Government as Customer of Last Resort: The Stabilizing Effects of Government Purchases on Firms*

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Abstract

I document a beneficial effect of the government's participation in product markets. Exploiting the 2008-09 financial crisis as a natural experiment, I show that federal procurement contracts insulate government contractors' performance from the crisis. By 2009, government contractors had 15% higher market capitalization, 18% higher capital expenditures, and received 26% more bank credit than otherwise similar firms. This stabilizing effect, in turn, spills over onto neighboring firms. An average amount of government purchases reduces local employment losses by 35% in retail industries and by 48% in industries supplying government contractors. The spillovers are particularly strong in high economic slack areas.

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Introduction

The US federal government is one of the single largest purchasers of goods and services in the world. In 2012, it spent $518 billion (3.2% of GDP) on direct purchases from firms and organizations. For individual firms, the federal government is not only a large customer; it is also a remarkably stable one, being less likely than other clients to cut purchases in a recession.[1] However, despite the government's distinctive characteristics as a customer and their possible macroeconomic consequences, little is known about whether and how the stability of recurrent government purchases affects the resilience of firms to severe economic shocks.

In this paper, I use microeconomic data on US firms, narrowly defined geographic units, and federal government purchases to estimate whether, how, and to what extent the federal government's participation in product markets alters the impact of an aggregate shock on firms. Unlike macroeconomic studies that focus primarily on the aggregate effects of increases in government purchases over long time periods (Hall 2009; Ramey 2011), my approach allows me to examine in detail the channels through which government purchases affect firms' resilience to a shock. It also allows me to gauge government purchases' differential impacts across firms, sectors, or regions. Heterogeneity in firm performance is particularly relevant during a recession, as it affects the distribution of consumption losses – a determinant of the welfare effects of a downturn (Krebs 2007, Mian and Sufi 2016).

I identify two primary channels through which government purchases affect firms' stability. First, government purchases may directly affect the performance of government contractors that derive a large portion of their revenues from those purchases. Second, government contractors' performance may also spill over onto other firms, amplifying the

[1] For example, Figure 1 shows that federal contract spending remained steady during the 2008-09 financial crisis, while private consumption and investment dropped significantly.

initial stabilizing effect of government purchases. I quantify the corresponding direct and indirect effects.

I do so in the context of the 2008-09 financial crisis, which provided a sudden and unanticipated economic shock to firms. Using a difference-in-differences approach, I compare before, during and after the shock (i) the performance of government contractors with other firms, and (ii) economic outcomes of narrow geographic regions receiving different amounts of government contracts.

In implementing this approach, I use several strategies to mitigate the concern that firms and regions that receive government contracts might differ from other firms and regions in terms of additional characteristics that could also explain their greater resilience. First, I identify the amount of government contracts that firms and regions receive before the crisis, which ensures that the results are not due to firms and regions choosing to become more dependent on government purchases as a response to the crisis. Second, the regressions include (i) firm or region fixed effects that control for the selection of firms or regions as dependent on government purchases in terms of time-invariant characteristics, and (ii) industry-year (for firm regressions) or city/state-year fixed effects (for region regressions) that mitigate the concern of a possible correlation between the allocation of government contracts and unobserved time-varying factors driving the results. Finally, additional interaction terms explicitly control for any association between firms' or areas' characteristics and their resilience to the crisis.

The analysis yields three main findings. First, during the financial crisis of 2008-09, the stability of government purchases provided government contractors with a hedge against the recession. Government contractors – defined as listed firms deriving more than 10% of sales from the federal government – experienced smaller declines in sales, profitability, market values, investment, and employment than otherwise similar firms: by 2009, they had 15%

higher sales, 15% higher market capitalization, 18% higher capital expenditures, and 9% higher employment. Government contractors also kept investing more than firms that experienced similar sales stability during the recession. Relative to the latter firms, government contractors received more credit, and had capital expenditures that were less sensitive to pre-crisis cash balances. These results support the notion that the stability of government contracts not only protected government contractors from the drop in aggregate demand, but also helped government contractors access credit as bank lending contracted.

Second, the stabilizing effect of government purchases went beyond government contractors to affect neighboring businesses without government contracts. During the crisis, retail industries (e.g. bars and restaurants, grocery stores, furniture stores) in ZIP codes with average government contractor activity experienced 35% fewer job losses than in ZIP codes without government contractor activity. I find that the stabilizing effect of government contracts also propagated along local supply chains. The average amount of government contracts is associated with 48% fewer job losses in county-industries that did not contract with the government but that were in the top tercile by fraction of output sold indirectly to the government through supply chains. I do not observe significant crowding out of government purchases in non-linked industries.

These average stabilizing effects of government purchases are heterogeneous across regions. In particular, the spillovers are strong in areas that, pre-crisis, had lower employee earnings or higher unemployment. Thus, government purchases particularly stabilized areas with more economic slack.

Finally, I quantify "spending-per-job" and compare it to other studies that exploit geographic variation in government spending. I estimate the effect of government contracts on total county private employment. I find that the allocation of $1 million in government contracts

to firms in a county prevented 13.5 local job losses during the recession. This means that approximately every $75,000 in government contracts prevented one local job loss during the recession. This implied spending on government purchases that saves one local job is in between Chodorow-Reich, Feiveson, Liscow, and Woolston's (2012) and Wilson's (2012) state-level estimates for the 2009 American Recovery and Reinvestment Act (ARRA) fiscal stimulus ($26,000 and $125,000). Note that much of ARRA funds were exceptional federal transfers to subnational governments and welfare benefits distributed to increase local employment and consumption. The stabilizing effect of government purchases that I estimate derives from stable and recurrent product purchases, as opposed to deliberate spending increases designed to stimulate the economy.

The paper proceeds as follows. Section 1 reviews the relevant literature and provides background on the stability of government purchases. Section 2 discusses the data. Sections 3, 4, and 5 respectively quantify the direct, indirect, and total effects of government purchases. Section 6 concludes.

1. Related Literature and Background

1.1 Related literature

This paper relates to an emerging literature that exploits firm and other microeconomic data to understand macroeconomic questions. In particular, macroeconomists have recently estimated regional fiscal multipliers measuring the effect of an increase in local or federal government spending over long time periods across regions (Nakamura and Steinsson 2014; Shoag 2012; Serrato and Wingender 2014). These researchers identify exogenous increases in spending and measure how regional employment (or output) responds. They generally find

positive effects.[2] At the firm level, however, the literature documents negative responses to local increases in government spending: large listed firms reduce investment when their headquarter state experiences an increase in federal spending associated the promotion of local politicians to congressional committee chairs (Cohen et al. 2011), or when their headquarter county experiences an increase in government transfers following decennial population count adjustments (Kim and Nguyen 2017). Studying the Great Recession and closer to this paper, Chodorow-Reich et al. (2012) and Wilson (2012) estimate the effectiveness of the 2009 fiscal stimulus on state employment. They exploit pre-determined rules in the allocation of federal stimulus funds to each state and find annual costs per job of $26,000 and $125,000. Over the same period, Adelino, Cunha, and Ferreira (2017) study Moody's recalibration of municipal bonds that reduced some localities' borrowing costs in 2010. They find that every $20,000 increase in local spending created one job.

I contribute to this strand of research by exploiting *ex-ante* variation in federal product purchases at a very local level to assess their effect on firms' resilience during the 2008-09 financial crisis. The paper is the first to examine channels through which recurrent government product purchases, as opposed to sudden increases in public spending, embed an insurance component that reduces the impact of a recession on firms. The empirical strategy separates out direct and spillover effects, relates their magnitudes to the literature, and assesses their heterogeneity across firms and regions. The paper, thus, also complements earlier macroeconomic studies that relate larger governments to lower aggregate volatility (Gali 1994; Fatas and Mihov 2002).

[2] Studying military purchases over a 60-year period, Nakamura and Steinsson (2014) find that increases in military purchases increase state output and employment. They estimate a local multiplier of approximately 1.5. Shoag (2012) exploits increases in state spending induced by variations in a state's pension funds returns and finds that every $22,000 creates one job. Serrato and Wingender (2014) measure the effect of decennial Census population adjustments and obtain an estimate of $30,000 per job.

The results also speak to the literature on unemployment during the 2008-09 financial crisis. Mian and Sufi (2014) show that the housing price shock at the heart of the financial crisis dramatically affected household consumption, and in turn employment in the non-tradable sector. I identify government contracts as a mitigating factor in this regard.

Finally, this paper contributes to the literature on the performance of listed firms during the 2008-09 financial crisis. Research has shown that firms with higher cash balances (Duchin et al. 2010), lower leverage (Giroud and Mueller 2015), longer debt maturity (Campello, Graham, and Harvey 2010; Almeida, Campello, Laranjeira, and Weisbenner 2010), or better banking relationships (Chodorow-Reich 2014) fared better during the crisis. Alfaro and Chen (2012) and Kuppuswamy and Villalonga (2015) find similar performance results for multinationals and conglomerates, and Lins, Volpin, and Wagner (2013) show that family firms were more affected by the crisis. I add to this evidence by showing that large government contractors and private firms in close proximity to them suffered less from the crisis.[3]

1.2 Stability of government purchases

In this paper, federal government purchases encompass the goods and services purchased directly by federal agencies through public procurement. In the US, government purchases are uncorrelated with the business cycle: from 1985 to 2010, the correlation between the growth in annual procurement expenditures and GDP growth was only 0.04.[4] The stability

[3] More generally, this paper also contributes to the literature on the propagation of shocks through product networks. For example, Barrot and Sauvagnat (2016) empirically show that idiosyncratic firm shocks (natural disasters) propagate in the product network. My results suggest that the federal government, as a large stable customer, may reduce the propagation of such shocks through the network.

[4] For the period from 1960 to 2006, Bachmann and Bai (2013) also document a low correlation between GDP and (i) total federal government consumption and gross investment expenditures (0.12), (ii) federal government defense spending (0.13), and (iii) federal government non-defense spending (0.04). Note that, unlike procurement purchases, their government spending measures include the wages and salaries of government employees, subsidies and grants, and social benefits paid by the government.

of aggregate government purchases was also evident in the 2008-09 recession. Figure 1 shows that they were unaffected by the financial crisis, while domestic private investment and personal consumption declined significantly.

[[INCLUDE FIGURE 1 ABOUT HERE]]

Government purchases were also stable at the firm level. During the recession, the federal government continued to purchase significantly more from its existing suppliers than private firms. In Internet Appendix Table S.1, I estimate that listed firms' sales to the federal government were 18.2% less likely to decrease during the financial crisis than their sales to private firms.[5] In short, not only is the federal government a large buyer of goods: it is also a stable buyer, less likely to cut back on purchases during a recession.

In times of stress, one might expect stable government contracts to directly affect the performance of these firms that derive a large portion of their revenues from the contracts. In fact, for a firm, an existing business relationship with the government may serve as protection against the risk of future sales reductions. A quantity hedge is notoriously difficult to obtain in the private market (Brown and Toft 2002), which suggests that the government may play a role in completing asset markets. In addition, a business relationship with the government may be seen favorably by lenders and facilitate access to external financing when credit supply contracts.

If government purchases improve the performance of government contractors, that better performance could spill over into the surrounding economy. In normal times, Moretti (2010) and Greenstone, Hornbeck, and Moretti (2010) identify substantial positive spillovers from the manufacturing sector to employment, wages and productivity in other local industries.

[5] The estimation uses Compustat customer segment files to construct a yearly panel at the customer-supplier level. I estimate the probability that sales from customer *i* to supplier *j* decrease during the crisis as a function of customer type (government vs. private firm), controlling for time and customer-supplier fixed effects. I thank Jean-Noel Barrot and Julien Sauvagnat for their help with the data on customer-supplier links.

During a recession, the stability provided by government purchases to government contractors may have a multiplicative effect on other firms through a relative increase in demand for local goods and services.

In sum, the stability of government purchases may affect firms and local regions in a way that purchases from private firms do not. The government's participation in the product market may enable firms to mitigate a source of risk that they may not have been able to address otherwise. The behavior of government contractors is central to that propagation mechanism.

2. Data

2.1 Federal contracts

Data on federal contract awards comes from the Federal Procurement Data System (FPDS), accessed through www.usaspending.gov. The FPDS records all contracts awarded by federal agencies to firms and other organizations. In 2012, those payments came to a total of $518.4 billion, representing 16% of total federal expenditures and 3.2% of GDP. This total also represents 4% of all purchases made by non-financial Compustat firms and is at least 30% greater than the worldwide purchases made by Walmart, the largest Compustat firm by sales.[6]

The nature of government purchases is diverse. In 2012, contracts spanned 357 four-digit NAICS industries: 12% of the value of the contracts was related to aerospace products and parts, 8% to R&D, 7% to architecture and engineering services, 6% to computer systems design

[6] The total amount of purchases by Walmart is not available from the financial statements. I conservatively estimate the amount of goods and services Walmart purchased in 2012 by assuming it makes zero profits (i.e., sales = total expenditures) and that 20% of these estimated expenditures are labor costs (in 2012, the median of the labor-to-sales ratio of non-financial Compustat firms for which wage bills are available is 27%. As an example, McDonald's ratio is 17%).

services, 4% to facilities support services, 3% to measuring instruments, 3% to consulting services, and 3% to non-residential building construction. Government suppliers are located across the US, but particularly in Virginia (15%), California (14%), Texas (8%), Maryland, (7%) and Florida (4%).[7]

2.2 Government contractors

To assess the direct effect of government purchases at the firm level, I use quarterly data on US-listed firms from the merged CRSP-Compustat database. By regulation, firms must disclose their main customers, i.e., client relationships representing more than 10% of their sales. I collect that information from Compustat customer segment files and identify firms that report the federal government as a large customer as "government contractors". I check the names of the customers reported manually to isolate the firms for which the business with the federal government makes up over 10% of their sales. I disregard firms with negative sales or assets, firms active in financial services (SIC codes 6000 to 6999), and firms without US-listed ordinary shares. I exclude all health services firms (SIC codes 8000 to 8099), because 51% of them report the federal government as a large customer through their interactions with social security programs (e.g. Medicaid and Medicare), not procurement contracts.

Government contractors in the Compustat sample are active in 31 industries, encompassing manufacturing and services sectors (Table 1, Panel A). The industries with the highest fraction of sales to the federal government are: measuring instruments, heavy construction, transportation and transportation equipment, and engineering, accounting research and management services.

[7] For comparison, US Census data indicate that the five states with the largest number of firms in 2012 were California (12%), New York (8%), Florida (7%), Texas (7%) and Illinois (4%).

In the pre-crisis period (2004q1 to 2007q3), government contractors represented 8% of firms – I identify 251 government contractors among a total of 3,275 firms. In 2012, they reported $294 billion in sales to the federal government, which amounts to 57% of the total contract expenditures recognized by the government in that year. In the three years before the financial crisis, the average government contractor was deriving 35% of its sales from federal agencies, and 14% of government contractors were deriving more than 85% of their revenues from government contracts.

As the regression analysis below compares government contractors to non-government contractors, I document how these differ along other characteristics that could influence the resilience of firms during the recession. Panel B of Table 1 shows that, pre-crisis, government contractors have smaller sizes, smaller capital expenditures, higher labor intensities, and pay more political contributions. The difference-in-differences analysis will explicitly control for differences between government contractors and other firms.

[[INSERT TABLE 1 ABOUT HERE]]

2.3 Neighboring firms

The lack of public financial information about private firms makes the estimation of spillovers from government contractors to neighboring firms challenging. To address this issue, I rely on US Census Bureau ZIP Code Business Patterns (ZBP), a little-explored public panel of the number of private establishments by size, six-digit NAICS industry, and five-digit ZIP code.[8]

ZIP codes are the smallest areas with data on businesses available on a yearly basis. Studying these small areas is the most precise way to identify very local spillovers. In addition,

[8] ZIP Code Business Patterns do not include self-employment. The US Census Bureau defines an establishment as a single physical location where business is conducted or where services or industrial operations are performed.

working at the ZIP code level allows me to compare areas that belong to a common political, administrative and economic region: city-year fixed effects will exclude the possibility that time-varying unobserved variables defined at a narrow regional level are driving the results.

Following the urban economics and real estate literature, I assign ZIP codes to their corresponding Census ZIP Code Tabulation Areas (ZCTA), which are geographic units of greater stability than US Postal ZIP codes, and which, unlike ZIP codes, never reference a single, large-volume mailbox. In this paper, a ZIP code technically refers to a ZCTA.[9]

The ZBP dataset classifies establishments into nine categories according to their number of employees as of March each year. The size categories are 1 to 4, 5 to 9, 10 to 19, 20 to 49, 50 to 99, 100 to 249, 250 to 499, 500 to 999, and over 1000 employees. I estimate total employment in each industry-ZIP code based on the number of establishments in each category and the mid-point number of employees in the category.[10] I measure performance as the estimated number of employees in an industry-ZIP code.

I restrict the analysis to the 22,565 ZIP codes located in the Core Based Statistical Areas (CBSA) in the 48 contiguous states, with at least 3 establishments in 2005.[11] In 2005, this sample included 93% of the 7,412,747 active establishments.

Panel A of Table 2 presents the ZIP code sample statistics. The average ZIP code contains 5,211 employees and 309 establishments. The largest ZIP code contains 164,254

[9] I used the ZCTA-ZIP code crosswalk provided by the Department of Housing and Urban Development. Over 80% of ZIP codes exactly correspond to their ZCTA.

[10] Unlike employment in the County Business Patterns, the number of establishments in an industry-ZIP code is not considered a disclosure by the US Census and, therefore, is never suppressed for confidentiality reason. To estimate employment in an industry-ZIP code, I sum the products of the mid-point number of employees of each size category and the number of establishments in that category. For the last category (over 1000 employees), I assume a mid-point number of 1500. In Census years, the estimate has a correlation of over 90% with the actual Census ZIP code employment figure.

[11] A Core Based Statistical Area (CBSA) is a US geographic area defined by the Office of Management and Budget (OMB) that centers on an urban center of at least 10,000 people with adjacent areas that are socioeconomically tied to the urban center by commuting.

employees and 7,810 establishments. On average, a ZIP code has 10% of its employees in the tradable sector, 21% in the non-tradable sector, and 17% in the construction sector.

[[INSERT TABLE 2 ABOUT HERE]]

From 2006 to 2009, the average drop in employment among ZIP codes was 7% overall, 14% in the tradable sector, 5% in the non-tradable sector, and 18% in the construction sector. These numbers are similar to these reported by Mian and Sufi (2014) at the county level.

[[INSERT FIGURE 2 ABOUT HERE]]

Figure 2 shows that there is substantial heterogeneity in government contractor activity (measured as the sum of all amounts paid to local government contractors divided by the total number of local employees) at the ZIP code level. Some activity is clustered around Washington DC and in the Northwest but, overall, there are many areas of high and low levels of activity across the country. ZIP codes with large dollar amounts of contracts paid to private corporations include, for example, 63166 (St Louis, MO; location of McDonnell Douglas), 22102 (McLean, VA; location of Booz Allen Hamilton, Xerox, and Northrop Grumman), and 94104 (San Francisco, CA; location of McKesson). Scaled by the number of employees, high government contractor activity ZIP codes include 76108 (Forth Worth, TX; location of Lockheed Martin), 40516 (Lexington, KY; location of L-3 Communications), and 64163 (Kansas City, MO; location of US Premium Beef). Pre-crisis, 70% of ZIP codes received at least one payment.

Panel B of Table 2 compares ZIP code characteristics as a function of their exposure to procurement contracts. ZIP codes with little government contractor activity are smaller and have a higher share of employment in the construction sector. The econometric analysis will not only control for these differences, but also for the possibility that businesses in ZIP codes of different sizes and with different distributions of employment across sectors behave differently during the financial crisis.

3. Direct Effect on Government Contractors

3.1 Estimation strategy

To estimate the stabilizing effects of government purchases on firms and local regions during a deep recession, this paper exploits the 2008-09 financial crisis, which offers a particularly useful setting for the study. The financial crisis was large and sudden, originated in the banking sector, and is therefore plausibly exogenous to firm outcomes. I study firm outcomes from 2004 to 2015 and define the economic downturn ("Crisis") as the period between 2007q4 and 2010q4.[12]

To assess the direct effect of government purchases on government contractors, I compare the financial performance and investment of listed firms before, during, and after the crisis as a function of their government contractor status before the crisis using a difference-in-differences framework. The base regression is:

$$Y_{jt}=\alpha+\beta_1\left(GC_j\times Crisis_t\right)+\beta_2\left(GC_j\times AfterCrisis_t\right)+\eta_j+\delta_t+\epsilon_{jt} \quad (1)$$

where j indexes firms, t indexes a calendar quarter; Y is the firm outcome of interest and ε_{jt} is an error term. *Crisis* is a dummy variable that equals one if a quarter falls between 2007q4 and 2010q4, and *AfterCrisis* equals one after 2010q4. *GC* is a dummy variable that flags government contractors. *GC* equals one if a firm reports the federal government as a significant client at any fiscal year-end between 2004q4 and 2007q2, which is up to two quarters before the start of the crisis.[13] Quarter dummies δ_t control for quarterly aggregate fluctuations. The firm fixed effects η_j control for time-invariant differences between government contractors and

[12] The NBER defines the recession as the period between 2007q4 and 2009q2. However, 2009q2 only marks the bottom of the cycle. Real US GDP only recovered its 2007q4 level in 2010q4. Figure 4 displays the regression coefficients that compare government contractors and other firms in each year. These coefficients are not sensitive to the recession's definition and allow us to examine the full dynamic effects.

[13] In Internet Appendix Table S.2, I use the fraction of sales made to the government as a continuous measure of government contracting and obtain similar results.

other firms that can directly affect outcome *Y*. The parameter of interest is β_1 – the difference-in-differences estimate of the effect of being a government contractor during the crisis.

As the categorization of firms as government contractors is not random, β_1 could also reflect a time-varying omitted variable correlated with *GC*. I address this concern in several ways. First, I mitigate the endogeneity concern regarding government contractor status by defining government contractors based on the pre-crisis period. Second, I use firm fixed effects that control for the selection of firms as government contractors in terms of constant firm characteristics. Third, I further saturate the regression by interacting pre-crisis characteristics, (such as size, leverage, cash holdings, profitability, labor intensity, proportion of short-term debt and ratio of political contributions paid from political action committees (PAC) to sales) with time dummies.[14] These interaction terms alleviate the concern that government contractors might be larger, less leveraged, more profitable, less reliant on short-term debt, and pay more political contributions than other firms, and as a consequence more resilient to the financial crisis. As the results below indicate, β_1 is remarkably robust to the inclusion of these terms, suggesting that it indeed reflects government contractor status and not other firm characteristics. The full specification, which includes industry-quarter (ζ_{st}) fixed effects that control for any time-varying variable defined at the industry level, is:

$$Y_{jst}=\alpha+\beta_1\left(GC_j\times Crisis_t\right)+\beta_2\left(GC_j\times AfterCrisis_t\right)+\Sigma_{i=2004}^{2015}\gamma_i\left(\boldsymbol{Z}_j\times\tau_i\right)+\eta_j+\zeta_{st}+\epsilon_{jst} \quad (2)$$

where *j* indexes firms, *s* indexes industries (SIC2), and *t* indexes a calendar year-quarter. $\boldsymbol{Z}$ is the vector of control variables pre-determined before the crisis and τ are year fixed effects.

Finally, in Internet Appendix Table S.3, I also estimate the treatment effect using a matched sample that balances firm characteristics across treatment and control groups. To construct that sample, I first estimate the probability of a firm being a government contractor

[14] Political contributions data is from the Federal Election Commission.

based on observable characteristics – pre-crisis average of ln(total assets), leverage, ln(capital per employee), return on assets, proportion of debt that is short-term, political contributions over sales, and industry. I then run a probit regression to estimate the probability (i.e., the propensity score), $\hat{p}$, that a firm is a government contractor as a function of these characteristics, and use the propensity scores to perform a radius match with replacement (Dehejia and Wahba 2002). I use a standard tolerance level (0.005 caliper) and keep observations that fall on the common support. Panel B of Table 1 shows that covariates balance well in the matched sample. I then obtain an estimate of the treatment effect by reweighing equation (1), where treatment units are weighed equal to one and control units at the number of times they are matched to a treatment unit (Dehejia and Wahba 2002).

Overall, the exogenous shock, the pre-determined treatment definition, the firm and industry-year fixed effects, the matching estimator, and the stability of the coefficient of interest across specifications all serve to mitigate the concern that β_1 reflects a time-varying unobserved variable instead of the effect of government contractor status.[15]

3.2 Performance and investment of government contractors during the crisis

3.2.1 Baseline results

Figure 3 starts by illustrating the stability of government contractors in the raw data. It plots sales, return on assets, market capitalization, capital expenditures, and employment for

[15] The multiple fixed effects, the interaction terms, and the propensity score control for many potential confounding factors. However, a remaining possible concern might be that the federal government grants procurement contracts to stable firms, which could explain the greater resilience of these firms in the crisis. With firm fixed effects that control for firms' initial riskiness, the concern is that the government allocates contracts to firms that have recently become less risky. Accounting for the characteristics included in vector $\boldsymbol{Z}$ greatly mitigates this concern: the lower riskiness would need to come from a variable uncorrelated to those in vector $\boldsymbol{Z}$. Nonetheless, Table S.5 of the internet appendix directly assesses the proposition that the government allocates contracts to stable firms. Columns 1 to 5 present the results of a selection analysis. There, I do not find evidence that firms that will become government contractors are less risky than other firms – as measured by their asset beta – when they enter the sample or a few years before they become government contractors. In addition, Column 6 suggests that firms' asset betas significantly decline – reflecting lower risk – in the year in which they become government contractors.

government contractors and non-government contractors over the sample period, adjusted for firm fixed effects and fiscal quarter fixed effects. All variables follow parallel trends before and after the shock, supporting the identification assumption that the behavior of non-government contractors is a valid counterfactual for government contractors. The figures show, however, that the shock had a clear differential effect – during the recession, government contractors maintained higher performance, investment, and employment.

[[INSERT FIGURE 3 ABOUT HERE]]

Table 3 presents the regression results. For each dependent variable, the first column corresponds to the base specification with firm and year fixed effects. The second column shows the saturated model with industry-year fixed effects and additional interaction terms between pre-determined controls and time fixed effects.

The base specification in Column 1 indicates that, during the crisis, government contractors' sales stayed 8.2% higher than other firms'. The coefficient increases to 9.9% in the saturated model (Column 2). The coefficients are statistically and economically robust to the alternative specifications, supporting the view that they represent the effect of government sales and not of another omitted variable.

[[INSERT TABLE 3 ABOUT HERE]]

Moving to financial performance, Columns 3 and 4 show that government contractors maintained a return on assets 0.32 to 0.45 percentage points higher than that of other firms. The superior performance of government contractors during the crisis is also reflected in market values – their market capitalization remains 11.5% to 13.6% higher. These coefficients are again robust across specifications.

Government contractors also continued investing during the crisis. Their capital expenditures stayed 12.4% to 13.3% higher than those of other firms (Columns 7 and 8), and they maintained 8.5% more employees (Column 10). In Internet Appendix Table S.4, I examine

mergers and acquisitions, which are a particular type of investment. Gathering data on completed mergers from the Thomson-Reuters SDC database, I find that government contractors have 31% higher odds than their industry peers of making an acquisition during the recession, particularly a vertically-related or a diversifying acquisition. These results hold after eliminating targets that received a government contract between 2004 and 2007. The hedge provided by government contracts allowed government contractors to seize opportunities in non-government contracting businesses.

The previous results compare firms' outcomes across three periods: before, during and after the crisis. Figure 4 studies the dynamics of government contractors' performance in each year, and plots the coefficients on the interaction between *GC* and each calendar year dummy. Year 2007 is the reference year and is omitted. The patterns are clear: for each variable, the difference between government contractors and other firms cannot be distinguished from zero before the crisis, but the difference increases sharply after 2007. By 2009, government contractors' sales are 15.3% higher than other firms', market capitalization is 15.2% higher, employment 9.4% higher, and investment 18.4% higher. The difference reverts towards zero from 2010. While government contracts reduce the effect of the crisis, they also attenuate firms' growth in the recovery. By the end of the sample period, the coefficient on capital expenditures has returned to zero, and the coefficients on sales, market capitalization and employment coefficients have turned negative, although the estimates are not statistically significant.

[[INSERT FIGURE 4 ABOUT HERE]]

3.2.2 Stability of sales, investment, and access to credit

One question that arises from the previous findings is how the sales stability associated with government purchases compares to the stability that other firms may derive from an

alternative source. Do firms with sales as stable as government contractors during the crisis keep investing as much?

I start by comparing the capital expenditures of government contractors to those of firms that experienced similar limited sales reductions during the financial crisis. I include in the main regressions additional interaction terms between firms' 2007-08 sales growth and year fixed effects and between firms' 2008-09 sales growth and year fixed effects. Figure 5 plots the year-by-year coefficients from this adjusted regression. The crisis sales growth controls are effective: the difference in sales between government contractors' and other firms' is now constant around zero from the beginning of the sample until 2010. In contrast, the difference in capital expenditures between government contractors' and other firms' is constant around zero before the crisis but increases significantly during the crisis. By 2009, government contractors' capital expenditures are 16% higher than the capital expenditures of these other firms. Controlling for investment opportunities with contemporaneous Tobin's Q does not affect the patterns, presumably because the interactions between crisis sales growth and time dummies already control for changes in investment opportunities over the economic cycle.

[[INSERT FIGURE 5 ABOUT HERE]]

To better understand the greater resilience of government contractors' capital expenditures relative to other stable firms, I examine firms' access to credit during the financial crisis. In addition to providing sales stability, the product relationship with the federal government may be seen by lenders as a sign of credit quality, particularly beneficial in a period of tight credit supply. I follow Chodorow-Reich (2014) and focus on syndicated loans for corporate or working capital purposes as reported in LPC Dealscan.[16] Table 4 compares the credit received by government contractors and other firms across various credit indicators and

[16] I match Dealscan loans to Compustat firms with Chava and Roberts (2008) Compustat-Dealscan key.

econometric specifications. In Column 1, I first assess the probability that a firm gets a credit extension (e.g., a new loan or a positive modification of an existing loan) in the recession as a function of its government contractor status. After controlling for pre-crisis industry, size, capital intensity, political contribution payments, leverage, profitability, cash, and proportion of short-term debt, government contractors were 5.5 percentage points more likely to receive a credit extension between 2008 and 2010 than the other firms that finance their activities through syndicated loans. Further controlling for firms' change in size, capital per employee, profitability, and cash balances during the crisis does not materially change the coefficient (0.0511, Column 2).

[[INSERT TABLE 4 ABOUT HERE]]

A potential concern with this result is that government contractors may receive more credit extensions during the crisis simply because they borrow from better banks. Columns 3 to 6 address this issue and compare government contractors' probability of getting a new loan (in Columns 3 and 4) or change in lending (in Columns 5 and 6) to that of other firms that borrow from the same bank. In this test, a firm's banks are defined as the lead banks of the last syndicate that lent to the firm before the crisis (Chodorow-Reich 2014).[17] I exclude banks in the top quartile in terms of exposure to the financial crisis as measured by their co-syndication exposure to Lehman Brothers (Ivashina and Sharfstein, 2010 ; Chodorow-Reich, 2014). These banks' contraction in credit supply was presumably so severe that they may have had to reduce credit to all borrowers. The remaining 75% of banks were between 9.1 and 10.2 percentage points more likely to grant a loan to government contractors than to other firms (Columns 3 and 4). Using the log change in loan volume to the firm between the time of the last pre-crisis syndicate and the crisis shows a similar pattern: for the same bank, government contractors

[17] Like Chodorow-Reich (2014), I focus on the 43 most active lenders.

enjoyed greater credit growth than other firms. The 1.8 and 1.9 coefficients of Columns 5 and 6 suggest that government contractors are associated with an increase in credit volume of 26% to 28% from the mean (-6.9).

As a further test of the relevance of external financing, I exploit the fact that firms experienced difficulties in accessing debt markets during the crisis and relied on internal cash to finance investment (Duchin et al. 2010). If government contractors maintained better access to debt financing, their investment during the crisis should be less sensitive to their pre-crisis cash balances relative to other firms that experienced similar crisis sales declines. In Column 5, I implement a triple difference test where I compare the sensitivity of investment to cash for government contractors and these other firms. Consistent with the results of Duchin et al. (2010), I find that the coefficient on $Crisis \times Cash$ is positive: firms with higher cash balances before the crisis invested more during the crisis. In addition, the negative coefficient on $GC \times Crisis \times Cash$ suggests that having the government as a major customer hampers this sensitivity, arguably because government contractors maintained better access to external financing.

Together, the tests support the notion that government contractors benefited from the stability of their sales to the government and maintained better access to credit markets during the financial crisis.

3.2.3 Recurrent product purchases or fiscal stimulus?

The evidence so far indicates that the stability of government purchases reduced the impact of the 2008-09 financial crisis on government contractors. In February 2009, the US Congress enacted a $800 billion fiscal stimulus package (the American Recovery and Reinvestment Act, ARRA). Did this active fiscal policy underpin the greater resilience of

government contractors? Since government contractors are identified pre-crisis, ARRA spending would only drive the results if firms that were government contractors before 2007 were more likely to receive ARRA money. This is unlikely. From ARRA's inception in 2009 to June 2012 only 5.2% of government contracts were related to ARRA (95% of ARRA spending was in the form of grants, loans, tax benefits, or entitlements, not contracts to firms), and 56% of these small contract amounts was spent between April and June 2012.[18] Three quarters of the contract amounts were infrastructure- and energy-related. The results establishing the resilience of government contractors are based on more than 30 industries and are robust to the exclusion of the infrastructure and energy sectors. In addition, Figure 4 indicates that government contracts' return on assets, capital expenditures, and market values were already significantly higher in 2008, before the implementation of ARRA.

Together with the evidence that during the crisis, sales were less likely to decline when the customer was the government and that government contractors maintained greater access to external financing, the results support the interpretation that the product market relationship that government contractors have with the federal government makes them more resilient to a negative shock.

4. Indirect Effect: Spillovers

Large firms can affect economic activity in nearby areas through spillover effects. For example, Moretti (2010) and Allcott and Keniston (2018) document that manufacturing firms generate substantial spillovers for their neighboring firms. In Moretti (2010), an increase in the number of jobs at manufacturing firms increases the demand for local goods and services,

[18] Data from www.fedspending.org compiled by the Project On Government Oversight (POGO).

which, in turn, increases the number of jobs in the local non-tradable sector. In Allcott and Keniston (2018), an oil price boom also propagates locally along supply chains and benefits firms supplying the oil and gas sector. During a recession, the better performance and greater activity of government contractors could promote local businesses if government contractors and their employees maintain higher levels of consumption and investment relative to firms and employees in other areas. Such spillovers can amplify the stabilizing effect of government purchases in the crisis.

Thus, after establishing that government purchases have a stabilizing effect on government contractors, I assess how they affect neighboring firms. Tracing the effects of government purchases from government contractors to other firms located in close proximity can shed light on important mechanisms through which government purchases may stabilize the economy more generally.

I focus on assessing the existence of spillovers at the ZIP code level because working with small areas allows the identification of very local effects. In addition, using ZIP codes lets me compare areas with different government contractor activity but within a common political, administrative and economic region (e.g., a city). This strategy ensures that unobserved variables defined at a local level do not drive the results. To gauge spillovers along supply chains that may be missed at the narrow geographic level, I also loosen this strict identification and compare county-level outcomes within states.

4.1 Estimation strategy

To capture spillovers from government contractors to other local firms (and not the performance of local government contractors themselves), I remove from the ZIP Code Business Patterns dataset the ZIP code-industries (defined at the four-digit level) that received

a government contract in 2005 or 2006.[19] I then adapt the difference-in-differences methodology of Section 3.1 to estimate the effect that ZIP code government contracting activity had on the firms located in the ZIP code during the crisis. Specifically, I estimate the following model:

$$Y_{zrt}=\alpha+\beta_1(Gov_z\times Crisis_t)+\beta_2(Gov_z\times AfterCrisis_t)+\Sigma_{i=2004}^{2015}\gamma_i(\boldsymbol{X}_z\times\tau_i)+\eta_z+\zeta_{rt}+\epsilon_{zrt} \quad (3)$$

where Y is the logarithm of estimated non-government contracting employment in year t in ZIP code z in CBSA r.

Gov represents the ZIP code's government contractor activity. I use two versions of this treatment variable: a continuous version that uses the full distribution of government contracts across ZIP codes, and a discrete version which contrasts ZIP codes with high and low government contract activity. In the continuous treatment specification, *Gov* is defined as one plus the logarithm of the sum of all contracts allocated to firms in ZIP code z divided by the number of employees in that ZIP code, averaged over 2005-06.[20] In the discrete treatment specification, *Gov* is a dummy variable that equals one if the continuous measure falls in the highest tercile, and zero if it is in the lowest tercile.

$\boldsymbol{X}$ is a vector of ZIP code characteristics measured in 2005 that includes the log number of establishments (size), the proportion of jobs in each two-digit NAICS sector, the proportion of residents employed in the armed forces and public administration, and the amount of political contributions that originated from the ZIP code. ZIP code fixed effects (η_z) control for time-invariant differences across ZIP codes with different levels of government contractor activity. The interactions between $\boldsymbol{X}$ and the time fixed effects further control for the fact that ZIP codes

[19] For each federal contract awarded, the Federal Procurement Data System gives the ZIP code and industry of the government contractor. The results are robust to excluding ZIP code-industries that received a government contract during the crisis (i.e., between 2007 and 2009).

[20] For each ZIP code in each year, I sum contract amounts across all government contractors of the ZIP code, as recorded in the Federal Procurement Data System.

with government contractor activity are, on average, larger and have a smaller share of employment in the construction sector, and that these characteristics might also affect the resilience of ZIP codes to shocks.

CBSA-year fixed effects (ζ_{rt}) control for local shocks that occur at the CSBA level. Thus, the regressions compare the resilience of firms across ZIP codes that belong to the same city. The CBSA-year fixed effects absorb the possible effects of changes in taxes, house prices, welfare benefits and political power that vary at the state or city level. For example, BAE Systems reports an address in ZIP code 17404 in York, PA. The regression compares changes in outcomes of ZIP code 17404 with outcomes at other ZIP codes within the York-Hanover CBSA. While pre-crisis government contractor activity varies between \$0 and \$22,455 per employee across the 32 ZIP codes of the CBSA (a variation equivalent to two standard deviations), these ZIP codes belong to the same congressional district, and the average pair-wise correlation between ZIP code house prices from 2005 to 2015 is 0.92.

In a robustness test reported in Internet Appendix Table S.6, I also adapt the matching estimator of Section 3.1. Within each state, I estimate the probability (i.e., propensity score) that a ZIP code falls in the highest tercile (vs. lowest tercile) of government contractor activity as a function of observable characteristics.[21] I then use these propensity scores to perform a radius match with a 0.005 caliper.

4.2 Local spillovers on neighboring firms

Table 5 presents the main results of the spillover regressions. Columns 1 to 4 show that ZIP code government contractor activity is positively related to the local number of jobs during

[21] The characteristics are employment and the proportions of employment in the tradable, non-tradable and construction sectors, all measured in 2005. I restrict the observations to those on the common support. The matching procedure achieves covariate balance across treatment and control groups.

the recession. Columns 1-3 contain the results of the continuous specification, which uses all the information from the distribution of government contractor activity. The interaction terms between the predetermined controls and year fixed effects and the CBSA-year fixed effects have little effect on the significance of the coefficients. The point estimate in the most saturated model (Column 3) implies that during the crisis, firms in ZIP codes with an average amount of government contracts ($2,089 per worker) kept 2.9% more jobs than in ZIP codes without government contractors. As ZIP codes without government contractors experienced a 8.7% reduction in jobs during the crisis, the continuous treatment coefficients imply that an average amount of contracting activity cushioned the impact of the recession by 30% (equal to (1-8.7%)×2.9%/8.7%). The discrete treatment specification in Column 4 confirms this result. Firms in ZIP codes in the top tercile of government contractor activity maintained 2.7% more jobs than ZIP codes in the bottom tercile.

[[INSERT TABLE 5 ABOUT HERE]]

Next, I investigate the channels through which firms benefit from the stability of contractors located in the ZIP code. Mian and Sufi (2014) document the important role of the fall in consumption associated the 2007-09 unemployment spike. The local multiplier channel (Moretti, 2010) suggests that the resilience of government contractors could mitigate the unemployment spike if contractors and their employees kept consuming around the workplace. I follow Mian and Sufi (2014) and assess the effect of local consumption by contrasting employment outcomes in industries that are dependent on local demand (the non-tradable sector) and industries that are not (the tradable sector). I follow their sector definitions and aggregate four-digit industries into four sectors. An industry belongs to the tradable sector if the total of its imports plus exports exceeds $10,000 per employee or exceeds $500 million. Industries in the non-tradable sector are local and include retail stores and restaurants.

"Construction" includes industries related to construction, real estate, and land development. Any industry in the construction category is not included in either the tradable or non-tradable category. The remaining industries are classified as "Other".

Columns 5 to 8 of Table 5 display the regressions contrasting the results for the non-tradable and tradable sectors. Consistent with the importance of local consumption, the spillovers benefit firms in the non-tradable sector. In the tradable sector, government contractor activity had no significant effect on firm activity during the financial crisis. In terms of magnitudes, non-tradable industries maintained 2.8% more jobs in ZIP codes with average government contractor activity than in ZIP codes without such activity. As ZIP codes without contractors experienced a 7.3% reduction in jobs in non-tradable industries during the crisis, an average amount of government contractor activity cushioned the crisis impact by 35%.

Figure 6 plots the difference-in-differences coefficients of the employment regressions year-by-year (that is, the coefficients on the interactions between *Gov* and the year fixed effects). In the tradable sector, the point estimates are statistically insignificant. In the non-tradable sector, the coefficients are stable around zero before the crisis, and increase sharply during the crisis period. This suggests that after controlling for the terms included in equation (3), non-tradable employment dynamics in high and low government contractor ZIP codes tend to be similar before the crisis. While the decline in tradable employment is not statistically different between ZIP codes with high and low government contractor activity, ZIP codes with high government contractor activity experience a smaller decline in non-tradable employment, resulting in positive difference-in-differences coefficients in 2008, 2009 and 2010. The coefficients reach 0.0042 in 2008 and 0.0044 in 2009. From 2010 onwards, the point estimates are noisier but remain above zero: they decline between 2010 to 2012 and increase again from

2013.[22] In the internet appendix, I separately estimate the effects for each three-digit industry in the non-tradable sector (Table S.7). Disaggregating the results supports the idea that during the crisis, government contractors and employees kept consuming in the neighborhood of the firm's location. The coefficients are particularly large for food services and drinking places. These businesses sell products and services that are likely to be consumed locally around a workplace.

[[INSERT FIGURE 6 ABOUT HERE]]

The internet appendix also presents the results from several robustness tests (Table S.6). Excluding ZIP codes in the top 5% of government contractor activity, ZIP codes in Washington DC and the neighboring states of Virginia and Maryland, ZIP codes in the "Sand" states , or ZIP codes hosting a military base leaves the difference-in-differences coefficient on non-tradable sector employment virtually unchanged.[23] The results are also robust to estimating the discrete treatment model on a matched sample that balances observables characteristics across treated and control ZIP codes.

In summary, Section 3 showed that government purchases have a direct stabilizing effect on government contractors. The evidence in this section suggests that the resilience of government contractors also has an effect on local firms, primarily because it mitigates the drop

[22] The results for the non-tradable sector also alleviate the concern that the spillover results are driven by the misclassification of government contractors across tradable industries (if, for example, a single firm is active in various 4-digit industries within the same ZIP code). Ninety-nine percent of federal contracts by dollar amount are outside the non-tradable sector, making it unlikely that the results for the non-tradable sector are driven by misclassified government contractors rather than spillovers. For the same reason, the results for the non-tradable sector alleviate the concern that the spillover results are driven by a mechanical relationship between government contracting activity and employment in the industries removed from total employment to calculate non-government contracting employment. The results of Table 5 are virtually unchanged if I exclude government contracts in the non-tradable sector from the calculation of ZIP code government contracting exposure.

[23] The "Sand" states – Arizona, California, Florida, Nevada, and Texas – were severely affected by the 2007-09 collapse in house prices.

in local consumption. Studies restricted to large listed firms would miss this effect because it is very local and concentrated in typically small and private non-tradable establishments.

4.3 County employment and spillovers along supply chains

Working with ZIP codes is the most precise way of identifying very local spillovers on neighboring firms, and it allows me to control for many potential time-varying factors determined at the narrow city level.[24] That said, working with ZIP codes may miss spillovers on firms outside the government contractor's ZIP code, for example, along supply chains.

Empirically, there is a trade-off between capturing distant spillovers and the tightness of the identification strategy. As I extend the geographic unit of analysis, I need to relax the *Region×Year* fixed effects up to a greater aggregation level (for example, from *CBSA×Year* to *State×Year* in moving from a ZIP code to a county analysis), potentially controlling for fewer time-varying unobservable variables. With this trade-off in mind, Table 6 presents results at the county level. The data are aggregated up from the ZIP code dataset to avoid deleting entire county-industries when only a few ZIP code-industries within the county contract with the government. Columns 1 and 2 show that during the crisis, county employment in firms that do not contract with the government increases with government contracting activity. Moving from a county in the first tercile of government contractor activity to the third tercile is associated with a 1.6% increase in employment.

Within a county, we can also examine spillovers along the supply chain. Most suppliers are located within a small distance from their customers (Bernard et al. 2015) and, on average, positive industry shocks propagate through production networks within a county (Allcott and

[24] Internet Appendix Table S.8 shows that the spillovers on the non-tradable sector decline rapidly with distance. The coefficient on government contractor activity gets close to zero and loses its statistical significance one ZIP code away.

Keniston 2018). Among firms that do not contract with the government, I define firms linked to government contractors through supply chains (using the 2002 Bureau of Economic Analysis input-output matrix) as firms active in four-digit industries that sell more than 1% of output to the government through supply chains. This threshold corresponds to the top tercile by share of output indirectly sold to the government and is more conservative than the 0.1% threshold used by Allcott and Keniston (2018). Columns 3 and 4 of Table 6 show that firms in linked industries maintained more employees in counties with higher government contracting activity. The coefficient implies that an average amount of government contracting activity is associated with 7.5% more employment in these industries during the crisis, which is equivalent to a 48% reduction in job losses. The insignificant coefficients in Columns 5 and 6 indicate that, on average, firms in non-linked industries are not significantly affected – positively or negatively – by the presence of government contractors.

4.4 Heterogeneous effects: Economic slack

Which areas do government purchases particularly benefit? This is an important question from the perspective of understanding the redistributive consequences of government purchases on firms and regional development. Microeconomic data allow researchers to study heterogeneous effects across geographies with different pre-crisis economic slack. I define low/high-slack counties based on the pre-crisis unemployment rate relative to the median. Unemployment rates are not meaningful measures for ZIP codes and are unavailable at that level of aggregation. I therefore define low/high-slack ZIP codes based on pre-crisis average employee earnings (as reported in the ZIP Code Business Patterns) relative to the median.

Table 7 presents the results of the regressions run separately for low and high economic slack subsamples. The positive spillovers on the non-tradable sector (Columns 1 to 4) and

linked industries (Columns 5 and 8) are particularly large in high-slack areas and I do not observe negative effects in low-slack areas. To the extent that high-slack areas are hit the hardest by recessions, the results suggest that the stability of government purchases may reduce disparities in regional economic outcomes that recessions otherwise exacerbate.

[[INSERT TABLE 7 ABOUT HERE]]

5. Estimation of the Average Total Effect

The microeconomic approach also makes it possible to quantify the average total stabilizing effect (that is, the sum of the direct and spillover effects) of government purchases on firms in terms of dollars per job, and to compare it to recent studies that exploit different sources of variation in government spending.

To do this, I estimate the effect of government contracting activity on total employment at the county level. Estimating the effect at the county level presents several advantages. First, the effect of government purchases on total county employment includes the ZIP code spillovers on the non-tradable sector, the county spillovers on linked industries, as well as the direct effect of government purchases on government contractors. Second, actual county employment is available for most counties in the dataset, and this allows a more precise estimation than one based on the approximation method used in the rest of the analysis.

Table 8 displays the results. After controlling for county fixed effects, for the differential effect of the crisis across different states and across counties of different sizes, industry composition, and political contribution intensity, total employment is higher in counties that pre-crisis received more government contracts. Firms in a county that received an average amount of government contracts ($1,790 per employee) retain 2.2% more employees during

the crisis than those in a county that would not receive any contract. Given that, during the crisis, the average employment reduction in a county was 7.7% and that the average county had 63,970 employees pre-crisis, the estimate implies that approximately $75,000 in government contracts prevented one direct job displacement during the crisis. In other words, $1,000,000 in contracts prevented 13.5 jobs displacements.

[[INSERT TABLE 8 ABOUT HERE]]

This average government expenditure per job is generally higher but in the same order of magnitude as the estimates found by recent studies that exploit other sources of variation in government expenditures. For example, relative to state-level studies of the 2009 fiscal stimulus, my spending-per-job estimate is in between Chodorow-Reich et al.'s (2012) and Wilson's (2012) estimates of $26,000 and $125,000. Relative to studies that exploit shocks to local government budgets, my estimate is higher than those of Adelino et al. (2017), Shoag (2012), or Serrato and Wingender (2014) at between $20,000 and $35,000.

Important differences in the nature of spending should be considered when comparing my estimate to those in the literature. First, a significant fraction of the federal purchases that I study consists in manufactured goods and, unlike some other types of government expenditures (such as the wages of public employees or welfare benefits), their price also reflects the cost of materials. Second, much of the 2009 stimulus funds were exceptional federal transfers to subnational governments and welfare benefits distributed deliberately to stimulate local employment and consumption. Instead, the stabilizing effect of government purchases that I estimate here derives from stable and recurrent product purchases. Finally, 50% of local government expenditures relate to education, hospitals, police protection, and public welfare, which may provide greater increases in local consumption and fewer spillovers beyond local borders than federal product purchases.

6. Conclusion

This paper has provided evidence that recurrent government product purchases stabilize firms in a recession. Exploiting the severe macroeconomic shock of the 2008-09 financial crisis, I show that the stability of federal government purchases over the business cycle reduces the impact of the crisis on government contractors relative to otherwise similar firms. I then provide evidence that the better performance of government contractors spills over to other firms in their local economy. At the local level, the stabilizing effect of government purchases benefits firms active in the non-tradable sector and in industries supplying government contractors.

It is important to note that, although I do not observe a negative effect of government purchase activity on employment up to seven years after the beginning of the recession, the findings do not imply that a high level of government purchases is necessarily net beneficial for a region. Government purchases may also have subtle longer-term effects after the recession – for example, they may interact with reallocations of resources in the recovery – and these longer-term effects may possibly be negative. Furthermore, government purchases can at times decline – for economic or political reasons – and these cuts may have their own specificities and negatively affect government contractors and related firms. Better understanding the interaction between government purchases and long-term reallocations of resources, as well as the micro-economic effect of declines in government purchases are important avenues for further research.

In the short term, however, the empirical results of this study support the idea that the participation of the federal government in the product market changes many firms' sensitivity to an aggregate shock. The findings thus give a more nuanced picture of the effect of

government spending on firms than is present in the literature. They help explain why some local areas compete to attract federal contracts for firms, even though, on average, those public funds may crowd out private investment: government contracts also provide local stability in tough times.

References

Allcott, H., and D. Keniston. 2018. Dutch disease or agglomeration? The local economic effects of natural resource booms in modern America. *Review of Economic Studies* 85:695–731.

Adelino, M., I. Cunha, and M. A. Ferreira. 2017. The economic effects of public financing: Evidence from municipal bond ratings recalibration. *Review of Financial Studies* 30:3223–3268.

Alfaro, L., and M. X. Chen. 2012. Surviving the global financial crisis: Foreign ownership and establishment performance. *American Economic Journal: Economic Policy* 4:30-55.

Almeida, H., Campello, M., Laranjeira, B., and S. Weisbenner. 2012. Corporate debt maturity and the real effects of the 2007 credit crisis. *Critical Finance Review* 1:3–58.

Bachmann, R., and J. H. Bai. 2013. Public consumption over the business cycle. *Quantitative Economics* 4:417–451.

Barrot, J., and J. Sauvagnat. 2016. Input specificity and the propagation of idiosyncratic shocks in production networks. *Quarterly Journal of Economics* 131:1543–1592.

Bernard, A., Moxnes, A., and Y. Saito. 2015. Production networks, geography and firm performance. NBER Working Paper No. 21082.

Blanchard, O., and R. Perotti. 2002. An empirical characterization of the dynamic effects of changes in government spending and taxes on output. *Quarterly Journal of Economics* 117:1329–68.

Brown, G. W., and K. B. Toft, 2002. How firms should hedge. *Review of Financial Studies* 15:1283–1324.

Campello, M., Giambona, E., Graham, J. R., and C. R. Harvey. 2011. Liquidity Management and Corporate Investment during a Financial Crisis. *Review of Financial Studies* 24:1944–1979.

Campello, M., Graham, J. R., and C. R. Harvey. 2010. The real effects of financial constraints: Evidence from a financial crisis. *Journal of Financial Economics* 97:470–487.

Chava, S., and M. R. Roberts, 2008. How does financing impact investment? The role of debt covenants. *Journal of Finance* 63: 2085–2121.

Chodorow-Reich, G. 2014. The employment effects of credit market disruptions: Firm-level evidence from the 2008-9 financial crisis. *Quarterly Journal of Economics* 129:1–59.

Chodorow-Reich, G., Feiveson, L., Liscow, Z., and W. G. Woolston. 2012. Does state fiscal relief during recessions increase employment? Evidence from the American Recovery and Reinvestment Act. *American Economic Journal: Economic Policy* 4:118–145.

Cohen, L., Coval, J., and C. Malloy. 2011. Do powerful politicians cause corporate downsizing? *Journal of Political Economy* 119:1015–1059.

Cohen, L., and C. Malloy. 2014. Mini West Virginias: Corporations as government dependents. Working Paper, Harvard Business School.

Davis, S. J., Haltiwanger, J., Jarmin, R., and J. Miranda. 2007. Volatility and dispersion in business growth rates: Publicly traded versus privately held firms, in *NBER Macroeconomics Annual* 2006, eds. D. Acemoglu, K. Rogoff, and M. Woodford, vol. 21,107–180.

Dehejia, R. H., and S. Wahba. 1999. Causal effects in nonexperimental studies: Reevaluating the evaluation of training programs. *Journal of the American Statistical Association* 94:1053–62.

Dehejia, R. H., and S. Wahba. 2002. Propensity score-matching methods for nonexperimental causal studies. *Review of Economics and Statistics* 84:151–161.

Duchin, R., Ozbas, O., and B. A. Sensoy. 2010. Costly external finance, corporate investment, and the subprime mortgage credit crisis. *Journal of Financial Economics* 97:418–435.

Duchin, R., and D. Sosyura. 2012. The politics of government investment. *Journal of Financial Economics* 106:24–48.

Fan, J., and V. K. Goyal. 2006. On the patterns and wealth effects of vertical mergers. *Journal of Business* 79:877–902.

Fatas, A., and I. Mihov. 2001. Government size and automatic stabilizers: International and intranational evidence. *Journal of International Economics* 55:3–28.

Gali, J. 1994. Government size and macroeconomic stability. *European Economic Review* 38:117–132.

Giroud, X., and H. M. Mueller. 2017. Firm leverage, consumer demand, and employment losses during the Great Recession. *Quarterly Journal of Economics* 132:271–316.

Greenstone, M., Hornbeck, R., and E. Moretti. 2010. Identifying agglomeration spillovers: Evidence from winners and losers of large plant openings. *Journal of Political Economy* 118:536–598.

Hall, R. 2009. By how much does GDP rise if the government buys more output? *Brookings Papers on Economic Activity* 40:183–249.

Haltiwanger, J., R. Jarmin, and J. Miranda. 2013. Who creates jobs? Small versus large versus young. *Review of Economics and Statistics* 95:347–61.

Ivashina, V., and D. Sharfstein. 2010. Bank lending during the financial crisis of 2008. *Journal of Financial Economics* 97:319–338.

Kim, T., and Q. Nguyen. 2017. The effect of public spending on private investment: Evidence from census shocks. Working Paper.

Krebs, T. 2007. Job displacement risk and the cost of business cycles. *American Economic Review* 97:664–686.

Kuppuswamy, V., and B. Villalonga. 2015. Does diversification create value in the presence of external financing constraints? Evidence from the 2007-2009 financial crisis. *Management Science* 62:905–923.

Lins, K. V., Volpin, P., and H. F. Wagner. 2013. Does family control matter? International evidence from the 2008-2009 financial crisis. *Review of Financial Studies* 26:2584–2619.

Mian, A., and A. Sufi. 2014. What explains the 2007-2009 Drop in employment? *Econometrica* 82:2197–2223.

Mian, A., and A. Sufi. 2016. Who bears the cost of recessions? The role of house prices and household debt. NBER Working Paper No. 22256.

Moretti, E. 2010. Local multipliers. *American Economic Review: Papers & Proceedings* 100: 1–7.

Nakamura, E., and J. Steinsson. 2014. Fiscal stimulus in a monetary union: Evidence from US regions. *American Economic Review* 104:753–792.

Nekarda, C. J., and V. A. Ramey. 2011. Industry evidence on the effects of government spending. *American Economic Journal: Macroeconomics* 3:36–59.

Parker, J. A. 2011. On measuring the effects of fiscal policy in recessions. *Journal of Economic Literature* 49:703–718.

Ramey, V. A. 2011. Can government purchases stimulate the economy? *Journal of Economic Literature* 49:673–685.

Ramey, V. A. 2011. Identifying government spending shocks: It's all in the timing. *Quarterly Journal of Economics* 126:1–50.

Rodrik, D. 1998. Why do more open economies have bigger government? *Journal of Political Economy* 106:997–1032.

Serrato Suarez, J., and P. Wingender. 2014. Estimating the incidence of government spending. Working Paper.

Shoag, D. 2012. The impact of government spending shocks: Evidence on the multiplier from state pension plan returns. Working Paper.

Wilson, D. 2012. Fiscal spending jobs multipliers: Evidence from the 2009 American Recovery and Reinvestment Act. *American Economic Journal: Economic Policy* 4:251–282.

Table 1
Firms' Characteristics by Government Contractor Status

Panel A: Top 10 Industries by Average Fraction of Sales to the Government

SIC2	Description	Number of non-GC Firms	Number of GC Firms	Fraction of Firms that are GC	Average Fraction of Sales to Government
38	Measuring, Photographic, Medical, Optical Goods, Clocks	212	25	10.55%	35.60%
16	Heavy Construction, Except Building Construction Contractors	9	6	40.00%	32.53%
37	Transportation Equipment	54	24	30.77%	31.48%
87	Engineering, Accounting, Research, Management Services	49	22	30.99%	17.61%
41	Local and Suburban Transit, Interurban Highway Transportation	1	3	75.00%	16.78%
99	Non-classified establishments	30	4	11.76%	10.86%
34	Fabricated Metal Products	42	4	8.70%	5.72%
73	Business Services	382	45	10.54%	5.55%
82	Educational Services	15	3	16.67%	5.28%
59	Miscellaneous Retail	66	12	15.38%	4.08%

Panel B: Financial Characteristics of Firms

	Non-GC Firms		GC Firms		*t-stat* for Comparison of Means	
	Mean	S.D.	Mean	S.D.	Raw Sample	Matched Sample
Ln(Assets)	6.025	2.051	5.643	1.998	-2.79***	0.00
Ln(Capx)	2.964	2.004	2.351	1.788	-4.61***	-0.96
Ln(Market Cap.)	6.160	2.018	5.772	1.974	-2.88***	-0.02
Ln(Employment)	0.334	2.070	0.292	1.984	-0.31	0.15
Sales Growth YoY	0.217	0.480	0.190	0.424	-0.84	-1.11
Return on Assets	-0.013	0.190	-0.031	0.196	-1.34	-0.62
Capital per Employee	204.466	546.575	65.193	178.688	-3.95***	-1.46
Leverage	0.256	0.247	0.227	0.235	-1.78*	-1.00
Cash / Assets	0.219	0.260	0.213	0.239	-0.40	-0.88
R&D / Assets	0.056	0.106	0.054	0.094	-0.19	-1.04
Political Contrib. / Sales	4.801	23.582	16.673	46.521	6.81***	0.63
Sales to Government	-	-	0.335	0.305	-	-

This table shows the characteristics of government contractor (GC) and non-government contractor (non-GC) firms. Government contractors are defined as firms that derived more than 10% of their revenues from sales to the federal government at year-end 2005 or 2006 (pre-crisis). Panel A presents the distribution of firms across the top 10 two-digit industries by fraction of sales to the government, while Panel B presents the pre-crisis financial characteristics of the firms (average of year-ends 2005 and 2006). The matched sample is constructed by radius matching with a caliper 0.005. Variables are defined in Tables A.1 and A.2.

Table 2
ZIP Codes' Characteristics by Government Contractor Activity

Panel A: ZIP Code Characteristics by Sector

	Total				Tradable	Non-Tradable	Construction
	Mean	Median	S.D.	N	Mean	Mean	Mean
Employment	5,211.00	1,236.50	8,962.72	22,565	530.34	1,081.54	610.25
No. of Establishments	309.09	106.00	444.79	22,565	12.08	62.91	56.20
Employment Growth 2006-09	-0.07	-0.06	0.32	22,565	-0.14	-0.05	-0.18

Panel B: Mean Characteristics by Tercile of Government Contractor Activity

	All	GC Tercile 1	GC Tercile 2	GC Tercile 3
Employment	5,211.00	631.01	5,010.03	9,992.60
Proportion of Empl. in Tradable Sector	0.10	0.11	0.10	0.10
Proportion of Empl. in Non-Tradable Sector	0.21	0.19	0.22	0.21
Proportion of Empl. in Construction Sector	0.17	0.20	0.15	0.15
Government Contractor Activity ($/Employee)	1,457.15	0.12	49.78	4,321.94

This table presents descriptive statistics for ZIP codes in Core Based Statistical Areas. Panel A presents the statistics by sector according to the definitions of Mian and Sufi (2014). A four-digit NAICS industry is defined as *tradable* if the sum of its imports and exports is equal to at least $10,000 per worker or exceeds $500 million. *Non-tradable* industries are local and include the retail and restaurant sectors. *Construction* includes industries related to construction, real estate, and land development. Any industry in the construction category is not included in either the tradable or non-tradable category. Panel B presents the statistics for ZIP codes by tercile of government contractor activity, defined as one plus the logarithm of the sum of government contracts allocated to firms in the ZIP code divided by the number of employees.

Table 3
Government Contractors' Performance during the Financial Crisis

	Ln(Sales)		Return on Assets		Ln(Market Capitalization)		Ln(Capx)		Ln(Employment)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
GC×Crisis	0.0815**	0.0988**	0.0045**	0.0032*	0.1149**	0.1364***	0.1240***	0.1331***	0.0483*	0.0849***
	(0.0383)	(0.0425)	(0.0017)	(0.0019)	(0.0465)	(0.0489)	(0.0298)	(0.0334)	(0.0273)	(0.0316)
GC×AfterCrisis	0.0023	0.0105	0.0010	-0.0007	-0.0198	0.0002	0.0333	0.0427	-0.0270	-0.0028
	(0.0654)	(0.0713)	(0.0020)	(0.0020)	(0.0676)	(0.0764)	(0.0446)	(0.0491)	(0.0476)	(0.0534)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Industry FE×Time FE	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Z×Time FE										
N	106,093	105,926	106,093	105,926	95,006	94,843	106,093	105,926	28,909	28,863
R^2 *(within)*	0.0982	0.0412	0.0268	0.0351	0.1849	0.0324	0.0759	0.0216	0.0502	0.0626

This table shows the results of difference-in-differences regressions contrasting the financial performance of government contractors (GC) and other firms (non-GC) during and after the financial crisis. The crisis is defined as the period between 2007q4 and 2010q4. The sample period is from 2004 to 2015. Government contractors are defined as firms that derived more than 10% of their sales from the federal government in the pre-crisis period. Market capitalization regressions exclude penny stocks that have a price smaller than $2 in the pre-crisis period. All regressions are estimated based on quarterly data, except employment (annual data). Therefore, *Time FE* are calendar quarter fixed effects in Columns 1 to 8 and fiscal year fixed effects in Columns 9 and 10. *Z* represents a vector of firm characteristics that includes ln(total assets), leverage, cash balance, ln(capital per employee), return on assets, proportion of short-term debt, and political contributions paid over sales. Variables are defined in Tables A.1 and A.2. Standard errors are clustered by firm. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Table 4
Comparing Government Contractors and Other Stable Firms: The Role of Financing

	Credit Access						Capx Sensitivity to pre-Crisis Cash
	Credit ext.		New loan		ΔCredit		Ln(Capx)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
GC	0.0550**	0.0511**	0.0911**	0.1020**	1.7588**	1.9488***	
	(0.0266)	(0.0258)	(0.0424)	(0.0420)	(0.7316)	(0.7350)	
GC×Crisis							0.1841***
							(0.0534)
GC×Crisis×Cash							-0.3210**
							(0.1497)
Crisis×Cash							0.3296***
							(0.0541)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	–
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	–
ΔSalesCrisis	Yes	Yes	Yes	Yes	Yes	Yes	–
ΔPerfControlCrisis	–	Yes	–	Yes	–	Yes	–
Bank FE	–	–	Yes	Yes	Yes	Yes	–
Firm FE	–	–	–	–	–	–	Yes
Industry FE×Year FE	–	–	–	–	–	–	Yes
Z×Year FE	–	–	–	–	–	–	Yes
ΔSalesCrisis×Year FE	–	–	–	–	–	–	Yes
N	2,066	2,059	3,478	3,476	3,478	3,476	28,544
R^2 *(within)*	n/a	n/a	0.0739	0.0800	0.0735	0.0792	0.0720

Columns 1 to 4 show the results of cross-sectional regressions comparing the access to credit during the financial crisis of government contractors (GC) and other firms (non-GC). The crisis is defined as the period between 2008 and 2010. Government contractors are defined as firms that derived more than 10% of their sales from the federal government in the pre-crisis period. The controls include pre-crisis industry, size (ln(total assets)), ln(capital per employee), political contribution payments, leverage, profitability, cash, and proportion of short-term debt. Dependent variables are credit extension (Columns 1 and 2), the probability of getting a new loan from the bank with which the firm already has a relationship (Columns 3 and 4) and the change in credit given by that bank between the last pre-crisis loan and the crisis period (Columns 5 and 6). Column 7 shows the results of a panel regression assessing the sensitivity of investment during the crisis as a function of pre-crisis cash balances. Controlling for **Δ**SalesCrisis compares GC firms with other firms that experience similar drop in sales between 2007 and 2008, and between 2008 and 2009. **Δ**PerfControlCrisis compares GC firms with other firms that experience similar change in size, capital per employee, profitability, and cash balances between 2007 and 2008, and between 2008 and 2009. Standard errors are clustered by firm. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Table 5
Resilience of Firms Neighboring Government Contractors: ZIP Codes

	Ln(Non-GC Employment)							
	All Sectors				Non-Tradable Sector		Tradable Sector	
Treatment Type:	Cont.	Cont.	Cont.	Discr.	Cont.	Disc.	Cont.	Discr.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Gov×Crisis	0.0054***	0.0052***	0.0038***	0.0274***	0.0036**	0.0356**	0.0022	0.0012
	(0.0007)	(0.0007)	(0.0008)	(0.0074)	(0.0015)	(0.0138)	(0.0022)	(0.0199)
Gov×AfterCrisis	0.0108***	0.0096***	0.0049***	0.0321***	0.0032*	0.0411**	0.0012	-0.0046
	(0.0010)	(0.0010)	(0.0011)	(0.0096)	(0.0019)	(0.0171)	(0.0027)	(0.0247)
ZIP Code FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	–	–	–	–	–	–	–
CBSA FE×Year FE	–	Yes	Yes	Yes	Yes	Yes	Yes	Yes
X×Year FE	–	–	Yes	Yes	Yes	Yes	Yes	Yes
N	270,780	270,144	270,144	162,360	270,144	162,360	270,144	162,360
R^2 *(within)*	0.0039	0.0026	0.0178	0.0172	0.0231	0.0253	0.0199	0.0212

This table shows the results of difference-in-differences regressions comparing non-government contractor employment (Non-GC Employment) in ZIP codes during the financial crisis, as a function of their pre-crisis exposure to government contracts. For each ZIP code, local four-digit NAICS industries that receive government contracts pre-crisis are excluded. The crisis is defined as the period between 2007q4 and 2010q4. The sample period is from 2004 to 2015. In the continuous treatment specification (Cont.), *Gov* is defined as one plus the logarithm of the sum of all contracts allocated to firms in a ZIP code divided by the number of employees in that ZIP code, all measured pre-crisis. In the discrete treatment specification (Discr.), *Gov* is a dummy variable that equals one if government contractor activity falls in the highest tercile, and zero if it is in the lowest tercile. *X* represents a vector of ZIP code characteristics that includes size (ln(number of establishments)), the share of employment in each 2-digit NAICS industry, share of residents employed in the armed forces, and political contributions paid from the ZIP code (all measured in 2005). Sector classification is from Mian and Sufi (2014). Standard errors are clustered by CBSA. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Table 6
Resilience of Firms Neighboring Government Contractors: Counties

	Ln(Non-GC Employment)					
	All sectors		Linked industries		Non-linked industries	
Treatment Type:	Continuous	Discrete	Continuous	Discrete	Continuous	Discrete
	(1)	(2)	(3)	(4)	(5)	(6)
Gov×Crisis	0.0026**	0.0157***	0.0100***	0.0322*	0.0013	0.0075
	(0.0013)	(0.0058)	(0.0038)	(0.0176)	(0.0017)	(0.0073)
Gov×AfterCrisis	0.0037**	0.0219**	0.0088	0.0461**	0.0024	0.0090
	(0.0018)	(0.0089)	(0.0054)	(0.0218)	(0.0023)	(0.0106)
County FE	Yes	Yes	Yes	Yes	Yes	Yes
State FE×Year FE	Yes	Yes	Yes	Yes	Yes	Yes
X×Year FE	Yes	Yes	Yes	Yes	Yes	Yes
N	21,288	12,744	21,288	12,744	21,288	12,744
R^2 *(within)*	0.1521	0.1871	0.0822	0.1012	0.0930	0.1128

This table shows the results of difference-in-differences regressions comparing non-government contractor employment (Non-GC Employment) in counties during the financial crisis, as a function of their pre-crisis exposure to government contracts. For each ZIP code included in a county, ZIP code-industries that receive government contracts pre-crisis are excluded. The crisis is defined as the period between 2007q4 and 2010q4. The sample period is from 2004 to 2015. In the continuous treatment specification (Cont.), *Gov* is defined as one plus the logarithm of the sum of all contracts allocated to firms in a county divided by the number of employees in that county. In the discrete treatment specification (Discr.), *Gov* is a dummy variable that equals one if government contractor activity falls in the highest tercile, and zero if it is in the lowest tercile. *X* represents a vector of county characteristics that includes size (ln(number of establishments)), the share of employment in each 2-digit NAICS industry, share of residents employed in the armed forces, and political contributions paid from the county (all measured in 2005). Linked industries include firms that do not directly contract with the government but for which the industry falls in the top tercile of industries that sell to the government indirectly through supply chains. Standard errors are clustered by county. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Table 7
Heterogeneity in Spillovers: Economic Slack

	ZCTA – Ln(Non-GC Employment ; Non-Tradable)				County – Ln(Non-GC Employment; Linked Industries)			
Subsample:	Low Employee Earnings		High Employee Earnings		High Unemployment		Low Unemployment	
Treatment Type:	Cont.	Disc.	Cont.	Disc.	Cont.	Disc.	Cont.	Disc.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Gov×Crisis	0.0046**	0.0574***	0.0020	0.0252	0.0125***	0.0770***	0.0046	-0.0042
	(0.0019)	(0.0181)	(0.0023)	(0.0325)	(0.0048)	(0.0241)	(0.0044)	(0.0220)
Gov×After	0.0048**	0.0552**	0.0007	0.0174	0.0081	0.0671**	0.0031	0.0111
	(0.0024)	(0.0246)	(0.0029)	(0.0391)	(0.0057)	(0.0296)	(0.0059)	(0.0290)
ZIP Code FE	Yes	Yes	Yes	Yes	–	–	–	–
County FE	–	–	–	–	Yes	Yes	Yes	Yes
CBSA FE×Year FE	Yes	Yes	Yes	Yes	–	–	–	–
State FE×Year FE	–	–	–	–	Yes	Yes	Yes	Yes
X×Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	98,844	48,216	97,428	53,736	10,200	5,952	9,876	5,880
R^2 *(within)*	0.0273	0.0321	0.0197	0.0234	0.0804	0.1103	0.0665	0.0955

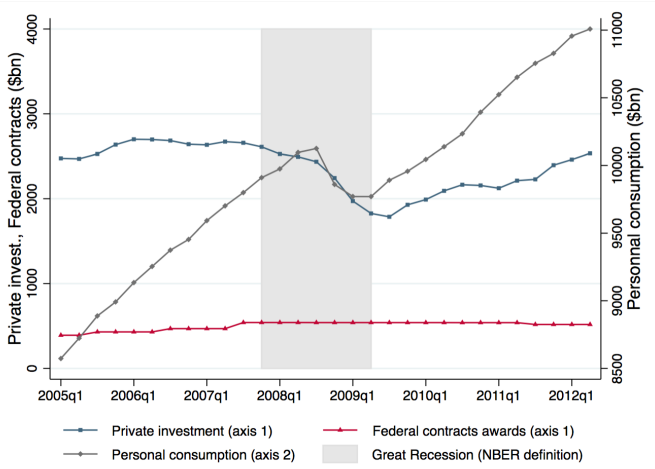
This table shows the results of difference-in-differences regressions comparing employment spillovers from government purchases during the financial crisis in regions with low or high economic slack. Economic slack is proxied by pre-crisis average employee earnings in ZIP code regressions and by the pre-crisis unemployment rate in county regressions. The crisis is defined as the period between 2007q4 and 2010q4. The sample period is from 2004 to 2015. In the continuous treatment specification (Cont.), *Gov* is defined as one plus the logarithm of the sum of all contracts allocated to firms in the area divided by the number of employees in that area. In the discrete treatment specification (Discr.), *Gov* is a dummy variable that equals one if government contractor activity falls in the highest tercile, and zero if it is in the lowest tercile. *X* represents a vector of the area characteristics that includes size (ln(number of establishments)), the share of employment in each 2-digit NAICS industry, share of residents employed in the armed forces, and political contributions paid from the area (all measured in 2005). Standard errors are clustered by CBSA (in ZIP code regressions) or county (in county regressions). ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Table 8
Total Effect at the County Level

	Ln(Total Employment)		
Treatment Type:	Continuous	Continuous	Continuous
	(1)	(2)	(3)
Gov×Crisis	0.0036***	0.0045***	0.0030**
	(0.0014)	(0.0013)	(0.0014)
Gov×AfterCrisis	0.0051***	0.0067***	0.0024
	(0.0019)	(0.0018)	(0.0019)
County FE	Yes	Yes	Yes
Year FE	Yes	–	–
State FE×Year FE	–	Yes	Yes
X×Year FE	–	–	Yes
N	20,904	20,892	20,892
R^2 *(within)*	0.0029	0.0049	0.1005

This table shows the results of difference-in-differences regressions comparing total employment in counties during the financial crisis, as a function of their pre-crisis exposure to government contracts. The crisis is defined as the period between 2007q4 and 2010q4. The sample period is from 2004 to 2015. Gov is defined as one plus the logarithm of the sum of all contracts allocated to firms in a county divided by the number of employees in that county. *X* represents a vector of county characteristics that includes size (ln(number of establishments)), the share of employment in each 2-digit NAICS industry, share of residents employed in the armed forces, and political contributions paid from the county (all measured in 2005). Total employment is obtained from the County Business Patterns. Standard errors are clustered by county. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Figure 1
Stability of Government Purchases during the Great Recession

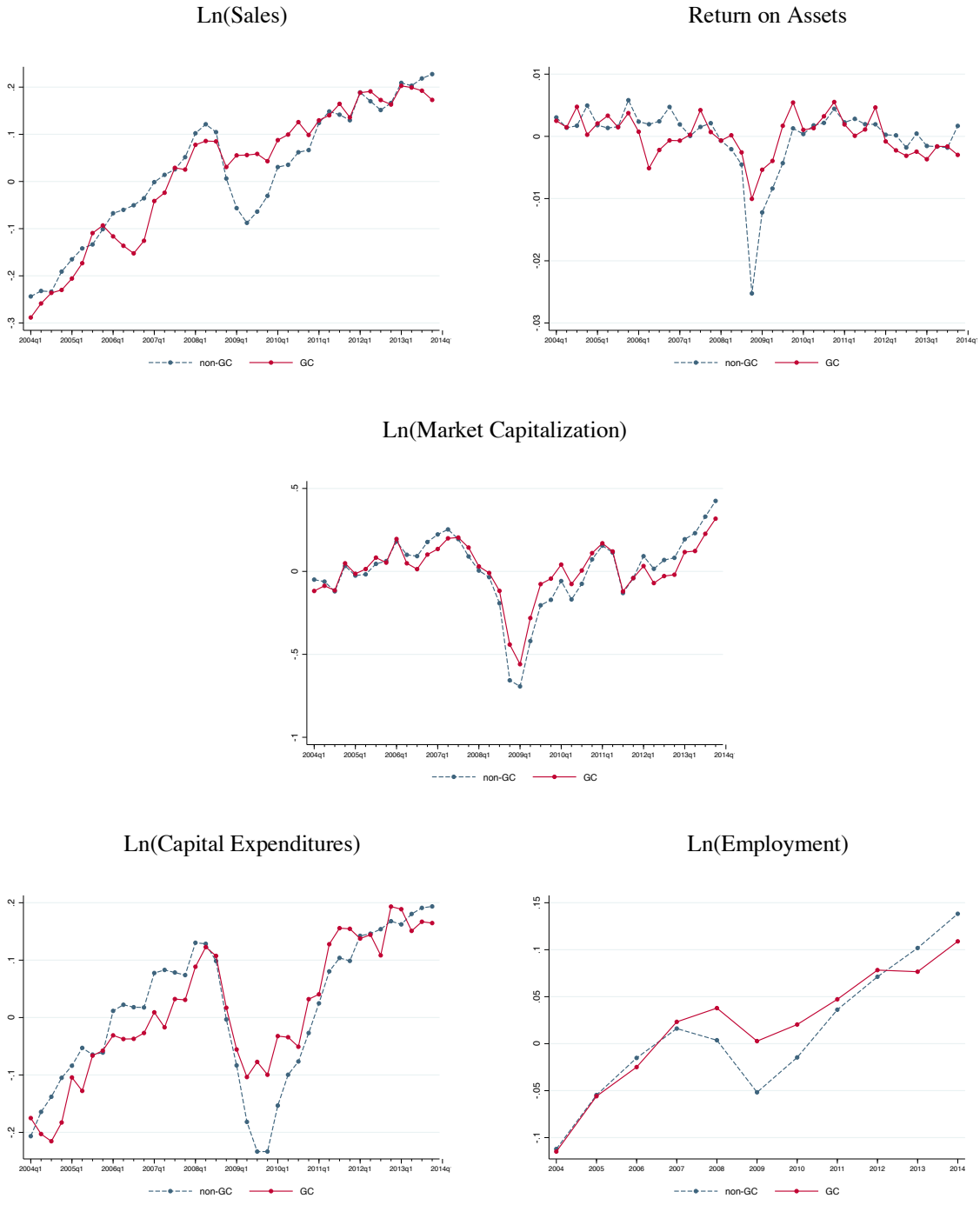


This figure presents time series of federal contract awards, gross private investment, and personal consumption over the sample period. Data is quarterly and taken from the US Bureau of Economic Analysis' National Income and Products Accounts, with the exception of federal contract awards, which are extracted from the Federal Procurement Data System. Contract awards are available at the yearly frequency and have been split throughout the fiscal year.

Figure 2
Distribution of Government Contractor Activity

This figure shows the distribution of government contractor activity averaged over 2005-06 across US ZIP codes belonging to Core Based Statistical Areas (CBSA). Government contractor activity is defined as the logarithm of one plus the sum of government contracts allocated to firms in the ZIP code divided by the number of employees. ZIP codes with positive government contracting activity are categorized according to the quartile of government contractor activity to which they belong (categories 1 to 4). ZIP codes that do not have any government contracts in 2005-06 are categorized as 0.

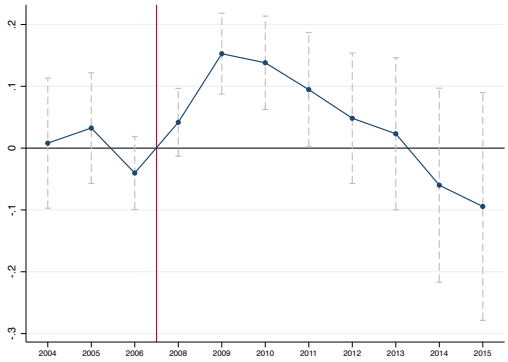
Figure 3
Performance of Government Contractors during the Financial Crisis



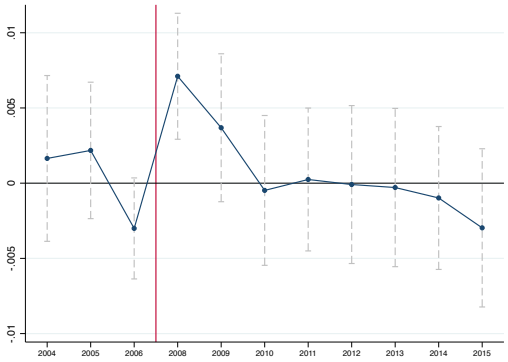
These charts compare the average financial performance of government contractors (GC) to the financial performance of other firms (non-GC) during the financial crisis. Government contractors are defined as firms that derived more than 10% of their sales from the federal government in the pre-crisis period (2005q1 to 2007q2). Firm and fiscal quarter fixed effects have been removed from each firm's series. The variables are defined in Tables A.1 and A.2.

Figure 4
Performance of Government Contractors during the Financial Crisis: Dynamic Coefficients

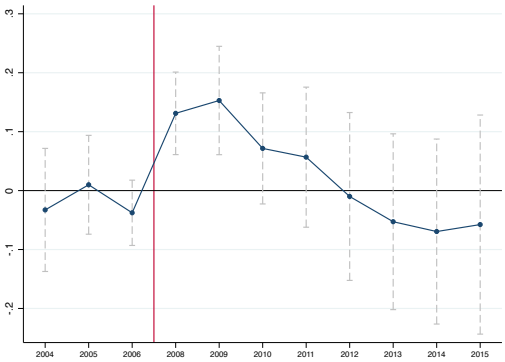
Ln(Sales)



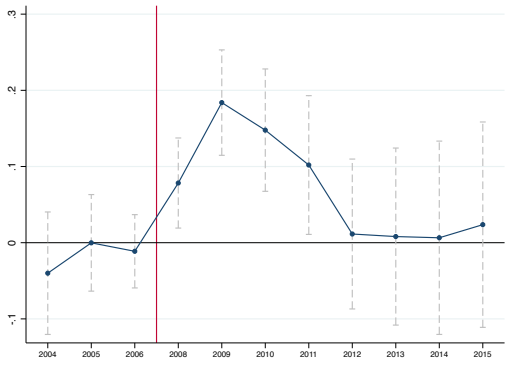
Return on Assets



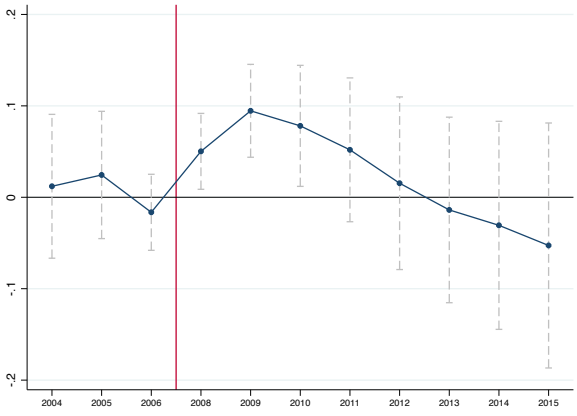
Ln(Market Capitalization)



Ln(Capital Expenditures)

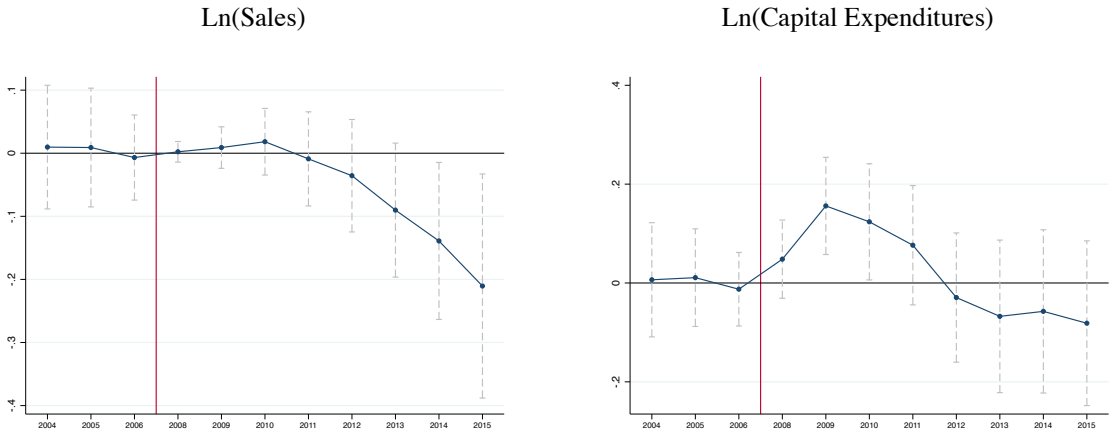


Ln(Employment)



These charts display the difference-in-differences coefficients year-by-year (GC×year dummies in regressions similar to those reported in Table 3). The (omitted) reference year is 2007. Government contractors are defined as firms that derived more than 10% of their sales from the federal government in the pre-crisis period (2005q1 to 2007q2). The market capitalization figure excludes penny stocks that have a price smaller than $2 in the pre-crisis period. Dotted grey lines represent 95% confidence intervals.

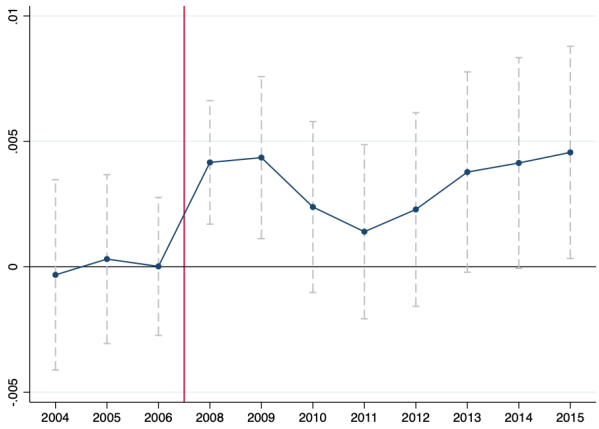
Figure 5
Investment of Government Contractors during the Financial Crisis: Controlling for Sales Growth



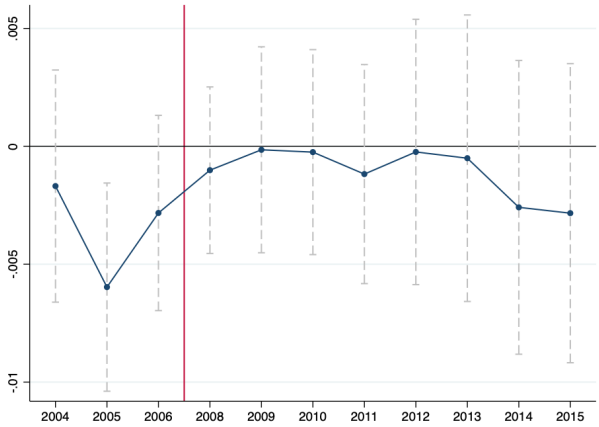
These charts display the difference-in-differences coefficients year-by-year (GC×year dummies in regressions similar to those reported in Table 3). The (omitted) reference year is 2007. To compare GC firms with firms experiencing a similar decrease in sales during the financial crisis, the regressions control for the interaction between 2007-08 sales growth and year dummies, and between 2008-09 sales growth and year dummies. Government contractors are defined as firms that derived more than 10% of their sales from the federal government in the pre-crisis period (2005q1 to 2007q2). Dotted grey lines represent 95% confidence intervals.

Figure 6
Performance of Firms Neighboring Government Contractors: Dynamic Coefficients

Panel A: Employment in the Non-Tradable Sector



Panel B: Employment in the Tradable Sector



These charts display the difference-in-differences coefficients year-by-year (*Gov*×year dummies in regressions similar to those reported in Table 5). The (omitted) reference year is 2007. Dotted grey lines represent 95% confidence intervals.

Appendix

Table A.1
Firm Variables Definitions

Sales	Compustat	Firm total sales.
Return on assets	Compustat	Operating income after depreciations divided by lagged total assets.
Market capitalization	Compustat	End of quarter share price×number of shares outstanding.
Capital expenditures	Compustat	Firm capital expenditures.
Employment	Compustat	Number of employees.
Sales growth	Compustat	Year-on-year sales growth.
Assets	Compustat	Firm total assets.
Leverage	Compustat	Long-term debt plus short-term debt divided by lagged total assets.
Cash holdings	Compustat	Cash and equivalent divided by lagged total assets.
Capital per employee	Compustat	Net property, plant and equipment divided by number of employees.
Proportion of short-term debt	Compustat	Short-term debt divided by long-term debt plus short-term debt.
Political contribution / sales	Federal Election Commission	Amount of political contributions paid by the firm through a political action committee in election cycle 2004 or 2006, divided by firm sales.
Government contractor indicator (GC)	Compustat	Dummy variable that equals one if a firm derives more than 10% of revenues from sales to the federal government.
Asset beta	Compustat-CRSP	Coefficient of a regression of monthly stock returns on the market return, multiplied by the ratio of beginning of period market capitalization over market capitalization plus book value of debt.
Credit extension	LPC Dealscan	Variable that equals one if the firm receives a new loan or a positive modification of an existing loan.
New loan	LPC Dealscan	Variable that equals one if the firm receives a new loan.
ΔCredit	LPC Dealscan	Log change in credit volume received by the firm.

Table A.2
ZIP Code and County Variables Definitions

Non-GC employment	ZBP	*ZIP code-level* – number of ZIP code (ZCTA) employees in industries that do not receive a government contract in 2005 or 2006, calculated as detailed in Section 2.3. *County-level* – sum of ZIP code Non-GC Employment across all the ZIP codes of a county. ZIP codes are matched to counties through the crosswalk provided by the Missouri Census Data Center.
County total employment	CBP	Actual total county employment as reported in the County Business Patterns.
NAICSshare	ZBP	Proportion of employees active in each two-digit NAICS, measured in 2005 (vector of 19 variables).
Size	ZBP	Number of active establishments in 2005.
Fraction of residents employed in the armed forces	2000 Census	Fraction of residents employed in the armed forces.
Fraction of residents employed in public administration	2000 Census	Fraction of residents employed in public administration.
Political contributions	Federal Election Commission	Average amount of political contributions paid across election cycles 2004 and 2006.
Government contractor activity (Gov)	FPDS	*ZIP code-level* – in the continuous treatment specification (Cont.): one plus the logarithm of the sum of all contracts allocated to firms in a ZIP code divided by the number of employees in that ZIP code, averaged over 2005 and 2006. In the discrete treatment specification (Discr.): a dummy variable that equals one if local government contractor activity falls in the highest tercile, and zero if it is in the lowest tercile. *County-level* – in the continuous treatment specification (Cont.): sum of ZIP code Government Contractor Activity across all the ZIP codes of a county. In the discrete treatment specification (Discr.): a dummy variable that equals one if local government contractor activity falls in the highest tercile, and zero if it is in the lowest tercile.

INTERNET APPENDIX for

"Government as Customer of Last Resort: The Stabilizing Effects of Government Purchases on Firms"

Table of Contents

Table S.1
Resilience of Sales to the Government and Private Firms during the Crisis

	Sales Growth < 0	
	(1)	(2)
GC×Crisis	-0.1159***	-0.1819***
	(0.0227)	(0.0240)
GC×AfterCrisis	0.0539*	-0.0511
	(0.0317)	(0.0338)
GC	-0.0844***	
	(0.0165)	
Constant	0.3991***	
	(0.0136)	
Year FE	Yes	Yes
Customer-Supplier FE	–	Yes
N	14,355	14,355
R^2	0.0317	0.2770

This table presents the results of difference-in-differences regressions of the probability that the sales between a customer-supplier pair experience negative growth during the financial crisis, as a function of the identity of the customer. Sales growth is deemed negative if the amount sold by supplier *i* to customer *j* decreases from one year to the next or if the customer disappears from the supplier's customer report. The regressions are estimated using a linear probability model. The sample includes customer-supplier pairs that reported positive sales before the crisis. All regressions include year dummies, and standard errors are clustered at the supplier level. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Table S.2
Government Contractors Regressions: Continuous Treatment

	Ln(Sales)	Return on Assets	Ln(Market Capitalization)	Ln(Capx)	Ln(Employment)
	(1)	(2)	(3)	(4)	(5)
GCc×Crisis	0.1752*	0.0074**	0.2619***	0.2042***	0.1455**
	(0.0896)	(0.0031)	(0.0842)	(0.0541)	(0.0650)
GCc×AfterCrisis	-0.0214	-0.0039	-0.0896	-0.0092	-0.0559
	(0.1457)	(0.0037)	(0.1221)	(0.0824)	(0.1080)
Firm FE	Yes	Yes	Yes	Yes	Yes
Industry FE×Time FE	Yes	Yes	Yes	Yes	Yes
Z×Time FE	Yes	Yes	Yes	Yes	Yes
N	105,844	105,844	94,773	105,844	28,863
R^2 *(within)*	0.0412	0.0354	0.0329	0.0214	0.0465

This table shows the results of difference-in-differences regressions contrasting the financial performance of firms with different fraction of sales to the federal government during and after the financial crisis. The crisis is defined as the period between 2007q4 and 2010q4. The sample period is from 2004 to 2015. GCc is the average fraction sales going to the federal government in the pre-crisis period. The market capitalization regressions exclude penny stocks that have a price smaller than $2 in the pre-crisis period. All regressions are estimated based on quarterly data, except employment (annual data). Therefore, Time FE are calendar quarter fixed effects in Columns 1 to 4 and fiscal year fixed effects in Column 5. *Z* represents a vector of firm characteristics that includes ln(total assets), leverage, cash balance, ln(capital per employee), return on assets, proportion of short-term debt, and political contributions paid over sales. Variables are defined in the appendix. Standard errors are clustered by firm. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Table S.3
Government Contractors Regressions: Propensity Score Matching

	Ln(Sales)	Return on Assets	Ln(Market Capitalization)	Ln(Capx)	Ln(Employment)
	(1)	(2)	(3)	(4)	(5)
GC×Crisis	0.1103**	0.0044**	0.1237**	0.1157***	0.0760**
	(0.0431)	(0.0020)	(0.0519)	(0.0313)	(0.0361)
GC×AfterCrisis	0.0089	-0.0000	-0.0232	0.0256	-0.0212
	(0.0705)	(0.0023)	(0.0765)	(0.0473)	(0.0577)
Firm FE	Yes	Yes	Yes	Yes	Yes
Industry FE×Time FE	Yes	Yes	Yes	Yes	Yes
Matched Sample	Yes	Yes	Yes	Yes	Yes
N	81,667	81,667	72,004	81,667	22,443
R^2 *(within)*	0.0025	0.0010	0.0040	0.0028	0.0030

This table shows the results of difference-in-differences regressions contrasting the financial performance of government contractors (GC) and other firms (non-GC) during and after the financial crisis. The crisis is defined as the period between 2007q4 and 2010q4. The sample period is from 2004 to 2015. Government contractors are defined as firms that derived more than 10% of their sales from the federal government in the pre-crisis period. The market capitalization regressions exclude penny stocks that have a price smaller than $2 in the pre-crisis period. All regressions are estimated based on quarterly data, except employment (annual data). Therefore, Time FE are calendar quarter fixed effects in Columns 1 to 4 and fiscal year fixed effects in Column 5. The matched sample is constructed by first estimating the propensity score of a firm being GC before the crisis as a function of the pre-crisis average of ln(total assets), leverage, ln(capital per employee), return on assets, proportion of debt that is short term, political contributions over sales, and industry. Treatment firms are then radius matched using a standard tolerance level (0.005 caliper). Variables are defined in the appendix. Standard errors are clustered by firm. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Table S.4
Probability of Making an Acquisition during the Financial Crisis

	Acquisition	Horizontal	Vertical	Diversifying
	(1)	(2)	(3)	(4)
GC	1.3073**	1.1943	1.3775***	1.4707***
	[0.1435]	[0.1472]	[0.1687]	[0.1974]
Ln(Assets)	1.1709***	1.1710***	1.1839***	1.2153***
	[0.0276]	[0.0300]	[0.0262]	[0.0271]
Cash/assets	1.3614***	1.2793*	1.4616***	1.3955***
	[0.1615]	[0.1758]	[0.2030]	[0.1791]
Constant	0.1356***	0.1900***	0.0825***	0.1053***
	[0.0227]	[0.0372]	[0.0122]	[0.0170]
Industry FE	Yes	Yes	Yes	Yes
N	5,132	4,531	4,110	4,173
Pseudo-R^2	0.0779	0.0822	0.1114	0.1036

This table shows the odd ratios obtained from a logit estimation of the probability of making an acquisition in 2008-09 as a function of government contractor status. All regressions include industry dummies, and control variables are averaged over the pre-crisis period. *Acquisition* equals one if the firm made an acquisition and zero otherwise. *Horizontal* equals one if the firm made at least one acquisition in the same SIC3 industry, zero if it did not make any acquisition, and omitted if it made an acquisition of a different type. *Vertical* equals one if the firm made at least one acquisition in an industry with which it has a vertical relatedness coefficient—as defined in Fan and Goyal (2006)—of more than 0.01, while *Diversifying* equals one if the firm made at least one acquisition in a different SIC3 industry with which it has a vertical relatedness coefficient smaller than 0.01. With these definitions, 1,175 firms made an acquisition, of which 686 firms made at least one horizontal acquisition, 358 firms made at least one vertical acquisition, and 492 firms made at least one diversifying acquisition. Standard errors are clustered by industry (SIC2). ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Table S.5
Beta of Government Contractors and Other Firms

	Firm will become GC					GC_t
	(1)	(2)	(3)	(4)	(5)	(6)
Asset $Beta_0$	0.0063	0.0033	0.0007	0.0003	0.0007**	
	(0.0041)	(0.0044)	(0.0005)	(0.0005)	(0.0003)	
Asset $Beta_t$						-0.0019**
						(0.0009)
Asset $Beta_{t-1}$						-0.0013
						(0.0008)
Asset $Beta_{t-2}$						0.0001
						(0.0008)
Measurement time	2nd obs.	3rd obs.	1 yr. *pre*-GC	2 yr. *pre*-GC	3 yr. *pre*-GC	Full panel
Firm FE	–	–	–	–	–	Yes
Industry FE×Year FE	Yes	Yes	Yes	Yes	Yes	–
Controls	Yes	Yes	Yes	Yes	Yes	–
N	9,722	9,720	98,025	98,023	97,972	97,286
R^2 *(within)*	0.115	0.117	0.026	0.027	0.027	0.790

Columns 1 to 5 of this table show the results of cross-sectional regressions of the government contractor dummy (GC) on asset beta. The regressions use annual data from 1980 to 2015. Beta is calculated as the coefficient of a regression of firms' monthly returns on market returns over 24 months. The estimated beta is then unlevered to obtain the asset beta. The sample starts with all firms that are not government contractors in the first two years in which they appear in the sample, and I flag the firms that will eventually become government contractor. The regressions assess whether beta in the measurement year predicts that the firm will become government contractor. Betas and controls variables are measured in the second or third year the firm appears in the sample (in Columns 1 and 2), or one, two, or three years before the firm becomes a government contractor (in Column 3, 4, 5). Columns 3, 4, 5 include all years for firms that never become government contractors. All regressions include industry×year dummies. Column 6 uses the full sample and regress the government contractors dummy (*GC*) on contemporaneous and lagged asset beta. Standard errors are clustered by industry in Columns 1 to 5, and by firms in Column 6. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Table S.6
Resilience of Firms Neighboring Government Contractors, Robustness

	Ln(Non-GC Employment, Non-Tradable Sector)						
	Base	Excl. p95	Excl. DC	Excl. Sand.	Excl. Mil.	Base	Matching
Treatment:	Cont.	Cont.	Cont.	Cont.	Cont.	Discr.	Discr.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Gov×Year 2004	-0.0003	0.0001	-0.0003	-0.0006	-0.0007	-0.0150	0.0040
	(0.0019)	(0.0022)	(0.0021)	(0.0020)	(0.0019)	(0.0191)	(0.0212)
Gov×Year 2005	0.0003	0.0011	0.0008	0.0001	0.0001	-0.0046	-0.0014
	(0.0017)	(0.0020)	(0.0018)	(0.0017)	(0.0017)	(0.0167)	(0.0189)
Gov×Year 2006	0.0000	0.0003	0.0002	0.0003	-0.0003	-0.0084	0.0020
	(0.0014)	(0.0016)	(0.0015)	(0.0014)	(0.0014)	(0.0142)	(0.0166)
Gov×Year 2008	0.0042***	0.0040***	0.0046***	0.0040***	0.0041***	0.0390***	0.0440***
	(0.0013)	(0.0014)	(0.0014)	(0.0013)	(0.0013)	(0.0121)	(0.0136)
Gov×Year 2009	0.0044***	0.0043**	0.0042**	0.0042**	0.0041**	0.0322**	0.0377**
	(0.0016)	(0.0019)	(0.0018)	(0.0017)	(0.0017)	(0.0154)	(0.0180)
Gov×Year 2010	0.0024	0.0020	0.0027	0.0021	0.0024	0.0146	0.0235
	(0.0017)	(0.0019)	(0.0019)	(0.0018)	(0.0018)	(0.0164)	(0.0196)
Gov×Year 2011	0.0014	0.0019	0.0010	0.0009	0.0015	0.0095	-0.0026
	(0.0018)	(0.0021)	(0.0020)	(0.0018)	(0.0018)	(0.0175)	(0.0214)
Gov×Year 2012	0.0023	0.0026	0.0022	0.0019	0.0023	0.0277	0.0177
	(0.0020)	(0.0022)	(0.0022)	(0.0020)	(0.0020)	(0.0185)	(0.0240)
Gov×Year 2013	0.0038*	0.0040*	0.0044*	0.0035*	0.0036*	0.0386**	0.0297
	(0.0020)	(0.0023)	(0.0023)	(0.0021)	(0.0020)	(0.0192)	(0.0241)
Gov×Year 2014	0.0041*	0.0048*	0.0046*	0.0040*	0.0040*	0.0478**	0.0553**
	(0.0021)	(0.0025)	(0.0024)	(0.0022)	(0.0021)	(0.0202)	(0.0245)
Gov×Year 2015	0.0046**	0.0051**	0.0044*	0.0043*	0.0044**	0.0468**	0.0620**
	(0.0022)	(0.0025)	(0.0024)	(0.0022)	(0.0022)	(0.0202)	(0.0247)
ZIP Code FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
CBSA×Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
X×Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	270,144	256,620	221,772	258,228	268,140	162,360	77,484
R^2 *(within)*	0.0231	0.0225	0.0234	0.0228	0.0225	0.0254	0.0006

This table shows the results of robustness tests on the difference-in-differences regressions comparing non-government contractor employment in the non-tradable sector in ZIP codes during the financial crisis, as a function of their pre-crisis exposure to government contracts. For each ZIP code, local four-digit NAICS industries that receive government contracts pre-crisis are excluded. The crisis is defined as the period between 2007q4 and 2010q4. The sample period is from 2004 to 2015. In the continuous treatment specification (Cont.), *Gov* is defined as one plus the logarithm of the sum of all contracts allocated to firms in a ZIP code divided by the number of employees in that ZIP code. In the discrete treatment specification (Discr.), *Gov* is a dummy variable that equals one if government contractor activity falls in the highest tercile, and zero if it is in the lowest tercile. *X* represents a vector of ZIP code characteristics that includes size (ln(number of establishments)), the share of employment in each 2-digit NAICS industry, share of residents employed in the armed forces, and political contributions paid from the ZIP code (all measured in 2005). Sector classification is from Mian and Sufi (2014). Column 1 shows the baseline result with the continuous treatment. Column 2 excludes ZIP codes falling in the top 5% of government contract activity, Column 3 excludes Washington DC, Maryland and Virginia, Column 4 excludes Arizona, California, Florida, Nevada, and Texas, Column 5 excludes ZIP codes associated with a military base. Column 6 shows the baseline result with the discrete treatment. Column 7 shows estimates the discrete treatment regression on a radius matched sample (see Section 4.1 for the description of the matching procedure). Standard errors are clustered by CBSA. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Table S.7
Resilience of Firms Neighboring Government Contractors, by Industry

NAICS3	Treatment Type:	Ln(Non-GC Employment)	
		Cont.	Discr.
		(1)	(2)
441	Motor Vehicle and Parts Dealers	-0.0001	-0.0119
		(0.0016)	(0.0144)
442	Furniture and Home Furnishings Stores	0.0027*	-0.0019
		(0.0015)	(0.0124)
443	Electronics and Appliance Stores	-0.0010	-0.0091
		(0.0016)	(0.0119)
445	Food and Beverage Stores	0.0007	0.0300
		(0.0020)	(0.0188)
446	Health and Personal Care Stores	-0.0034**	-0.0002
		(0.0015)	(0.0119)
447	Gasoline Stations	0.0001	-0.0171
		(0.0018)	(0.0169)
448	Clothing and Clothing Accessories Stores	0.0018	0.0229*
		(0.0017)	(0.0133)
451	Sporting Goods, Hobby, Book, and Music Stores	-0.0036*	-0.0267*
		(0.0022)	(0.0142)
452	General Merchandise Stores	0.0009	0.0035
		(0.0019)	(0.0174)
453	Miscellaneous Store Retailers	0.0010	-0.0020
		(0.0017)	(0.0140)
722	Food Services and Drinking Places	0.0048***	0.0579***
		(0.0018)	(0.0169)
N		270,144	162,360

This table shows the results of difference-in-differences regressions comparing non-government contractor employment in ZIP codes during the financial crisis, as a function of their pre-crisis exposure to government contracts, and split by three-digit industries in the non-tradable sector. Each cell is the result of a separate regression, and shows the coefficient on Gov×Crisis. For each ZIP code, local four-digit NAICS industries that receive government contracts pre-crisis are excluded. The crisis is defined as the period between 2007q4 and 2010q4. The sample period is from 2004 to 2015. In the continuous treatment specification (Cont.), *Gov* is defined as one plus the logarithm of the sum of all contracts allocated to firms in a ZIP code divided by the number of employees in that ZIP code. In the discrete treatment specification (Discr.), *Gov* is a dummy variable that equals one if government contractor activity falls in the highest tercile, and zero if it is in the lowest tercile). Regressions include ZIP code and CBSA×Year fixed effects, as well as *X*×Year interaction terms, where *X* represents a vector of ZIP code characteristics that includes size (ln(number of establishments)), the share of employment in each 2-digit NAICS industry, share of residents employed in the armed forces, and political contributions paid from the ZIP code (all measured in 2005). Gov×AfterCrisis is included in the regression but not tabulated for brevity. Standard errors are clustered by CBSA. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Table S.8
Spillovers on Neighboring ZIP Codes

	Ln(Non-GC Employment, Non-Tradable Sector)		
	ZIP codes - Closest 1	ZIP codes - Closest 2	ZIP codes - Closest 5
Treatment Type:	Continuous	Continuous	Continuous
	(1)	(2)	(3)
Gov×Crisis	0.0036**	0.0037**	0.0037**
	(0.0015)	(0.0015)	(0.0015)
Neighboring Gov×Crisis	0.0004	-0.0015	-0.0005
	(0.0012)	(0.0013)	(0.0016)
ZIP Code FE	Yes	Yes	Yes
CBSA FE×Year FE	Yes	Yes	Yes
X×Year FE	Yes	Yes	Yes
N	270,072	270,072	270,072
R^2 *(within)*	0.0218	0.0218	0.0218

This table shows the results of difference-in-differences regressions comparing non-government contractor employment in the non-tradable sector in ZIP codes during the financial crisis, as a function of their pre-crisis exposure to government contracts. For each ZIP code, local four-digit NAICS industries that receive government contracts pre-crisis are excluded. The crisis is defined as the period between 2007q4 and 2010q4. The sample period is from 2004 to 2015. In the continuous treatment specification (Cont.), *Gov* is defined as one plus the logarithm of the sum of all contracts allocated to firms in a ZIP code divided by the number of employees in that ZIP code. In the discrete treatment specification (Discr.), *Gov* is a dummy variable that equals one if government contractor activity falls in the highest tercile, and zero if it is in the lowest tercile. *X* represents a vector of ZIP code characteristics that includes size (ln(number of establishments)), the share of employment in each 2-digit NAICS industry, share of residents employed in the public sector, share of resident employed in the armed forces, and political contributions paid from the ZIP code (all measured in 2005). Sector classification is from Mian and Sufi (2014). Closest 1 adds government contracting activity in the closest ZIP code, Closest 2 in the two closest ZIP codes, and Closest 5 in the five closest ZIP codes. Standard errors are clustered by three-digit ZIP code. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Table S.9
Note on Aggregation and Elimination for the Indirect Effect Analysis

NAICS	Industry Description	Number of ZIP Codes
5413	Architectural, Engineering, and Related Services	4,282
4234	Professional and Commercial Equipment and Supplies Merchant Wholesalers	3,901
5416	Management, Scientific, and Technical Consulting Services	3,891
5617	Services to Buildings and Dwellings	3,822
2382	Building Equipment Contractors	3,696
5419	Other Professional, Scientific, and Technical Services	3,456
5311	Lessors of Real Estate	3,305
5415	Computer Systems Design and Related Services	3,113
4238	Machinery, Equipment, and Supplies Merchant Wholesalers	3,112
3399	Other Miscellaneous Manufacturing	2,788

To estimate ZIP code non-government contracting employment (Non-GC employment), I remove from each ZIP code (in all years), the local industries (4-digit NAICS) that receive at least one government contract in years 2005 or 2006. Therefore, a different set of industries is removed from each ZIP code. The table below displays the top ten industries contracting with the federal government that are most often removed from a ZIP code to calculate Non-GC employment.