.

Finally, as we present in Panel F in Figure 3, using data from IRS 990 forms, we find that CEO pay at 508 recipient hospitals increased from 2006 through 2010 relative to what we observe at hospitals that were potentially eligible but did not apply for a 508 waiver. In Column (6) in Table 4, we illustrate that hospital CEO pay increased by $428,000 per year from 2006 through 2010 ($p < 0.10$) over what CEOs of non-508-recipient hospitals received during that period off of a base salary among high 508 recipient hospital CEOs of $528,000 in 2015. This

represented an 80.9% (= 427.56/528.42) increase in CEO pay per year from 2006 to 2010. The gains in salary, visible in Panel F in Figure 3, occurred two years after the 508 hospitals saw an increase in their payment rate. This lag is consistent with the fact that CEO salaries tend to be negotiated a year or more in advance.

In Appendix Table 3, we present estimates of Equation (2) for hospital staffing outcomes across the two additional sets of control hospitals. We find similar results across the two alternative control groups. Likewise, in Appendix Table 3, we run identical estimates of Equation (2) but examine the effect of a 508 waiver on the nearest neighbors of 508 hospitals. These hospitals did not receive a Medicare payment increase. As these results illustrate, there were not concurrent increases in staffing or payroll for hospitals nearby to Section 508 hospitals. This suggests that the staffing changes we observed were 508 related and were not the result of a local shock, such as a contemporaneous increase in demand. We also find a modest reduction in FTE nurses and a drop in CEO pay at neighboring hospitals. This placebo impact runs counter to our main results.

5.3 Estimating the Impact of the Medicare Payment Increases on Hospital Equipment and Quality

In this section, we explore how the Medicare payment increase from the Section 508 program impacted hospital investment in technology and their clinical quality. Recall that Newhouse (1970) posits that nonprofit hospitals maximize outputs and prestige. In addition to hospital outcomes, one key marker of hospital prestige is hospital technology. As a result, we might expect that as payment rates increase, hospitals might use the added revenue to invest in new technology.

To measure hospital adoption of technology, we use data from the AHA to construct a Saidin Index of Technology following Spetz and Baker (1999). The Saidin Index captures the number of rare technologies available at each hospital. To calculate a Saidin Index, for each technology indexed by k = 1,…,K that is listed in the AHA annual survey, we compute a weight to measure the ubiquity of that technology at each US hospital. To begin, we measure:

(3) $$\alpha_{k,t} = 1 - \left(\frac{1}{N_t}\right) \sum_{i=1}^{N_t} \tau_{i,\,k,\,t}$$

where N_t is the total number of hospitals in the AHA data and $\tau_{i,k,t}$ is equal to 1 if the AHA annual survey indicates that hospital i has technology k in year t. This results in a weight, $\alpha_{k,t}$, for each technology, that measures the percentage of hospitals nationally that have technology k in year t. We use these weights to measure the amount of technology $s_{i,t}$ available at hospital i in year t by calculating:

$$s_{i,t} = \sum_{k=1}^{K} \tau_{i,k,t} \alpha_{k,t} \tag{4}$$

By construction, a one-unit increase in the Saidin Index represents the addition of a single new technology that no other hospital possesses or the addition of two technologies that are each possessed by half of the hospitals registered with the AHA.

In Panel A in Figure 4, we present trends in the Saidin Index scores of our high 508 recipient hospitals and hospitals that were potentially eligible but did not apply for a 508 waiver. There is a clear increase in the Saidin Index at the high 508 recipient hospitals after the increase in Medicare payments generated by the 508 program. In Column (1) in Table 5, we present estimates of Equation (2) and test whether hospitals that received a 508 waiver altered their technology. We find that hospitals that received added funds from the 508 program increased their Saidin Index by 2.12 in 2005 ($p < 0.01$) and 4.16 from 2006 through 2010 ($p < 0.01$) off of a base Saidin Index score of 7.41 for high 508 recipient hospitals in 2004. In the short term, this increase represents the addition of two unique technologies that no other hospital had or the addition of four technologies held by half of the hospitals. Likewise, the increases represent a more than 50% increase in technology at a hospital. We find this result is robust across comparisons with the two additional control groups (Appendix Table 4).

An increase in payment rates in a prospective payment system such as Medicare could also push hospitals to increase quality. If previous reimbursement rates were set below marginal costs, then hospitals could be quality skimping. The evidence whether hospitals alter quality in response to pricing changes is mixed. Kaestner and Guardado (2008) did not find that Medicare wage index increases improved patient outcomes. In contrast, Baicker and Staiger (2004) examined how hospitals responded to changes in payments for treating poor patients. The authors found that increasing payments led to sizeable reductions in mortality. Likewise, Wu and

Shen (2014) found that payment cuts from the Balanced Budget Act of 1997 led to long-run mortality increases and a reduction in nursing staff.

We use the 100% sample of Medicare claims to create two measures of hospital quality: 1) 30-day overall mortality for patients who entered the hospital with acute myocardial infarction (AMI) and had a length of stay of two or more days and 2) length of stay for patients with acute myocardial infarction who had a length of stay of two days or more.[20] We focus on outcomes from AMI for three primary reasons. First, AMIs are fairly frequent and have a non-trivial mortality rate. Indeed, there were 94,355 AMIs in Medicare claims data in 2004 with an average mortality rate of 11.8%. Second, with AMIs, there is a clear link between a hospital actions and patient outcomes (Jha et al., 2007). Third, because AMIs are an emergency condition where patients are generally taken to the nearest provider and have little discretion where they receive care and what kind of care they receive in the hospital, there is less scope for risk selection by providers or patients choosing to attend high-quality providers.

Panels B and C in Figure 4 show trends in AMI mortality and AMI length of stay for high 508 recipient hospitals and hospitals that were potentially eligible to apply for a 508 waiver but did not. There are no visible differences in quality scores across the two groups of hospitals. Column (2) in Table 5 presents estimates of Equation (2) where we test the impact of hospital payment increases on hospitals' 30-day AMI mortality rate. In the short run, we find a point estimate of 0.006 off of a base mortality rate of 0.11. In the long run, we find a point estimate of -0.002. Neither point estimate is precisely estimated and the 95% confidence intervals for the short-run effects are from -0.011 to 0.007. In the long-run, the 95% confidence intervals on our estimates run from -0.011 to 0.007. Column (3) in Table 5 presents estimates of Equation (2) where we test the impact of hospital payment increases on average length of stay for patients with an AMI. In the short run, we find a point estimate of 0.013 (95% confidence intervals: -0.185 to 0.211) and in the long run, we find a point estimate of 0.034 (95% confidence intervals: -0.181 to 0.248). Neither point estimate is precisely estimated. In this study, we are ultimately underpowered to detect changes in AMI mortality of less than 10% (= -0.011/0.11).

[20] Most analysis of AMI mortality focuses on cases with length of stay of two or more days to rule out cases that may initially present as a heart attack but turn out to be something different (e.g. gastrointestinal distress) (see Skinner et al., 2005).

6. Estimating the Impact of the 508 Program on Hospital Spending

After hospitals received a Section 508 waiver, their Medicare reimbursements per case increased substantially. In Section 5, we showed that hospitals responded to this payment increase by significantly raising the number of cases they treated per year, hiring new staff, raising CEO pay, and adding new technology. As a result, it is likely that the 508 program significantly increased health spending in congressional districts that included a hospital that received a waiver. Indeed, the spending increase at 508 hospitals is likely to be much larger than the mechanical increase in payments for each case would suggest. The increase in hospital payments likely induced hospitals to deliver more care and invest in technology. Because of the likely returns to scale in the hospital sector and patient demand for high-technology hospitals (such as academic medical centers), these changes likely generated additional activity, which, in turn, would lead to more investment and even larger economies of scale (Pope, 2009; Gaynor et al., 2015).

To analyze the impact of the 508 program on hospital spending, we use data on annual hospital spending from the Medicare Cost Reports. These data allows us to observe total hospital spending across all funders of health care (Medicare, Medicaid, and private patients) for each hospital on an annual basis. We estimate Equation (2) and focus on spending for hospital h in year t.

Figure 5 presents trends in spending for hospitals that received a 508 waiver and hospitals that were potentially eligible but did not apply to the program. We observe that spending increases more quickly in hospitals that received a payment increase, after the payment increase took effect. In Column (4) in Table 5, we present estimates of Equation (2) where spending is measured in millions of dollars. In Column (4) in Table 5, we compare spending at hospitals that received a 508 waiver to what occurred at hospitals that were eligible but did not apply to the program. We observe a \$103.40 million increase in spending in 2005 ($p < 0.05$) and a \$228.60 million increase in spending from 2006 through 2010 ($p < 0.05$) off of a mean revenue for high 508 recipient hospitals in 2004 of \$795.95 million. Relative to hospital spending in 2004, this implies that the Medicare payment increase generated by the Section 508 program led to a 13.0% (= 103.4/795.95) increase in spending in the short term and a 28.8% (= 228.60/794.95) per year increase in spending in the long term. This result is robust across each control group. In Column (4) in Appendix Table 4, we show these results are robust when we compared the outcomes at the high 508 recipient hospitals to other groups of control hospitals. Ultimately, these results

suggest that the Medicare payment increase generated by the Section 508 program led to a spending increase of more than $1.25 billion at the average high 508 recipient hospital from 2005 through 2010 (103.40 + (5)(228.60)).

7. Section 508 Waivers and Political Donations

7.1 Background, Data, and Estimator

As we have demonstrated, when a hospital received a Section 508 waiver, the hospital's spending increased, and there was an uptick in hiring in the congressional district where the hospital was located. In this section, we test whether the members of Congress who had a hospital in their district that received a 508 waiver received larger campaign donations after the 508 program was introduced. This question is directly related to the wider political science literature that analyzes whether members of Congress receive benefits in the form of votes or donations when they use distributive policies to steer funds to their district. As Levitt and Snyder (1997) note, it is widely accepted by academics, the media, and politicians that members of Congress are rewarded for bringing additional federal funding to their districts. However, few studies have established a causal link between distributive policies championed by members of Congress and changes in fundraising or votes. We offer some of the first causal evidence linking distributive policies and subsequent campaign donations.

It is possible that there is simply not a causal link between bringing funding and benefits to a district and increases in political donations and vote margins for members of Congress. For politicians to be rewarded, voters must be both aware of the benefits brought by their member of Congress and have the ability infer and assign credit to members for bringing home the funds (Samuels, 2002; Rocca and Gordon, 2012). Likewise, an absence of evidence could also be a function of the challenge of identifying the causal effect donations and legislators' behavior. From an identification perspective, establishing a causal link between donations and distributive policies is challenging because donations could lead members to push for specific policies that benefit donors, and simultaneously, distributive policies could lead individuals to make donations.

Two studies have used instrumental variable (IV) analysis to get around endogeneity issues and have found a causal link between federal funding and donations and federal funding and votes. Rocca and Gordon (2013) analyze whether representatives who allocate more

defense-related earmarks receive more donations from political action committees (PACs) representing defense manufacturers. The authors instrument for defense industry earmarks using the total number of earmarks a representative makes, and they find that every $10,000 in defense earmarks raises PAC campaign contributions by $3.00.[21] Levitt and Snyder (1997) analyze whether increasing federal funding for a district raises vote margins for the incumbent. The authors instrument for federal funding in the district using federal spending outside the district but inside the state and find that a $100 increase in per-capita federal spending (approximately $50 million per district) leads to a 2% gain in the popular vote for incumbents. We add to this literature by analyzing the impact of the Section 508 program on campaign contributions.

The Section 508 program offers a unique opportunity to test the link between campaign contributions and targeted distributive policies. Lee (2003) and Rocca and Gordon (2013) have argued the extent to which a particular distributive policy will yield electoral gains and higher donations to a legislator will be a function of the extent to which the legislator can credit claim for the benefit (e.g. whether his or her efforts are salient to voters). However, formula-based distributive policies, such as the 508 program, in which a member of Congress lobbies for a specific formula or a change to an existing formula may not allow legislators the opportunity to claim credit (Lee, 2003; Rocca and Gordon, 2003). As Rocca and Gordon (2012) note, with formula-based distributive policies, "credit claiming is difficult in these circumstances because while the legislator may have pushed hard for a formula that increased the allocation to his state, explaining to voters the intricacies of that process and the MC's role in it is virtually impossible" (pg. 242-243).

The 508 program was designed to expire three years after it was introduced. However, once hospitals received the 508 funds, the recipient hospitals and their constituents had a strong motivation to extend the program beyond its slated 2007 expiration. That the 508 program needed to be reauthorized by votes in the House of Representatives created a very clear link between legislators' actions and the financing of hospitals in their district. To that end, there is evidence that politicians were aware of the 508 program and that they viewed supporting it as politically advantageous. As the 508 program was coming up for a reauthorization vote in 2007,

[21] It is debatable whether instrumenting for defense earmarks using total earmarks (including defense earmarks) satisfies the exclusion restriction. Ultimately, as Rocca and Gordon (2013) note, they "study defense because it represents a huge percentage of all earmarks distributed by Congress. Indeed, the industry received 60% of all earmark dollars from the 111th Congress" (pg. 245).

Senator Charles Schumer's office issued a press release that stated, "In light of todays [sic] announcement that Senate leaders will pursue an extension of Section 508 of the Medicare Modernization Act, US Senator Charles E. Schumer, a member of the Senate Finance Committee, pledged today to work to include all New York Section 508 hospitals…" (Office of Senator Charles Schumer, 2006). In the remainder of the statement, the senator's office reiterated his commitment to increasing funding for New York hospitals. As a result, we should expect that donations to legislators would increase in the 2005-2006 and 2007-2008 congressional cycles as hospitals lobbied for the 508 program to be extended and politicians sought to curry favor with their constituents.

We begin by analyzing whether members of Congress were lobbied to extend the 508 program. To do so, we use data on lobbying spending by the Section 508 Hospital Coalition from the Center for Responsive Politics to track their lobbying spending over time. We also use data on political donations and the number of donors per year from the DIME to test whether members located in congressional districts that had a 508 hospital received higher donations after funding for those hospitals increased.[22] The DIME data include detailed information on campaign contributions from the Federal Elections Commission (FEC).

In practice, we identify campaign contributions to members of Congress from all donors and from individuals who work in the health care industry before and after the 508 program was introduced. To do so, we estimate:

$$(5) \qquad Outcome_{d,t} = \Upsilon_t + \delta_t High_508_Recipient_District_d + \alpha_d + \varepsilon_{d,t},$$

where we observe a range of outcomes $Outcomes_{d,t}$ that include the logged and unlogged dollars of donations made to a member of Congress located in congressional district d, in two-year election cycle t. We include a vector of election cycle fixed effects Υ_t and a vector of congressional district fixed effects α_d. We limit our analysis to members of Congress who had a hospital in their district and were in office in 2003. We focus on the 2001-2002, 2003-2004, 2005-2006, 2007-2008, and 2009-2010 election cycles. We use the election cycle before the MMA vote (the 2003-2004 election cycle) as the reference category. We focus on donations

[22] Bonica, Adam. 2013. Database on Ideology, Money in Politics, and Elections: Public version 1.0. Stanford, CA: Stanford University Libraries. ‹http://data.stanford.edu/dime›.

made to members of Congress from across the country and donations to members of Congress from individuals living in a member's home state. We examine the impact of the 508 program on total donations and donations from individuals working in the health care industry. We also introduce a placebo test and examine whether after the MMA vote, members of Congress who had hospitals in their district that received a 508 waiver had an increase in donations from individuals working in several unrelated industries (the oil and gas industry, the automobile industry, and the liquor and alcohol industry).

7.2 Lobbying by 508 Hospitals and Estimating the Gains from the 508 Program to Members of Congress

The Section 508 Hospital Coalition was formed in 2005 to promote the interests of hospitals that received a Section 508 Waiver. We obtained the amount the Section 508 Hospital Coalition spent lobbying members of Congress each year from 2005 through 2012 (see Appendix Figure 1). In 2005, the first year the 508 program took effect, the coalition spent $15,000 lobbying members of Congress. Over the next five years, annual spending increased substantially and, by 2010, the coalition spent $1,025,477 on lobbying members of Congress. Rocca and Gordon (2013) note that although individual voters may not observe and reward members of Congress for contributing to distributive policies that benefit their district, interest groups, such as the Section 508 Hospital Coalition can sharpen the incentives for members of Congress to act.

In the 2005-2006 congressional cycle, based on analysis of the DIME, the average member of Congress raised $1.3 million. Approximately 37% of these donations came from donors in the representative's state and 5.43% of a member of Congress's donations came from individuals working in the health care industry. Panel A in Figure 6 plots the total dollars of donations from all donors to members of Congress with a 508 hospital in their district and donations to members of Congress who had only hospitals that were eligible to apply but did not receive a waiver. It shows that after the funding increase, there was a large increase in donations in the 2005-2006 and 2007-2008 election cycles. In Panel C, we present total donations from all donors over time, but we limit our data to donations made by individuals who live in the same state as the member of Congress to whom they are making donations and we observe the same patterns. In Column (1) in Table 6, we present estimates of Equation (5) and analyze campaign contributions to members of Congress with a 508 hospital in their district relative to donations to

members of Congress who had hospitals that were potentially eligible to apply for a waiver but did not receive one. Results from Column (1) in Table 6 illustrate that members with a 508 hospital in their district saw a $390,000 increase (390.2/925.34 = 42.2%) in total donations from all their donors in the 2005/2006 congressional cycle ($p < 0.10$). In the identical logged specification presented in Column (5), we observe a 22% increase in total donations in the 2005-2006 cycle ($p < 0.05$). It is notable that the increase in donations occurred after hospital payment rates increased but before the votes to reauthorize the Section 508 program occurred.

In Panel D in Figure 6, we show trends in donations from individuals working in the health care industry who live in a member's home state (Panel C shows trends in donations to members of Congress from all individuals in the health care sector, regardless of where they live). We compare trends in donations for districts with a 508 hospital and districts with hospitals that were potentially eligible but did not apply for the program. This figure illustrates that donations from individuals working in the health care industry increased dramatically in the 2005-2006 and 2007-2008 congressional cycles after the 508 funding was authorized. Results from Column (4) of Table 6 show that donations from individuals working in the health care industry from a member's home state increased by $7,880 in the 2005-2006 election cycle ($p < 0.10$). In Column (8) in Table 6, we present estimates of logged donations from individuals working in the health care sector. In this specification, during the 2007-2008 congressional cycle, we observe a 65% increase in donations from individuals working in the health care sector ($p < 0.05$) (this is one election cycle later than we observed in the levels specification). In Appendix Table 5, we present results showing that these results are robust when we compare the donations of the treated group to donations districts with hospitals that were ineligible for the 508 program and hospitals that applied to and were rejected by the program.

In Appendix Table 6, we present results from a placebo test to see whether members of Congress who had 508 hospitals in their district received an increase in donations from three unrelated industries: the automobile sector, the alcohol and liquor sector, and the oil and gas industry. Across those three industries, we see no statistically significant changes in donations after hospitals received 508 funds. We chose these industries because we would not expect increases in Medicare payment rates to directly influence the political donations of individuals working in the automobile, alcohol and liquor sector, or the oil and gas industry.

8. Conclusion

In the long term, improving the productivity of spending on the Medicare program represents one of the most significant policy priorities in the US. Until now, most analysis of health care spending has focused on the role that financial incentives, the adoption and diffusion of new technology, and differences in patient characteristics play in driving variation and growth in health care spending. In this paper, we present the first work that formally assesses how political dynamics in the US influence health care spending.

Legislators struggled to pass the Medicare program in 1965, and in the ensuing decades, there have been numerous political fights over altering and expanding the program (Marmor, 2000). Ultimately, the pressure members of Congress face to be re-elected makes it challenging for the House of Representatives to pass large pieces of sweeping legislation (Mayhew, 1974). Evans (2004) argues that logrolling is imperative to pass sweeping legislation in Congress. Nowhere was the role of logrolling more visible than in efforts to pass the MMA of 2003 (Lee, 2003). We study how one distributive policy added to the MMA of 2003 – the Section 508 program – was linked to congressional votes for the MMA and test how this program affected hospital behavior and health spending.

We show that Section 508 waivers were linked to votes for the MMA. Section 508 waivers increased hospitals' Medicare reimbursement rates substantially. In turn, we observe that hospitals increased their activity, hired more staff, dramatically increased CEO pay, and invested in new technology. We also show that this payment increase dramatically increased hospital spending. Once hospitals received a 508 waiver, we found that they spent significant resources lobbying members of Congress to preserve their benefits. Finally, we show that members of Congress who had a 508 waiver hospital in their district received a significant increase in political donations after the MMA was passed in 2003 and before they voted to extend the Section 508 program.

Rather than focusing on assessing the direct impact of expanding the Medicare program via the introduction of Medicare Part D, this project explores the knock-on effects of the political process necessary to pass health care laws in the US and the presence of lobbying by health care providers. This analysis offers a new lens through which to view health care spending in the US. When legislators add distributive policies to sweeping legislation and use logrolling to form the coalitions necessary expand health coverage, it can seem, at first blush, as though everyone wins.

In the case of the passage of the MMA, seniors got prescription drug coverage, hospitals received higher payments, and legislators representing those hospitals received increased donations. However, in the long term, these types of spending increases need to be financed, and their impact on health care spending, as we demonstrate, is non-trivial. Nearly a billion dollars was initially allocated to fund the Section 508 program. However, our results suggest that the impact of this program was larger and more lasting than was initially intended. Indeed, we found that the 508 program led to a 25% per-year increase in hospital spending at impacted hospitals for seven years after the MMA was passed and that the average high 508 recipient hospital increased spending by $1.25 billion from 2005 through 2010 because of the payment increase. Moreover, these types of policies can be hard to eliminate because the beneficiaries of the policies lobbying heavily to have their gains preserved.

A critical finding from this work is that there is a close link between electoral politics and the Medicare program. This link between the political process and the Medicare program undoubtedly influences patterns of health care spending in the US. Going forward, we hope this paper motivates future work in this area, including testing how lobbying dollars influence health care spending, examining which stakeholders benefit from health care spending growth, and considering how the role that Congress plays in defining the scope structure of the health system impacts health care outcomes and health care spending across the nation.

References

Aaron, Henry J. "The Transformation of Medicare, 2015 to 2030". *Forum for Health Economics and Policy,* 18(2015): 119 – 136.

Abaluck, Jason, Gruber, Jonathan. "Evolving Choice Inconsistencies in Choice of Prescription Drug Insurance: Do Choices Improve Over Time? *American Economic Review*, 108(2016): 2145 – 2184.

Abaluck, Jason, Gruber, Jonathan. "Choice Inconsistencies Among the Elderly: Evidence from Plan Choice in the Medicare Part D Program". *American Economic Review,* 101(2011): 1180 – 1210.

Abelson, Reed. Narrow Interest in a Broad Measure. New York Times, September 4, 2003.

American Hospital Association. The Economic Contribution of Hospitals Often Overlooked. Chicago, IL., January 2013. http://www.aha.org/content/13/13brief-econcontrib.pdf

American Hospital Association. Wage Index Chart Pack. Chicago, IL., November 2011. http://www.aha.org/content/11/11nov-wgindexchartpk.pdf

Baicker, Katherine, Staiger, Douglas. "Fiscal Shenanigans, Targeted Federal Health Care Funds, and Patient Mortality". *Quarterly Journal of Economics,* 120(2005): 345-386.

Bartlett, Bruce. Medicare Part D: Republican Budget Busting. New York Times, November 19, 2013.

Bresnahan, John. McConnell Gets a Win in Obamacare Repeal Opening Round. Politico, July 25, 2017.

Centers for Medicare and Medicaid Services. "National Health Expenditures Fact Sheet". Washington, D.C., 2017. https://www.cms.gov/research-statistics-data-and-systems/statistics-trends-and-reports/nationalhealthexpenddata/nhe-fact-sheet.html

Chandra, Amitabh, Skinner, Jonathan. Technology Growth and Expenditure Growth in Health Care. NBER Working Paper 2011.

Chang, Tom, Jacobson, Mireille. "What do Nonprofit Hospitals Maximize? Evidence from California's Seismic Retrofit Mandate". NBER Working Paper, 2012.

Cohn, Jonathan. "How they Did it: The Inside Account of Health Reform's Triumph". The New Republic, May 21, 2010.

Congressional Budget Office. "The 2016 Long-Term Budget Outlook". Washington, D.C., 2016.

Cubanski, Juliette, and Neuman, Tricia. "Overview of Medicare Spending". Kaiser Family Foundation. Washington, D.C., 2016. http://www.kff.org/medicare/issue-brief/the-facts-on-medicare-spending-and-financing/

Cutler, David. "Cost Shifting or Cost Cutting? The Incidence of Reductions in Medicare Payments". In James M. Poterba (Ed.), *Tax Policy and the Economy*, Vol. 12, Cambridge, MA, MIT Press, 1998.

Cutler, David, Skinner, Jonathan, Stern, Ariel D., Wennberg, David. "Physician Beliefs and Patient Preferences: A New Look at Regional Variation in Health Care Spending". NBER Working Paper 2013.

Dafny, Leemore. "How Do Hospitals Respond to Price Changes?" *American Economic Review,* 95(2005): 1525-1547.

Dafny, Leemore. "Estimation of Merger Effects: An Application to Hospital Mergers". *The Journal of Law & Economics,* 53(2009): 523-550.

Dafny, Leemore, Ho, Kate, Lee, Robin S. "The Price Effects of Cross-Market Hospital Mergers". NBER Working Paper, 2016.

Dranove, David, Garthwaite, Craig, Ody, Christopher. "How Do Hospitals Respond to Negative Financial Shocks? The Impact of the 2008 Stock Market Collapse on Hospitals" *The Rand Journal of Economics*, 48(2017): 485-525.

Duggan, Mark G. "Hospital Ownership and Public Medical Spending." *The Quarterly Journal of Economics* 115(2000): 1343-373.

Evans, Diana. Greasing the Wheels: Using Pork Barrel Projects to Build Majority Coalitions in Congress. Boston, MA., Cambridge University Press, 2004.

Federal Register. Medicare Program; Revisions to the One-Time Appeal Process for Hospital Wage Index Classifications. Department of Health and Human Services, 2004.

Finkelstein, Amy, Genzkow, Matthew, Williams, Heidi. "Sources of Geographic Variation in Health Care: Evidence from Patient Migration". *Quarterly Journal of Economics,* 131(2016): 1681-1726.

Frakt, Austin B. "How Much Do Hospitals Cost Shift? A Review of the Evidence". *The Milbank Quarterly,* 89(2011): 90-130.

Garmon, Christopher. "The Accuracy of Hospital Merger Screening Methods". Federal Trade Commission Bureau of Economics Working Paper 326, 2015.

Gaynor, M.S., Kleiner, S.A., Vogt, W.B. "Analysis of Hospital Production: An Output Approach". *Journal of Applied Econometrics,* 30(2015): 398-421.

Government Accountability Office. Medicare Legislative Modifications Have Resulted in Payment Adjustments for Most Hospitals. Washington, D.C., United States Government Accountability Office, 2013.

Iglehart, J. "Prepaid group medical practice emerges as likely federal approach to health care." *National Journal.* 3 (1971): 1443-1452.

Institute of Medicine. Geographic Adjustment in Medicare Payment: Phase I: Accuracy. Washington, D.C., The National Academies of Sciences, Engineering, and Medicine, 2012.

Institute of Medicine. Variation in Health Care Spending: Target Decision Making, Not Geography. Washington, D.C., The National Academies of Sciences, Engineering, and Medicine, 2013.

Jan, Tracy. "21 States Take Aim at Mass. Hospitals' Medicare Windfall". The Boston Globe, January 13, 2013.

Jha, Ashish K., Orav, John, Zhonghe, Li, Epstein, Arnold M. "The Inverse Relationship Between Mortality Rates and Performance in the Hospital Quality Alliance Measures". *Health Affairs,* 26(2007): 1104-1110.

Joyce, Geoffrey F., Goldman, Dana P., Vogt, William B., Sun, Eric, Jena, Anupam B. "Medicare Part D After Two Years". *American Journal of Managed Care*, 15(2009): 536-544.

Kaestner, Robert, Guardado, Jose. "Medicare Reimbursement, Nurse Staffing, and Patient Outcomes". *Journal of Health Economics,* 27(2008): 339-361.

Keane, Tom. Curing the 'Bay State Boondoggle'. The Boston Globe, May 28, 2013.

Kuhn, Herb, and Schencker, Lisa. End the "Bay State's Boondoggle'. The Hill, June 9, 2016.

Lee, Christopher. Medicare Bill Partly a Special Interest Care Package. The Washington Post, November 23, 2003.

Lee, Frances. "Geographic Politics in the US House of Representatives: Coalition Building and Distribution of Benefits". *American Journal of Political Science,* 47(2003): 714-728.

Lee, Mara. Hospital Executives Explain Their Views on Health Care Costs. Hartford Current, March 8, 2016.

Levitt, Steven D., Snyder, James M. "The Impact of Federal Spending on House Election Outcomes". *The Journal of Political Economy,* 105(1997): 30-53.

Mayhew, David. "The Electoral Connection". New Haven, Ct., Yale University Press, 1974.

Marmor, Theodore R., The Politics of Medicare. New York, NY., Aldine de Gruyter, 2000.

Medicare Prescription Drug, Improvement, and Modernization Act of 2003, U.S.C.

Newhouse, Joseph P. "Toward a Theory of Nonprofit Institutions: An Economic Model of a Hospital". *American Economic Review,* 60(1970): 64-74.

Oberlander, Jonathan. The Political Life of Medicare. Chicago, IL., The University of Chicago Press, 2003.

Office of Senator Charles Schumer. Schumer Demands Orange and Dutchess County Hospitals Be Included in Hospital Reclassification Deal Announced Today. October 20, 2006. https://www.schumer.senate.gov/newsroom/press-releases/schumer-demands-orange-and-dutchess-county-hospitals-be-included-in-hospital-reclassification-deal-announced-today.

Oliver, Thomas R., Lee, Philip R., Lipton, Helene L. "A Political History of Medicare and Prescription Drug Coverage". *The Milbank Quarterly,* 82(2004): 283-354.

The Center for Responsive Politics. Washington, D.C., 2017. www.opensecrets.org.

Pear, Robert. Health Industry Sees Wish List Made Into Law. The New York Times, December 6, 1999.

Pope, D. "Reacting to Rankings: Evidence from "America's Best Hospitals"". *Journal of Health Economics*, 28(2009): 1154-1165.

Rocca, Michael S., Gordon, Stacy B. "Earmarks as a Means and an End: The Link Between Earmarks and Campaign Contributions in the US House of Representatives". *The Journal of Politics,* 75(2012): 241-253.

Samuels, David J. "Pork Barreling is Not Credit Claiming or Advertising: Campaign Finance and the Sources of the Personal Vote in Brazil". *Journal of Politics,* 64(2002): 845-63.

Smith, Sheila, Newhouse, Joseph P., Freeland, Mark S. "Income, Insurance, and Technology: Why Does Health Spending Outpace Economic Growth?" *Health Affairs,* 28(2009): 1276-1284.

Skinner, Jonathan, Chandra, Amitabh, Staiger, Douglas, Lee, Julie, McClellan, Mark. Mortality After Acute Myocardial Infarction in Hospitals that Disproportionately Treat Black Patients. *Circulation,* 25(2005): 2534-41.

Spetz, Joanne, Baker, Laurence. Has Managed Care Affected the Availability of Medical Technology? San Francisco, CA., Public Policy Institute of California, 1999.

Starr, Paul. The Social Transformation of American Medicine. New York, NY., Basic Books, 1983.

Vladeck, Bruce C. “The Political Economy of Medicare” *Health Affairs*, 18(1999): 22-36.

Weingast, Barry R. “A Rational Choice Perspective on Congressional Norms”. *American Journal of Political Science*, 23(1979): 245-262.

Weingast, Barry R., Johnson, Christopher, Shepsle, Kenneth A. “The Political Economy of Benefits and Costs: A Neoclassical Approach to Distributive Politics. *Journal of Economy*, 89(1981): 642-664.

White, Chapin. “Contrary to Cost-Shift Theory, Lower Medicare Hospital Payment Rates for Inpatient Care Lead to Lower Private Payment Rates”. *Health Affairs,* 32(2013): 935-943.

Wu, Vivian Y., Shen, Yu-Chu. “Long-Term Impacts of Medicare Payment Reductions on Patient Outcomes”. *Health Services Research*, 49(2014): 1596-1615.

Table 1: Medicare Payment Increases and Quantity-Fixed 2005 Revenue Gains from the Section 508 Program

	Change in PPS (%)			Quantity-Fixed Revenue Gains ($ Millions)			Quantity-Fixed Revenue Gains as % of Revenue		
	(1) Mean	(2) Min	(3) Max	(4) Mean	(5) Min	(6) Max	(7) Mean	(8) Min	(9) Max
High 508 Recipients (29 Hospitals)	9.81	7.89	14.35	7.66	3.42	26.61	10.06	7.97	15.44
Med 508 Recipients (29 Hospitals)	6.34	5.82	7.70	2.37	1.34	3.41	6.44	5.74	7.96
Low 508 Recipients (30 hospitals)	3.48	0.48	5.49	0.59	0.04	1.27	3.5	0.47	5.41
Total Number of Treated Hospitals		88			88			88	

Notes: We calculate the percent change in Medicare PPS payments generated by the Section 508 program in 2005 across our baseline sample of Section 508 hospitals. To do so, we calculate hospital PPS base payment rate in 2005 with and without the wage index change generated by the 508 program. We calculate the percentage change as: ((reclassified base payment rate – original base payment rate)/(original base payment rate)) x 100. We present estimates of hospital potential exposure to the Section 508 program by calculating the gains in Medicare revenue that Section 508 hospitals would have received assuming the program did not induce any changes in the quantity or mix of cases that were delivered. We calculate Medicare revenue for each hospital by multiplying the number of each cases delivered at each hospital in 2004 by the corresponding 2005 Medicare payment rate by case. We repeat this calculation but instead of using the true 2005 PPS payment rates, we calculate revenue using the payment rates the 508 hospitals would have received had they not received a Section 508 waiver (e.g. based on PPS payments calculated using their original wage index). The difference between the two measures of revenue is our estimate of the potential gains from the Section 508 program.

Table 2. Congressional Votes for the Medicare Modernization Act of 2003, Probability of Receiving a Section 508 Waiver, and PPS Changes

	Hospitals Represented by All Members of Congress			Hospitals Represented by Republicans			Hospitals Represented by Democrats		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
				All Hospitals					
	Yea	**Nay**	**Yea-Nay**	**Yea**	**Nay**	**Yea-Nay**	**Yea**	**Nay**	**Yea-Nay**
Share of 508 Recipient Hospitals	0.035	0.025	0.010+	0.033	0.005	0.028**	0.070	0.027	0.042+
# of 508 Recipient Hospitals	71	47	-	62	1	-	9	45	-
Total Hospitals	2,018	1,860	-	1,889	205	-	129	1,644	-
Votes	207	204	-	198	19	-	9	184	
				Eligible Hospitals					
	Yea	**Nay**	**Yea-Nay**	**Yea**	**Nay**	**Yea-Nay**	**Yea**	**Nay**	**Yea-Nay**
Share of 508 Recipient Hospitals	0.059	0.042	0.017+	0.056	0.008	0.048**	0.110	0.046	0.064+
# Number of 508 Recipient Hospitals	71	47	-	62	1	-	9	45	-
Total Hospitals	1,193	1,111	-	1,111	121	-	82	982	-
Votes	198	183	-	189	19	-	9	163	-
				Hospitals Receiving 508 Waiver					
	Yea	**Nay**	**Yea-Nay**	**Yea**	**Nay**	**Yea-Nay**	**Yea**	**Nay**	**Yea-Nay**
Size of PPS Payment Gains through 508	396.89	361.03	35.86	392.41	0.00	392.41**	511.14	354.47	156.67**
Total Hospitals	53	34	-	51	1	-	2	32	-
Votes	28	19	-	27	1	-	1	17	-

Share of all hospitals that received a Section 508 waiver: 0.032
Share of eligible hospitals that received a Section 508 waiver: 0.058
Average base PPS payment rate of 508 hospitals in 2004: $5278.32
Average PPS payment increase from receiving a Section 508 waiver: $388.09

Notes: +p<0.10, *p<0.05, **p<0.01. Roll call vote 332 passed 216 to 215, with 207 Republicans voting 'Yea,' 19 Republicans voting 'Nay,' 3 Republicans abstaining, 9 Democrats voting 'Yea,' 195 Democrats voting 'Nay,' 1 Democrat abstaining, and 1 Independent voting 'Nay.' In comparing the fraction of hospitals that received a 508 waiver, we include all hospitals in our data except those where the member of Congress abstained from voting (2 of the 120 hospitals that received a Section 508 waiver in 2004; 1 of the 88 hospitals in our analytic sample of 88 Section 508 hospitals). We lose an additional hospital in Columns (4), (5), (7), and (8) because it is represented by a member of Congress registered as an Independent.

Table 3: Estimating the Impact of the Medicare Payment Increases on Hospital Activity and Prices

	Total Discharges	Medicare Discharges	Medicaid Discharges	Private Price
	(1)	(2)	(3)	(4)
High 508 Recipient *2005	978	500+	264*	91.28
	(710)	(266)	(129)	(262.70)
High 508 Recipient *2006-10	1577*	953*	457*	322.50
	(800)	(422)	(205)	(343.30)
Hospital FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
N	11,745	11,745	11,745	10,266
Control Group	Eligible but Didn't Apply	Eligible but Didn't Apply	Eligible but Didn't Apply	Eligible but Didn't Apply
Mean Dependent Variable in 2004				
High 508 Recipient Hospitals	19,519	8,728	2,790	8,089.67
Control Hospitals	10,586	4,258	1,937	6,842.24

Notes: Standard errors are in parentheses; +p<0.10, *p<0.05, **p<0.01. We present estimates of Equation (2). Standard errors are clustered around hospitals. Observations (N) are hospital-years. The High 508 Hospital indicator is switched on for hospitals from our baseline sample with returns in the top third of the distribution from Table 2. Control hospitals include those that were potentially eligible but did not apply for a 508 waiver. We have fewer observations in Column (4) because we do not have price measures for every hospital.

Table 4: Estimating the Impact of the Medicare Payment Increases on Hospital Staffing

	Payroll ($ Millions)	Total FTE	FTE MD	FTE Nurses	County Hires (in health sector)	Hospital CEO Salary ($ Thousands)
	(1)	(2)	(3)	(4)	(5)	(6)
High 508 Recipient *2005	15.98+	27	5	66*	378+	45.51
	(8.22)	(75)	(9)	(31)	(225)	(62.98)
High 508 Recipient *2006-10	48.91*	233	59	110+	20	427.56+
	(20.38)	(201)	(42)	(56)	(56)	(224.23)
Hospital FE	Yes	Yes	Yes	Yes	Yes (County)	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
N	11,745	11,745	11,745	11,745	11,370	5,890
Control Group	Eligible but Didn't Apply	Eligible but Didn't Apply	Eligible but Didn't Apply	Eligible but Didn't Apply	Eligible but Didn't Apply	Eligible but Didn't Apply
Mean Dependent Variable in 2004						
High 508 Recipient Hospitals	134.60	2,589	197	707	2,013	528.42
Control Hospitals	58.45	1,199	47	345	1,072	312.48

Notes: Standard errors are in parentheses; +p<0.10, *p<0.05, **p<0.01. We present estimates of Equation (2). Standard errors are clustered around hospitals for columns (1), (2), (3), (4), and (6) and around counties for Column (5). Observations (N) in Columns (1), (2), (3), (4), and (6) are hospital-years. Observations (N) in Column (5) are county-years. Additionally in Column (5), each observation is the number of hires in the county in which the hospital is located in year Y, weighted by the number of hospitals in that county. The High 508 Hospital indicator is switched on for hospitals from our baseline sample with returns in the top third of the distribution from Table 2. Control hospitals include those that were potentially eligible but did not apply for a 508 waiver. We have fewer observations in Column (6) because we were unable to fully match GuideStar hospital CEO pay data to every hospital in our sample.

Table 5: Estimating the Impact of the Medicare Payment Increases on Hospital Equipment and Quality and on Hospital Spending

	Saidin Technology Index (1)	Hospital 30-Day AMI Mortality Rate (2)	Hospital Length of Stay for AMI Patients (3)	Hospital Spending ($ Millions) (4)
High 508 Recipient *2005	2.1248**	0.0062	0.0133	103.40**
	(0.5882)	(0.0072)	(0.1010)	(37.77)
High 508 Recipient *2006-10	4.1584**	-0.0020	0.0338	228.60**
	(0.7504)	(0.0048)	(0.1094)	(87.42)
Hospital FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
N	11,745	10,830	10,830	10,977
Control Group	Eligible but Didn't Apply	Eligible but Didn't Apply	Eligible but Didn't Apply	Eligible but Didn't Apply
Mean Dependent Variable in 2004				
High 508 Recipient Hospitals	7.41	0.11	5.74	795.95
Control Hospitals	4.11	0.13	5.28	405.57

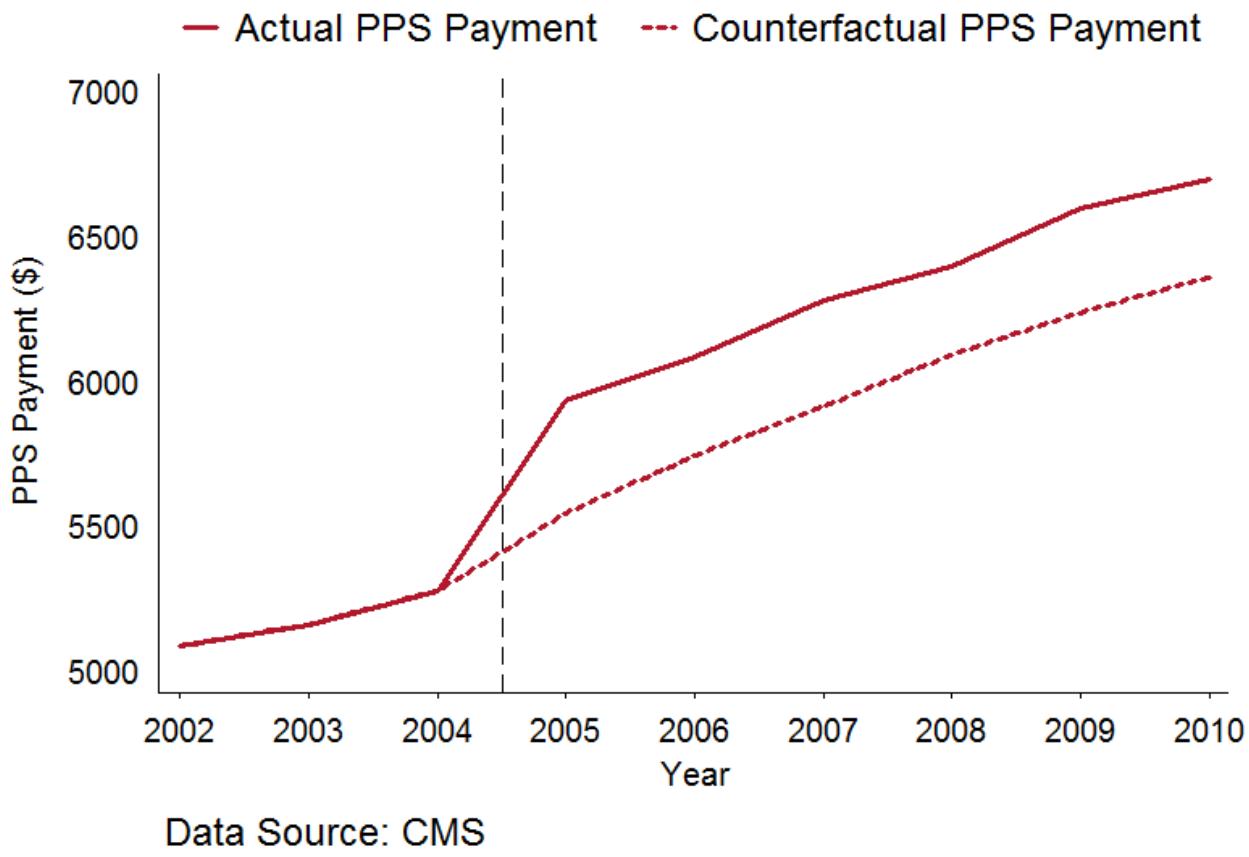
Notes: Standard errors are in parentheses; +p<0.10, *p<0.05, **p<0.01. We present estimates of Equation (2). Standard errors are clustered around hospitals. Observations (N) are hospital-years. The High 508 Hospital indicator is switched on for hospitals from our baseline sample with returns in the top third of the distribution from Table 2. Control hospitals include those that were potentially eligible but did not apply for a 508 waiver.

Table 6: Estimating the Impact of the 508 Program on Campaign Donations to Members of Congress

Campaign Contributions to 108th House Representative from:	All Donors	All Donors Working in Health Sector	All Donors in Same State	All Donors in Same State Working in Health Sector	All Donors	All Donors Working in Health Sector	All Donors in Same State	All Donors in Same State Working in Health Sector
	($ Thousands)				(Logged)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
High 508 Recipient District *2001/2 Election Cycle	144.70	-12.72	12.62	-1.68	0.00	-0.15	-0.04	0.25
	(130.60)	(11.98)	(63.40)	(4.04)	(0.10)	(0.16)	(0.11)	(0.19)
High 508 Recipient District *2005/6 Election Cycle	390.20+	44.22	90.40	7.88+	0.22*	0.13	0.19	0.14
	(224.70)	(47.43)	(64.04)	(4.27)	(0.09)	(0.12)	(0.12)	(0.22)
High 508 Recipient District *2007/8 Election Cycle	564.70	-5.50	119.10	3.59	0.08	0.48**	-0.05	0.65**
	(415.10)	(42.00)	(101.50)	(10.12)	(0.46)	(0.15)	(0.40)	(0.21)
High 508 Recipient District *2009/10 Election Cycle	484.80	1.45	40.77	0.86	0.16	0.03	-0.16	0.58
	(438.20)	(44.50)	(129.90)	(10.15)	(0.57)	(0.40)	(0.72)	(0.45)
District FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	1,805	1,805	1,558	1,486	1,572	1,519	1,558	1,486
Control Group	Eligible but Didn't Apply	Eligible but Didn't Apply	Eligible but Didn't Apply	Eligible but Didn't Apply	Eligible but Didn't Apply	Eligible but Didn't Apply	Eligible but Didn't Apply	Eligible but Didn't Apply
Mean Dependent Variable in 2003/2004 Election Cycle								
Districts with High 508 Recipient Hospitals	925.34	37.43	460.42	14.51	1,173.64	64.70	472.30	25.00
Districts with Control Hospitals	1183.15	63.78	477.12	25.38	1,084.10	74.90	430.70	34.70

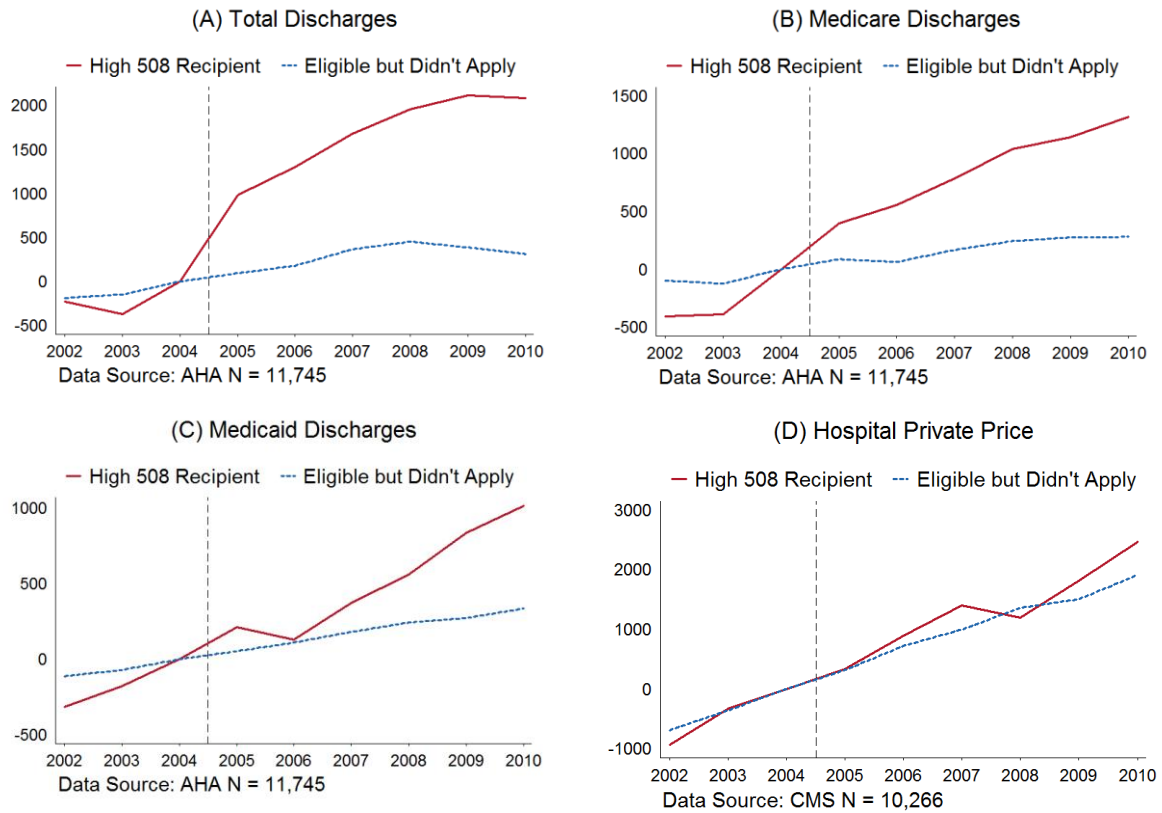
Notes: Standard errors are in parentheses; +p<0.10, *p<0.05, **p<0.01. We present estimates of Equation (6). Standard errors are clustered around congressional districts. Observations (N) are by congressional district by two-year electoral cycle. The High 508 Hospital indicator is switched on for hospitals from our baseline sample with returns in the top third of the distribution from Table 2. Control hospitals include those that were potentially eligible but did not apply for a 508 waiver. We omit the 2003/2004 election cycle. In our log specifications, we exclude observations that have 0-valued donations to that member of Congress for that district in those election years

Figure 1: The Effect of a 508 Waiver on Hospital PPS Payment Rates



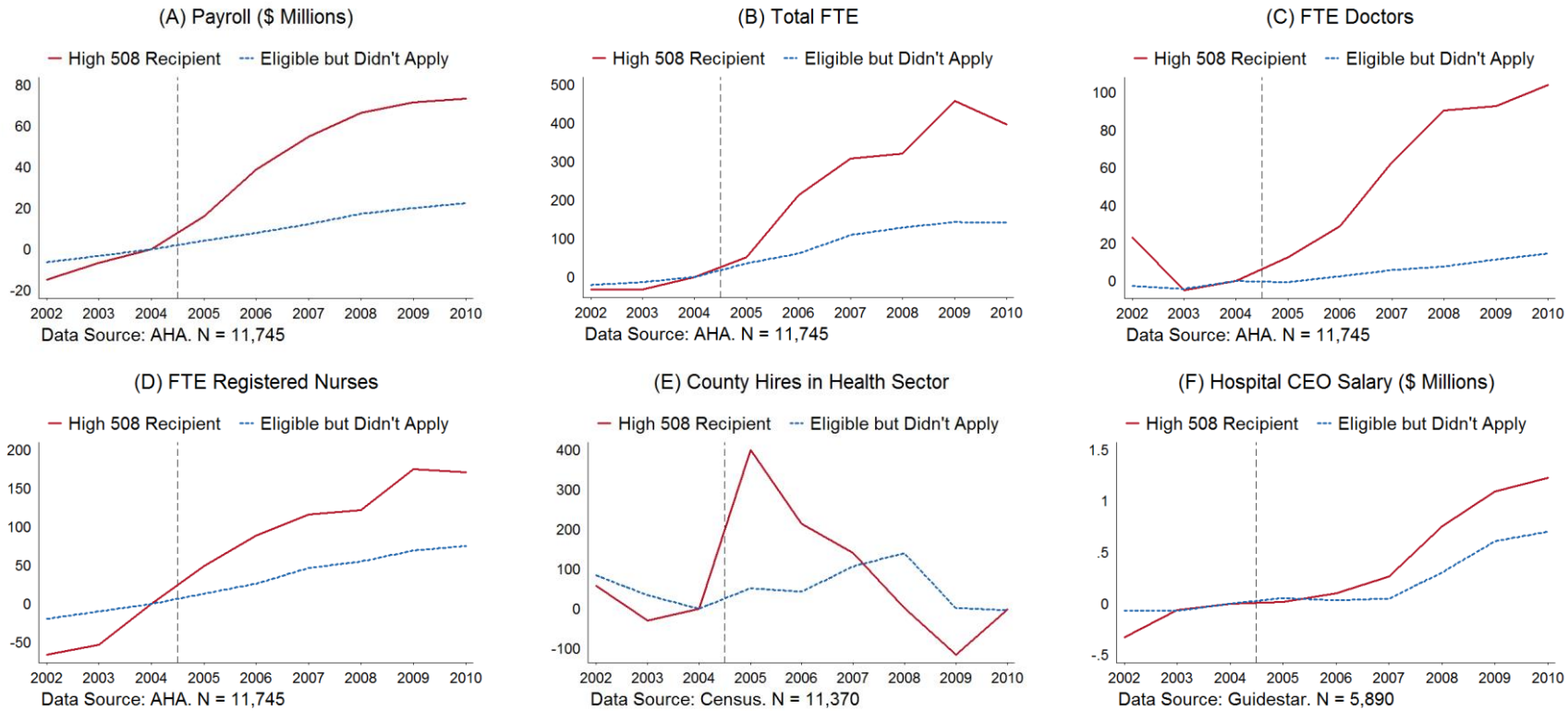
Notes: This figure plots the PPS base payment rate for hospitals that received a Section 508 waiver in our baseline sample (these are the changes identified in Columns (1) – (3) from Table 1). The red solid line represents hospital actual PPS payment rates, which takes into account the increase generated by the 508 program. The red dashed line represents what the hospitals would have been paid had they not received a Section 508 waiver and kept being paid using their original wage index.

Figure 2: The Effect of the Medicare Payment Increases on Hospital Activity and Prices



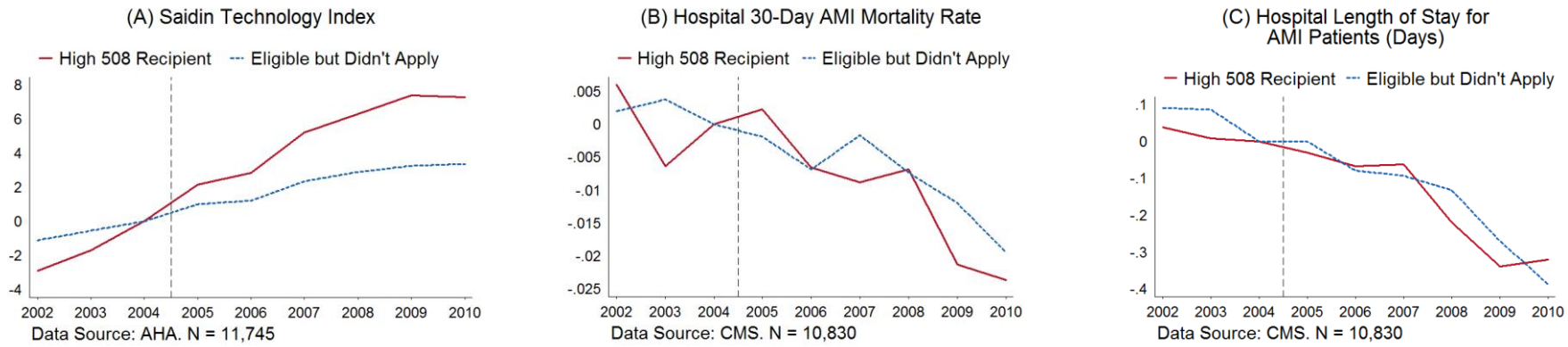
Notes: We regress hospital outcomes on a vector of hospital fixed effects, year fixed effects, and interactions between the high 508 hospital indicator and year dummies, with standard errors clustered around hospitals. The regression is normalized to 2004. The high 508 hospitals include those with returns in the top third of the distribution of 508 returns.

Figure 3: The Effect of the Medicare Payment Increases on Hospital Staffing



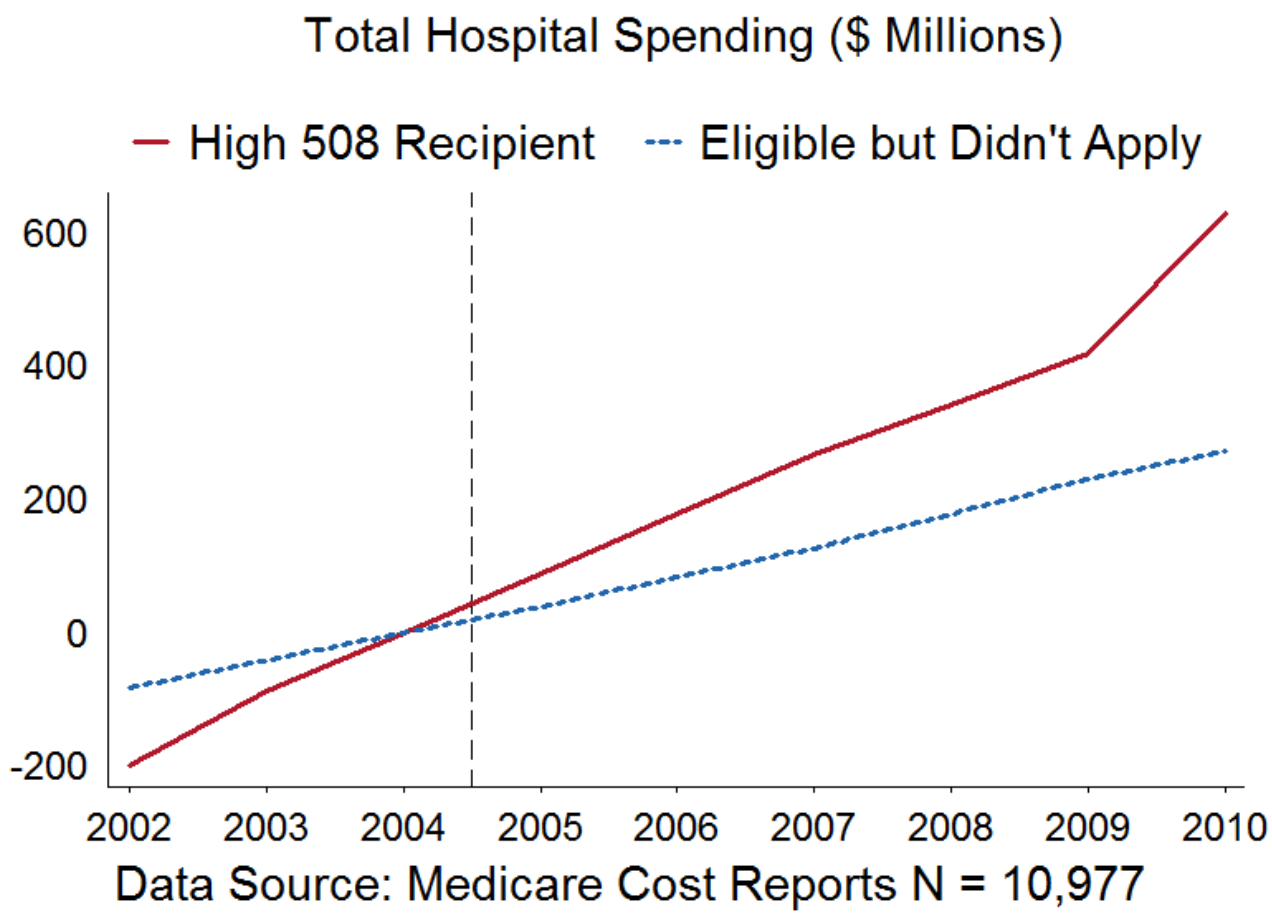
Notes: We regress hospital outcomes on a vector of hospital fixed effects, year dummies, and interactions between the high 508 hospital indicator and year dummies, with standard errors clustered around hospitals. The regression is normalized to 2004. The high 508 hospitals include those with returns in the top third of the distribution of 508 returns.

Figure 4: The Effect of the Medicare Payment Increases on Hospital Equipment and Quality



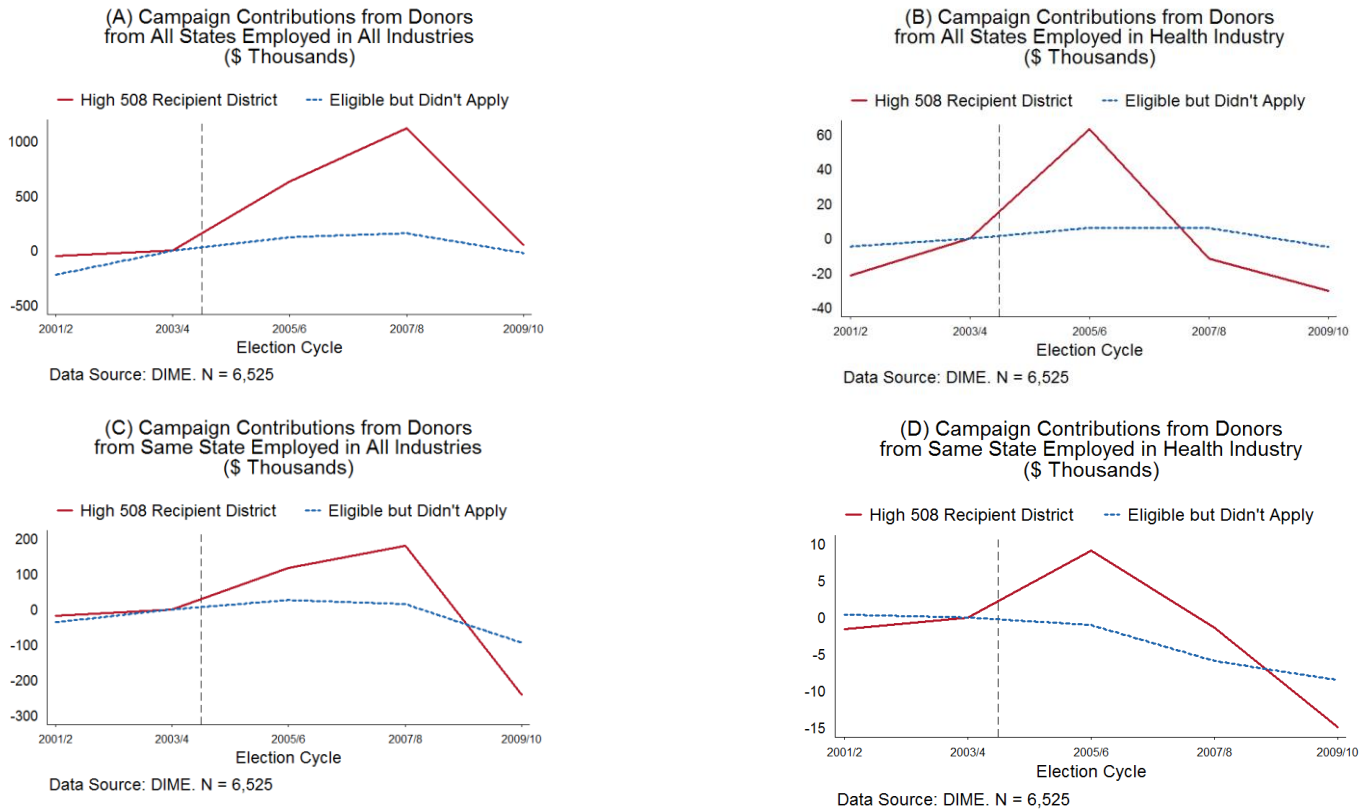
Notes: We regress hospital outcomes on a vector of hospital fixed effects, year dummies, and interactions between the high 508 hospital indicator and year dummies, with standard errors clustered around hospitals. The regression is normalized to 2004. The high 508 hospitals include those with returns in the top third of the distribution of 508 returns.

Figure 5: The Effect of the Medicare Payment Increases on Hospital Spending



Notes: We regress hospital outcomes on a vector of hospital fixed effects, year dummies, and interactions between the high 508 hospital indicator and year dummies, with standard errors clustered around hospitals. The regression is normalized to 2004. The high 508 hospitals include those with returns in the top third of the distribution of 508 returns.

Figure 6: The Effect of the 508 Program on Campaign Donations to Members of Congress



Notes: We regress district campaign donations on a vector of year dummies, district fixed effects and interactions between districts with a high treatment hospital and year dummies, with standard errors clustered around districts. Each observation is the sum of donations to the member of Congress representing the district where the hospital is located during a two-year election cycle.

Appendix Table 1: Descriptive Statistics on Hospitals

	All 508 Hospitals		High 508 Recipient Hospitals		Eligible But Didn't Apply		Ineligible		Applied and Rejected		All AHA Hospitals	
	Mean	*Std. Dev.*	*Mean*	*Std. Dev.*	*Mean*	*Std. Dev.*	*Mean*	*Std. Dev.*	*Mean*	*Std. Dev.*	*Mean*	*Std. Dev.*
Medicare Discharges	5,208	4,471	8,728	4,780	4,258	3,951	3,853	3,074	5,498	4,190	4,245	3,688
Medicaid Discharges	1,784	2,002	2,790	2,180	1,937	2,497	1,638	2,022	2,105	2,071	1,825	2,261
For-Profit Hospitals	0.06	0.23	0.00	0.00	0.13	0.34	0.18	0.38	0.21	0.41	0.16	0.36
Not-for-Profit Hospitals	0.88	0.33	0.93	0.27	0.64	0.48	0.65	0.48	0.69	0.46	0.66	0.48
Teaching Hospitals	0.40	0.49	0.74	0.45	0.29	0.46	0.23	0.42	0.38	0.49	0.28	0.45
Beds	237	191	377	213	226	203	194	164	274	210	218	190
Urban Area	0.81	0.40	0.89	0.32	0.73	0.44	0.57	0.50	0.79	0.41	0.68	0.47
N	88		29		1,278		1,125		284		2,275	

Notes: Means and standard deviations of hospital characteristics are calculated using 2004 values. We exclude critical access hospitals.

Appendix Table 2: Estimating the Impact of the Medicare Payment Increases on Hospital Activity and Prices With Other Control Groups and a Placebo Test

	Total Discharges (1)	Medicare Discharges (2)	Medicaid Discharges (3)	Private Price (4)
Control Group: *Eligible But Didn't Apply (Baseline)*				
High 508 Recipient *2005	978	500+	264*	91.28
	(710)	(266)	(129)	(262.70)
High 508 Recipient *2006-10	1577*	953*	457*	322.50
	(800)	(422)	(205)	(343.30)
N	11,745	11,745	11,745	10,266
Control Group: *Ineligible*				
High 508 Recipient *2005	998	516+	263*	115.86
	(711)	(266)	(128)	(263.00)
High 508 Recipient *2006-10	1821*	1042*	549**	287.29
	(799)	(422)	(204)	(343.86)
N	10,368	10,368	10,368	9,361
Control Group: *Applied and Rejected*				
High 508 Recipient *2005	776	382	120	24.23
	(716)	(273)	(138)	(281.56)
High 508 Recipient *2006-10	1537+	896*	319	396.64
	(811)	(429)	(211)	(360.04)
N	2,799	2,799	2,799	2,460
Placebo Test (Control group: *Eligible But Didn't Apply*)				
Placebo 508 Recipient *2005	121	90	9	164.60
	(116)	(82)	(61)	(232.70)
Placebo 508 Recipient *2006-10	32	70	-33	240.50
	(252)	(138)	(96)	(284.80)
N	11,835	11,835	11,835	10,336
Hospital FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

Notes: Standard errors are in parentheses; +p<0.10, *p<0.05, **p<0.01. We present estimates of Equation (2). Standard errors are clustered around hospitals. Observations (N) are hospital-years. The High 508 Hospital indicator is switched on for hospitals from our baseline sample with returns in the top third of the distribution from Table 2. The placebo 508 hospital is the nearest non-508 hospital to a 508 recipient hospital.

Appendix Table 3: Estimating the Impact of the Medicare Payment Increases on Hospital Staffing With Alternative Control Groups and a Placebo Test

	Payroll ($ Millions)	Total FTE	FTE Doctors	FTE Nurses	County Hires (in health sector)	Hospital CEO Salary ($ Thousands)
	(1)	(2)	(3)	(4)	(5)	(6)
Control Group: *Eligible But Didn't Apply (Baseline)*						
High 508 Recipient *2005	15.98+	27	5	66*	378+	45.51
	(8.22)	(75)	(9)	(31)	(225)	(62.98)
High 508 Recipient *2006-10	48.91*	233	59	110+	20	427.56+
	(20.38)	(201)	(42)	(56)	(56)	(224.23)
N	11,745	11,745	11,745	11,745	11,370	5,890
Control Group: *Ineligible*						
High 508 Recipient *2005	17.12*	31.34	3.316	71.58*	365.2	121.71*
	(8.22)	(75)	(9)	(31)	(224)	(54.03)
High 508 Recipient *2006-10	51.43*	257	61.83	122.5*	-0.1	520.65*
	(20.37)	(201)	(42)	(56)	(54)	(224.08)
N	10,368	10,368	10,368	10,368	9,948	5,469
Control Group: *Applied and Rejected*						
High 508 Recipient *2005	13.90+	8.01	3.25	59.01+	417.83+	108.3+
	(8.30)	(78)	(10)	(31)	(224)	(60.62)
High 508 Recipient *2006-10	45.38*	199.5	61.54	91.95	56.4	490.09*
	(20.52)	(203)	(42)	(57)	(58)	(230.67)
N	2,799	2,799	2,799	2,799	2,687	1,675
Placebo Test *(Control group: Eligible But Didn't Apply)*						
Placebo 508 Recipient *2005	-0.9	-18.32	0.914	-11.24*	11.1	-109.57+
	(1.40)	(27)	(4)	(5)	(68)	(62.92)
Placebo 508 Recipient *2006-10	-2.5	-0.486	11.42	-15	23.7	22.8
	(3.15)	(46)	(14)	(14)	(49)	(112.38)
N	11,835	11,835	11,835	11,835	11,458	5,894

Hospital FE	Yes	Yes	Yes	Yes		Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Standard errors are in parentheses; +p<0.10, *p<0.05, **p<0.01. We present estimates of Equation (2). Standard errors are clustered around hospitals for columns (1), (2), (3), (4), and (6) and around counties for Column (5). Observations (N) in Columns (1), (2), (3), (4), and (6) are hospital-years. Observations (N) in Column (5) are county-years. Additionally in Column (5), each observation is the number of hires in the county in which the hospital is located in year Y, weighted by the number of hospitals in that county. The High 508 Hospital indicator is switched on for hospitals from our baseline sample with returns in the top third of the distribution from Table 2. We have fewer observations in Column (6) because we were unable to fully match GuideStar hospital CEO pay data to every hospital in our sample. The placebo 508 hospital is the nearest non-508 hospital to a 508 recipient hospital.

Appendix Table 4: Estimating the Impact of the Medicare Payment Increases on Hospital Equipment and Quality and on Hospital Spending, With Alternative Control Groups and a Placebo Test

	Saidin Technology Index	Hospital 30-Day AMI Mortality Rate	Hospital Length of Stay for AMI Patients	Spending
	(1)	(2)	(3)	(4)
Control Group: *Eligible But Didn't Apply (Baseline)*				
High 508 Recipient *2005	2.1248**	0.0062	0.0133	103.40**
	(0.5882)	(0.0072)	(0.1010)	(37.77)
High 508 Recipient *2006-10	4.1584**	-0.0020	0.0338	228.60**
	(0.7504)	(0.0048)	(0.1094)	(87.42)
N	11,745	10,830	10,830	10,977
Control Group: *Ineligible*				
High 508 Recipient *2005	2.2713**	0.0091	0.0299	114.20**
	(0.5883)	(0.0072)	(0.1009)	(37.71)
High 508 Recipient *2006-10	4.2978**	-0.0020	0.0084	264.90**
	(0.7503)	(0.0048)	(0.1095)	(87.55)
N	10,368	9,770	9,770	10,977
Control Group: *Applied and Rejected*				
High 508 Recipient *2005	1.6754**	0.0108	0.0138	71.70+
	(0.6152)	(0.0076)	(0.1056)	(40.32)
High 508 Recipient *2006-10	3.3139**	-0.0071	0.0303	157.80+
	(0.7849)	(0.0052)	(0.1157)	(90.92)
N	2,799	2,639	2,639	2,561
Placebo Test (Control group: *Eligible But Didn't Apply)*				
Placebo 508 Recipient *2005	-0.4340	-0.0114	0.1330	-3.35
	(0.2780)	(0.0090)	(0.0984)	(17.35)
Placebo 508 Recipient *2006-10	-0.2930	-0.0010	0.0774	-30.29
	(0.4700)	(0.0053)	(0.0891)	(38.77)
N	11,835	10,898	10,898	11,066

Hospital FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

Notes: Standard errors are in parentheses; +p<0.10, *p<0.05, **p<0.01. Observations (N) are hospital-years and differ in Columns (2) and (3) AMI Length of Stay and 30-Day AMI Mortality because we cannot report data for hospitals with fewer than 20 hospital-year claims. We regress hospital equipment and quality outcomes on a vector of hospital fixed effects and interactions between our high treatment indicator and our short term impact dummy and between our high treatment indicator and our long term impact dummy; standard errors clustered around hospitals. Short Term refers to the year 2005, and Long Term refers to years 2006 through 2010. The High Treatment hospitals include those with returns in the top third of the distribution from Column (1) in Table 3. Control hospitals are denoted in bold. Where applicable, the Placebo Treatment tests the case where the treated hospitals are the closest hospitals to a 508 hospital (rather than 508 hospitals in the High Treatment group). For this test, the control hospitals are eligible hospitals that did not apply. We limit our analysis to hospitals that are registered with the American Hospital Association and are continually in the data from 2002 to 2010. We also exclude critical access hospitals. The Saidin index captures the number of technologies at a hospital. A one-unit increase in the Saidin Index represents the addition of one technology that no other hospitals have or of the addition of two technologies that 50% of hospitals have. The means and standard deviations are calculated for 2004, the year the 508 waiver took effect. All outcomes are measured using data from the AHA annual survey.

Appendix Table 5: Estimating the Impact of the 508 Program on Campaign Donations to Members of Congress With Other Control Groups

	Campaign Contributions to 108th House Representative from All Donors ($ Thousands)	Campaign Contributions to 108th House Representative from All Donors Working in Health Sector ($ Thousands)	Campaign Contributions to 108th House Representative from All Donors in Same State ($ Thousands)	Campaign Contributions to 108th House Representative from All Donors in Same State Working in Health Sector ($ Thousands)
	(1)	(2)	(3)	(4)
Control Group: *Eligible But Didn't Apply (Baseline)*				
High 508 Recipient District *2001/2	144.70	-12.72	12.62	-1.68
Election Cycle	(130.60)	(11.98)	(63.40)	(4.04)
High 508 Recipient District *2005/6	390.20+	44.22	90.40	7.88+
Election Cycle	(224.70)	(47.43)	(64.04)	(4.27)
High 508 Recipient District *2007/8	564.70	-5.50	119.10	3.59
Election Cycle	(415.10)	(42.00)	(101.50)	(10.12)
High 508 Recipient District *2009/10	484.80	1.45	40.77	0.86
Election Cycle	(438.20)	(44.50)	(129.90)	(10.15)
N	1,805	1,805	1,558	1,486
Control Group: *Ineligible*				
High 508 Recipient District *2001/2	151.00	-12.60	30.55	-1.30
Election Cycle	(126.20)	(11.94)	(62.55)	(4.06)
High 508 Recipient District *2005/6	392.70+	44.84	95.68	8.22+
Election Cycle	(223.10)	(47.43)	(64.45)	(4.32)
High 508 Recipient District *2007/8	589.90	-2.69	130.80	4.38
Election Cycle	(414.20)	(41.99)	(102.00)	(10.13)
High 508 Recipient District *2009/10	456.90	1.41	19.15	0.07
Election Cycle	(434.30)	(44.49)	(130.20)	(10.15)
N	1,740	1,740	1,740	1,740

Control Group: *Applied and Rejected*				
High 508 Recipient District *2001/2	65.45	-14.46	-7.83	-2.83
Election Cycle	(147.30)	(12.48)	(68.22)	(4.31)
High 508 Recipient District *2005/6	363.70	46.24	71.57	7.54+
Election Cycle	(231.40)	(47.69)	(69.55)	(4.37)
High 508 Recipient District *2007/8	669.50	1.14	170.40+	3.95
Election Cycle	(412.70)	(42.34)	(95.18)	(10.25)
High 508 Recipient District *2009/10	479.30	1.28	22.24	-1.09
Election Cycle	(443.10)	(45.08)	(134.00)	(10.34)
N	935	935	935	935
District FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

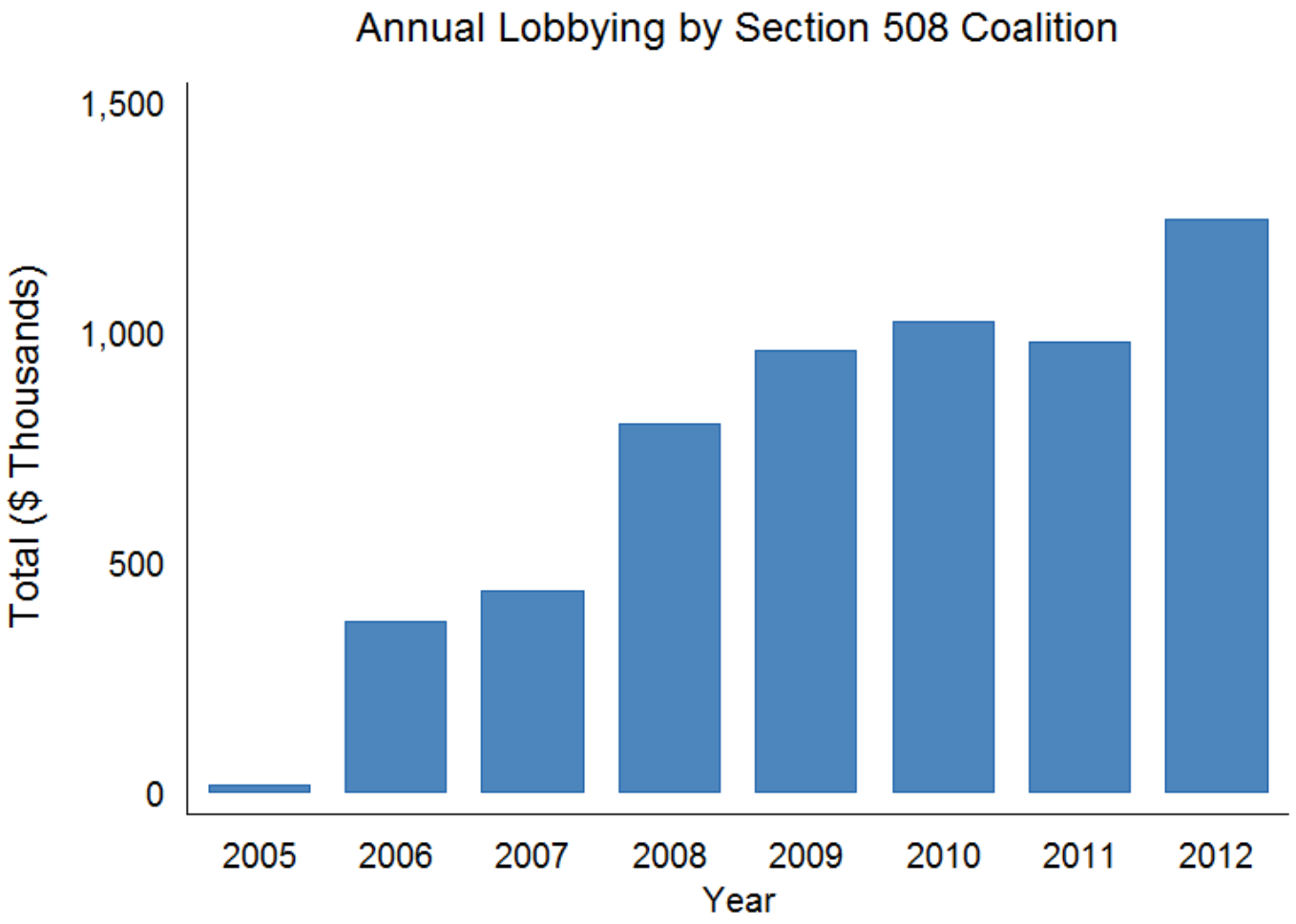
Notes: Standard errors are in parentheses; +p<0.10, *p<0.05, **p<0.01. We present estimates of Equation (6) with donations. Standard errors are clustered around congressional districts. Observations (N) are by congressional district by two-year electoral cycle. The High 508 Hospital indicator is switched on for hospitals from our baseline sample with returns in the top third of the distribution from Table 2. The placebo 508 hospital is the nearest non-508 hospital to a 508 recipient hospital. We omit the 2003/2004 election cycle.

Appendix Table 6: Placebo Test Estimating the Impact of the 508 Program on Logged Campaign Donations to Members of Congress From Unrelated Industries

Campaign Contributions (Logged) to:	108th House Representatives from Donors in Same State Working in Automotive Sector (1)	108th House Representatives from Donors in Same State Working in Alcohol/Liquor Sector (2)	108th House Representatives from Donors in Same State Working in Oil and Gas Sector (3)
High 508 Recipient District	-0.38	0.01	0.14
*2001/2 Election Cycle	(0.41)	(0.41)	(0.51)
High 508 Recipient District	-0.44	0.13	-0.38
*2005/6 Election Cycle	(0.51)	(0.36)	(0.47)
High 508 Recipient District	0.28	0.29	0.12
*2007/8 Election Cycle	(0.35)	(0.31)	(0.66)
High 508 Recipient District	-0.02	-0.45	0.46
*2009/10 Election Cycle	(0.68)	(0.60)	(0.54)
N	1,141	1,177	938

Notes: Standard errors are in parentheses; +p<0.10, *p<0.05, **p<0.01. We present estimates of Equation (6) with donations. Standard errors are clustered around congressional districts. Observations (N) are by congressional district by two-year electoral cycle. The High 508 Hospital indicator is switched on for hospitals from our baseline sample with returns in the top third of the distribution from Table 2.

Appendix Figure 1: Annual Lobbying Dollars from Section 508 Coalition



Notes: We plot the total amount of lobbying dollars spent by the Section 508 Coalition from 2005 to 2012. Data are from opensecrets.org.

CENTRE FOR ECONOMIC PERFORMANCE
Recent Discussion Papers

1522	Philippe Aghion Ufuk Akcigit Ari Hyytinen Otto Toivanen	The Social Origins of Inventors
1521	Andrés Barrios F. Giulia Bovini	It's Time to Learn: Understanding the Differences in Returns to Instruction Time
1520	Sara Calligaris Massimo Del Gatto Fadi Hassan Gianmarco I.P. Ottaviano Fabiano Schivardi	The Productivity Puzzle and Misallocation: An Italian Perspective
1519	Alex Bell Raj Chetty Xavier Jaravel Neviana Petkova John Van Reenen	Who Becomes an Inventor in America? The Importance of Exposure to Innovation
1518	Randolph Bruno Nauro Campos Saul Estrin Meng Tian	Economic Integration, Foreign Investment and International Trade: The Effects of Membership of the European Union
1517	Fabrice Defever José-Daniel Reyes Alejandro Riaño Miguel Eduardo Sánchez-Martín	Special Economic Zones and WTO Compliance: Evidence from the Dominican Republic
1516	Philippe Aghion Ufuk Akcigit Matthieu Lequien Stefanie Stantcheva	Tax Simplicity and Heterogeneous Learning
1515	Fabrice Defever Christian Fischer Jens Suedekum	Supplier Search and Re-Matching in Global Sourcing: Theory and Evidence from China

1514	Philippe Aghion Antonin Bergeaud Timo Boppart Peter J. Klenow Huiyu Li	Missing Growth from Creative Destruction
1513	Stephen J. Redding David E. Weinstein	Aggregating from Micro to Macro Patterns of Trade
1512	Andrew E. Clark Tom Lee	Early-Life Correlates of Later-Life Well-Being: Evidence from the Wisconsin Longitudinal Study
1511	Clément Bosquet Pierre-Philippe Combes Cecilia García-Peñalosa	Gender and Promotions: Evidence from Academic Economists in France
1510	Andrea Ariu Holger Breinlich Gregory Corcos Giordano Mion	The Interconnections between Services and Goods Trade at the Firm-Level
1509	Johannes Boehm Swati Dhingra John Morrow	Product Diversification in Indian Manufacturing
1508	Hanwei Huang Jiandong Ju Vivian Z. Yue	Structural Adjustments and International Trade: Theory and Evidence from China
1507	Laura Alfaro Pol Antràs Davin Chor Paolo Conconi	Internalizing Global Value Chains: A Firm-Level Analysis
1506	Alessandro Iaria Carlo Schwarz Fabian Waldinger	Frontier Knowledge and Scientific Production: Evidence from the Collapse of International Science

The Centre for Economic Performance Publications Unit
Tel: +44 (0)20 7955 7673 Email info@cep.lse.ac.uk
Website: http://cep.lse.ac.uk Twitter: @CEP_LSE