THE ARSENAL OF DEMOCRACY:
PRODUCTION AND POLITICS DURING WWII

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ABSTRACT

We study the geographic distribution of military supply contracts during World War II. This is a unique case, since over $3 trillion current day dollars was spent, and there were concerns that the country's future hinged on the war outcome. We find robust evidence consistent with the hypothesis that economic factors dominated the allocation of supply contracts, and that political factors---or at least winning the 1944 presidential election---were at best of secondary importance. General industrial capacity in 1939, as well as specialized industrial capacity for aircraft production, are strong predictors of contract spending across states. On the other hand, electoral college pivot probabilities are at best weak predictors of contract spending, and under the most plausible assumptions they are essentially unrelated to spending. This is true not only for total contract spending over the entire period 1940-1944, but also for shorter periods leading up to the election in November 1944, as well as for new facilities spending. That is, we find no evidence of an electoral cycle in the distribution of funds.

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1   Introduction

During the Second World War, the federal government assumed an unprecedented degree of control over the U.S. economy. At the peak, the share of federal government expenditures in GNP soared to 44 percent, a level never attained before or since. (Figure 1 shows the level has not even exceeded 25 percent in the post-World War Two era.) In addition to enrolling 16.4 million Americans—about one-eighth of the 1940 population—in the armed forces, the federal government spent \$196 billion between June 1940 and June 1945 on military supply contracts and \$31 billion on investments in new production facilities. In 2014 dollars, this is equivalent to roughly \$3.1 trillion. Although this war effort (coined the "Arsenal of Democracy" by President Roosevelt) probably represented the largest single economic intervention by the federal government in U.S. history, the political economy of these spending flows has been subject to relatively little systematic scholarly investigation.[1]
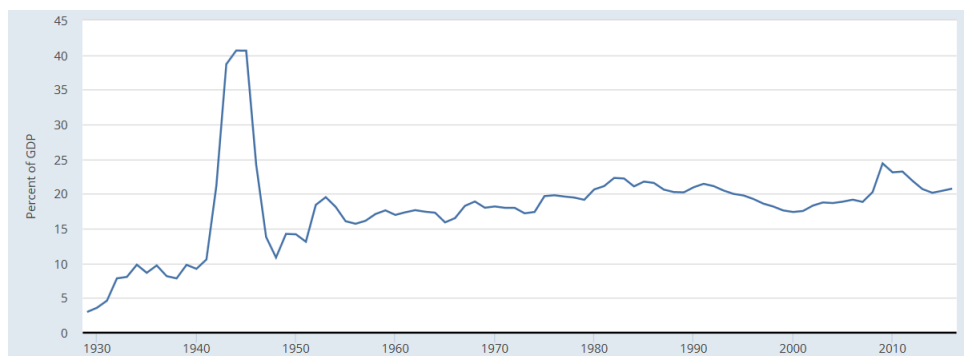

Figure 1: Federal Net Outlays as Percent of GDP

Source: Source: Federal Reserve Bank of St. Louis, U.S. Office of Management and Budget, `https://fred.stlouisfed.org/series/FYONGDA188S`

This paper uses state-level economic and political data to investigate the relative importance of political and economic factors in accounting for the geographic allocation of World War II-era military spending, both for major war supply contracts and for new facility projects. More specifically, we study the allocation of supply contracts and new facilities across all U.S. states during the period September 1940 thru October 1944. The temporal pattern of contract spending in per capita terms is shown in Figure 2.[2]

Following an extensive empirical and theoretical literature on distributive politics in the

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[1]U.S. munitions output played a crucial role in supplying Allied nations and in winning the war. William Knudsen, a business executive who played an important role in war spending decisions, said "We won because we smothered the enemy in an avalanche of production, the like of which he had never seen, nor dreamed possible" (quote from Somers (1950), 8).

[2]This figure omits spending on new facilities, but this was only one seventh of total spending.
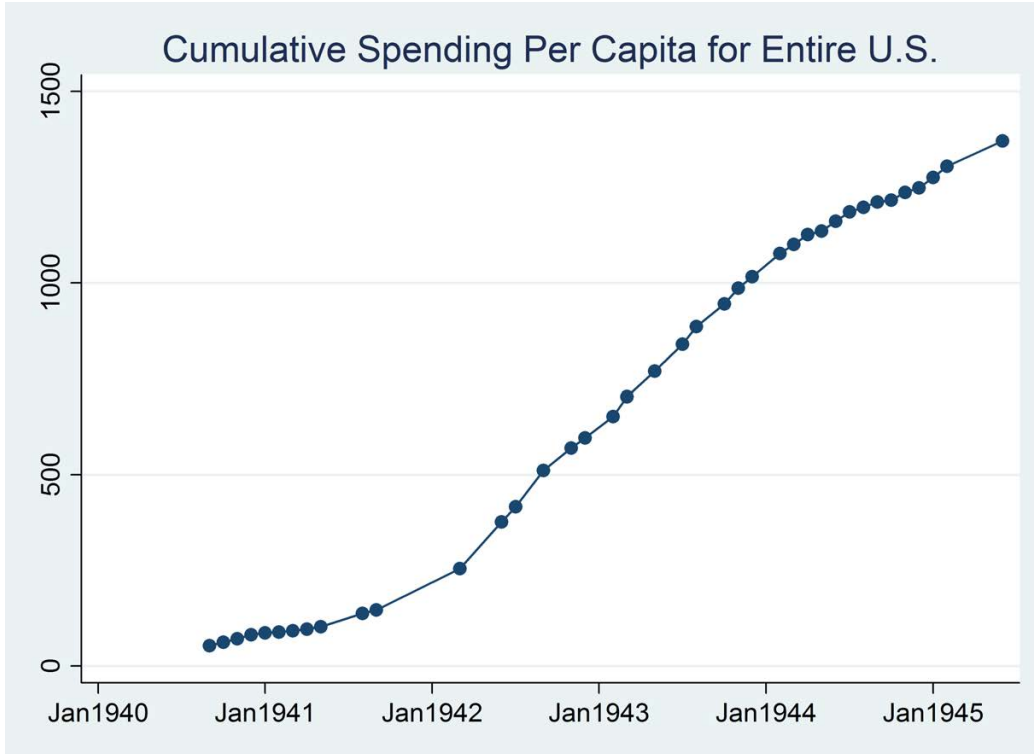
Figure 2: Cumulative Contract Spending Per Capita, 1940–1945

U.S., we focus on one of the incumbent party's main goals—winning the next presidential election (we also consider other political-based mechanisms in the robustness checks and in the conclusion).[3] To measure the electoral importance of each state we employ a model similar to that in Strömberg (2008). Simulations based on this model yield estimates of the relative probability that each state would be pivotal in the electoral college in the 1944 presidential election. The model incorporates four key elements: (i) How close the average two-party vote in each state is to 50 percent; (ii) How variable the two-party vote is in each state; (iii) How many electoral votes the state has per capita; and (iv) How correlated the two-party vote shares are across states. We use pre-war voting patterns together with the model to establish a distribution of 1944 election outcomes, and then simulate how frequently some level of spending in a state will change both its and the overall electoral college winner (the pivot probability for each state is the proportion of simulations in which spending tips the outcome in the state and overall). One indication that this pivot probability is superior to alternatives from the literature is that it is much more highly correlated with the

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[3]See, e.g., Wright (1974), Wallis (1987, 1991, 1998, 2001), Brams and Davis (1974, 1982), Colantoni, Levesque and Ordeshook (1975), Nagler and Leighley (1992), Shaw (2006), Shor (2006), Strömberg (2008), Hudak (2014).

distribution of presidential campaign visits than other measures. Since candidates allocate their scarce time just before the election to increase their chance of winning, these visits provide a revealed-preference ranking of the relative electoral value of different states.

To measure the economic importance of each state we use estimates of industrial capacity at the beginning of the war. States such as Connecticut, Michigan, and New Jersey already had large factories producing automobiles, trucks, airplanes, ships, steel, and so on. These states also had a large stock of human capital ready to do work—many thousands of workers with many years of experience in factory work. Converting this physical and human capital to wartime production was generally much cheaper than building factories from scratch. Perhaps even more importantly, conversion was typically the fastest way to get production up and running, which was crucial for the war effort.

Our findings are easily summarized. We find robust evidence consistent with the hypothesis that economic factors strongly influenced the allocation of supply contracts, and that political factors—or at least winning the 1944 presidential election—were at best of secondary importance. General industrial capacity in 1939, as well as specialized industrial capacity for aircraft production, are strong predictors of contract spending across states. For example, pre-existing manufacturing capacity alone can explain over 60 percent of the inter-state variation in contract spending over the course of the war. On the other hand, electoral college pivot probabilities are at best weak predictors of contract spending, and under the most plausible assumptions they are essentially unrelated to spending. (As discussed below, a key free parameter is how responsive votes are to spending—we use values based on estimates which relate voting preferences in Gallup polls to both World War II and New Deal spending.) This is true not only for total spending over the entire period 1940-1944, but also for shorter periods leading up to the election in November 1944. Thus, in addition to finding no overall effect of pivot probabilities, we also find no evidence of an electoral cycle in the distribution of funds.

There is additional evidence of the limited scope of political targeting. We find no evidence that spending on *new* military and industrial facilities was targeted towards politically pivotal states. New facilities also constituted a much smaller share of federal war spending than supply contracts. If political allocation was the driving factor, this share would be higher since it was easier to place new facilities in any location (such as electorally valuable areas) while supply contracts generally required using pre-existing manufacturing plants.

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With respect to congressional considerations, we find no significant relationship between the distribution of spending and states' representation on key military or appropriations committees. Nor do we find evidence that war spending is directed to states with closely contested senate or gubernatorial elections.

Finally, utilizing early opinion polls from Gallup and the Office of Public Opinion Research (OPOR), we investigate whether military spending in a state appears to have influenced voter support for Roosevelt (OPOR surveys have not been previously analyzed in the literature). The results show that the impact of spending on voter support was not large. This might be one reason we find little evidence of targeting.

A potential concern is that the 1944 presidential election was a foregone conclusion, and so there was little need for politically-motivated allocation of war funds. However, there was significant uncertainty about the outcome. Based on contemporaneous prediction market odds (Rhode and Strumpf (2004)), even in the weeks before the election there was a 25% chance that Dewey would win the presidency. Roosevelt's voter approval numbers (in the Gallup Polls) also dropped steadily by ten percentage points over 1943, and the substantial Republican victories in 1942 (when they gained 46 House seats and 9 Senate seats) were viewed as a lack of confidence in the president. Nor were wartime leaders ensured of re-election, as Churchill's loss in 1945, just two months after VE Day, illustrates. This should have provided plenty of incentive to allocate war funds for political gains. Moreover the prediction market odds were comparable to those from 1936, when there was evidence of Roosevelt allocating New Deal spending at least in part to increase his electoral chances (Wright (1974)).

It is possible, of course, that pragmatic concerns related to winning the war dominated narrow distributional concerns because of the enormous stakes involved.[4] As Churchill famously argued as the Battle of Britain began, "Upon this battle depends the survival of Christian civilization... If we fail, then the whole world, including the United States, including all that we have known and cared for, will sink into the abyss of a new Dark Age." It might not be surprising, therefore, to find the U.S. government acting as if it placed an extremely high value on social welfare—the "public good" of defeating Germany and Japan.

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[4]There are other ways in which war-time spending might be different. Specially created agencies played a central role in military procurement policies, and the leaders of these organizations were typically civilian business executives rather than politicians. Private production also fell sharply, as some war spending was a reallocation from civilian to military manufacturing. And finally voters might be less responsive to spending during a war as they are focused on other issues and the economy is approaching full employment.

This same focus on winning the war could also have an electoral benefit. A number of political economy models incorporate both public goods and distributive goods.[5] One (unsurprising) result in these papers is that elected officials will provide public goods rather than distributive goods if the public goods are valued enough by voters relative to the distributive goods. In these circumstances, it is difficult to distinguish a concern for social welfare from a concern for votes.[6]

We find mixed evidence for this hypothesis. On one hand, in OPOR surveys, as the war proceeded respondents became more confident that the war would end more quickly if the Democrats remained in power than if the Republicans held power. This suggests that the war effort increased voter support for Roosevelt. On the other hand, in Gallup and OPOR polls, voters reported that they would be more willing to support Republicans in 1944 if the war was over before the election. This suggests that electoral considerations favored a "slow but steady" approach to the war effort.

At a minimum, our evidence suggests that models which focus exclusively on "tactical" distributional politics—e.g., Lindbeck and Weibull (1987), Dixit and Londregan (1995, 1996), McCarty (2000), Strömberg (2008), Primo and Snyder (2008)—might do poorly at predicting government behavior during times of national crisis.

In some ways our results might be expected, but in other ways they are surprising. Given the threat to western democracies, one would expect that war monies would be allocated as efficiently as possible. On the other hand, political influence might not noticeably diminish the chance of winning the war but rather delay it. Inefficient spending (e.g., building new facilities in a politically valuable location rather than using pre-existing manufacturing capacity) does not imply that materiels are not made, just that it will take longer. We know various offensives were postponed until adequate munitions were made, most famously the D-Day invasion which was delayed until adequate landing ships could be manufactured. Given the possible trade-off– political gains against the costs of a delayed victory in the war– and the vast sums of monies involved, one might expect that politics would influence the allocation of war spending at least on the margin.

More broadly this paper contributes to the empirical distributive politics literature, which is discussed in the next section and is decidedly mixed about whether monies are allocated

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[5]See, e.g., Leblanc, Snyder and Tripathi (2000), Lizzeri and Persico (2005), Battaglini and Coate (2008), Volden and Wiseman (2007), and Cardona and Rubí-Barceló (2013).

[6]See also Becker (1983), which predicts that under "pluralism," in which a large number of interest groups compete for influence, we should also expect relatively efficient outcomes.

with the goal of influencing future elections. The paper advances the literature by overcoming two important empirical challenges. Typically one must model and control for pre-existing spending. This is not a significant concern here since military spending was quite small in the 1930s. It is also often hard to measure efficiency, but here pre-war private sector manufacturing capacity is a natural candidate since it was easy to re-purpose for military production. And while we make some methodological advancements in terms of how to evaluate the political value of different states, the small role for electoral concerns in World War Two munitions spending is of independent interest. It is perhaps surprising given that New Deal spending, which Roosevelt also oversaw, had a political element in its geographic allocation, and the vast size of war spending left ample room for political targeting. In the conclusion we discuss some possible reasons for our findings.

2   Previous Research on Distributive Politics

In a series of influential papers, Lindbeck and Weibull (1987), Dixit and Londregan (1995, 1996), and others develop models where electoral competition drives political parties to target divisible resources towards groups or regions with relatively large numbers of "swing" voters. Colantoni, Levesque and Ordeshook (1975), Snyder (1989), Strömberg (2008), and others develop related models in the context of allocating campaign resources.

The evidence on the allocation of campaign resources tends to strongly support the swing voter models. In particular, a number of papers find that battleground states—i.e., those with an expected Democratic vote share near 50 percent—receive a disproportionate share of the advertising in U.S. presidential campaigns (Colantoni, Levesque and Ordeshook (1975); Nagler and Leighley (1992); Shaw (2006); Strömberg (2008), Huang and Shaw (2009)). Strömberg (2008) is especially important for us. He develops a model that incorporates not only the expected vote, but also the volatility of each state's vote, as well as the number of votes each state has in the electoral college, in order to predict how likely each state is to be pivotal in the presidential election. He finds a strong relationship between the predicted pivot probabilities and the allocation of campaign expenditures in 2000 and campaign visits in 2000 and 2004. We follow his approach closely below.

The evidence on government expenditures is more mixed. Some studies of New Deal spending, federal grants, and federal employment find that states with presidential vote shares nearer to one-half, or more volatile presidential vote swings, or states that are more

"productive" in terms of electoral votes, receive more federal aid—e.g., Wright (1974); Wallis (1987, 1991, 1996, 1998); Fleck (1999).[7] Studies of spending in more recent time periods, however, such as Larcinese, Rizzo and Testa (2006) and Larcinese, Snyder and Testa (2013), find no evidence that states receive more federal funds if they have closer presidential races, more frequent presidential partisan swings, or a larger percentage of self-identified independent or moderate voters.[8]

The only previous studies of World War II spending, Rhode (2000) and Bateman and Taylor (2003), also fail to find support for the swing-voter or swing-state hypotheses. Rhode (2000) is the first paper to analyze the determinants of World War II spending. Rhode is most interested in the case of California so his analysis of spending across states is limited. He does, however, consider both political and economic factors, as we do below. Bateman and Taylor (2003) conduct a similar analysis, and largely replicate Rhode's results. We build on these papers in several ways. First—and this is our main contribution—we use a more rigorous and theoretically grounded measure of each state's relative influence in the electoral college. Second, we analyze the timing of spending in addition to overall levels, to check for electoral cycle effects. Finally, we go beyond the aggregate data and examine individual-level survey data on (i) the degree to which voting decisions in the 1930s and 1940s appear to be influenced by the distribution of federal spending, and (ii) the degree to which voting decisions during World War II appear to be influenced by U.S. efforts to win the war.

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[7]While most papers on the New Deal Deal find some role for politics, there is some debate on its magnitude and the role of other factors. Strömberg (2004) shows that the statistical significance of these estimates vanish when state fixed effects are included, suggesting that the results might be spurious and the result of omitted-variable bias. Wallis (1998) finds that the results depend on the specification used and the set of states included. Fishback, Kantor and Wallis (2003) study New Deal spending at the county level and find mixed evidence for pivotal politics—for some programs the distribution of spending appears to be related to electoral volatility or turnout at the county level, while for other programs it is not.

[8]The literature on distributive politics is vast, and includes several other branches. A number of papers study the distribution of spending across districts or counties, rather than states—e.g., Stein and Bickers (1994), Berry, Burden and Howell (2010), and Dynes and Huber (2015). Other studies consider the hypothesis that government expenditures flow disproportionately to areas with more "core" or "loyal" party voters—Levitt and Snyder (1995), Larcinese, Snyder and Testa (2013), and Dynes and Huber (2015). Other researchers focus on institutional factors such as committee structure, the distribution of party and committee leadership positions, legislative seniority, majority party membership, malapportionment, and universalism norms—e.g., Anderson and Tollison (1991) and Berry and Fowler (2016). Most relevant for us because of its historical nature, Anderson and Tollison (1991) find that New Deal spending was significantly higher for states with representation on the Senate Appropriations Committee, but they find mixed results for the House Appropriations Committee, and no significant relationships with either House or Senate seniority. Finally, there are many studies of distributive politics in countries other than the U.S..

3 Background on World War II Spending

The military procurement system used in the Second World War provided ample opportunity for political gains or economic efficiency. During this period, the federal government assumed an unprecedented degree of control over the U.S. economy. Various government bureaus– newly created during the war and run by leading civilian business executives– set the level, type and allocation of this spending. While efficiency was supposed to guide these bureaus, political pressure was explicitly and implicitly applied to shape their decisions and production speed was prioritized over competitive bidding. The push to get local spending stemmed in part from the desirable employment it created, with a significant pay premium for war-related jobs. Nonetheless an astonishing level of armaments were manufactured, but at the same time there were also glaring examples of inefficiencies which could be consistent with political meddling. The remainder of this section details these points.

The federal government spent $196 billion between June 1940 and June 1945 on military supply contracts and $31 billion on investments in new facilities. Relative to the 1940 total population, per capita spending over this five-year period averaged $1,813 in current dollars or almost $24,800 in 2014 purchasing power. In real annual per capita terms, domestic procurement spending during World War II was about four-and-one-half times higher than the New Deal era spending which has attracted so much scholarly attention.

In the interwar period, the U.S. government spent only 1-2 percent of GDP on the military. Most money for supplies and arms was allocated according to rigidly specified competitive procedures. Procurement officers would advertise for clearly defined quantities and qualities for a specific item, invited bids, and award the contract to the lowest quali-fied bidder. The federal government also imposed profit limits on aircraft and shipbuilding contracts under the 1934 Vinson-Trammel and 1936 Merchant Marine Acts. The tiny size of the military prior to the war helps alleviate concerns that the distribution of pre-existing manufacturing capacity—at least that most suitable for military production—might be en-dogenous.

These operating principles changed following the outbreak of full-scale war in September 1939. Recalling Figure 1, defense spending rose steadily to over 40 percent of GDP in 1945 (real spending in 1945 was 34 times larger than in 1940). Table 1 offers a condensed timeline of the evolution of government agencies in charge of procurement and industrial mobilization over the 1939-45 period. The expediting acts of June 28 and July 2, 1940 allowed negotiated,

cost-plus-a-fixed-fee contracts and payment before delivery; while procurement authorities continued to use competitive bidding for small contracts, the vast majority of procurement contracts shifted to a negotiated basis. The new contracts allowed greater production speed, since it avoided the need to develop engineering plans prior to the bid as would be needed under traditional process, though imposed little incentive for firms to reduce costs. In October 1940, the federal government also eliminated profit ceilings on defense contracts, using excess-profit taxes in their place. The contracts typically tied spending to specific locations: they listed specific items made at specific plants.

A series of civilian-run bureaucracies were created to facilitate the war production effort. These agencies were created within the executive branch, and their top officials were selected by and reported directly to the president. They were given broad powers and discretion to decide war production and procurement, including converting civilian manufacturing plants to military production and in directing new infrastructure building.[9] In May 1940, Roosevelt used his war powers to establish Advisory Commission of the Council for National Defense (NDAC). The NDAC begat the Office of Production Management (OPM) which begat the War Production Board (WPB) which begat the Civilian Production Administration (CPA). An additional layer of bureaucracy, first the Supply Priorities and Allocations Board (SPAB) and later the Office of War Mobilization (OWM), was imposed on top of these agencies. Although the agency names changed, the leading actors did not. These included William S. Knudson, president of General Motors, Donald M. Nelson, an executive at Sears-Roebuck, and Sidney Hillman, a former union chief. Other principals were Henry Stimson and Frank Knox, two Republicans that Roosevelt had appointed Secretaries of War and Navy, respectively, in the summer of 1940.

The commissions were specifically tasked with trying to produce efficiently. In particular they were instructed to locate new facilities in areas where there were adequate nearby resources, but not so dense as to lead to congestion.[10] They also were supposed to ensure

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[9]As an example of the former a fifth of all U.S. munitions (including most B-24 bombers, aircraft engines, tanks, and trucks) was made in automobile plants, with non-military car production shutdown in 1942. Foreshadowing results later in the paper, this production was widely dispersed (the automobile industry was spread over 44 states and 1375 cities).

The agencies also had other powers. They centralized control of raw materials, and they also influenced the level of production. For example, in 1942 the commissions convinced military leaders to reduce their munitions demand from a level which would damage the country's long-term manufacturing capacity.

[10]The OPM, which set plant locations early in the war, was to use as guiding principles, "Such factors as availability of labor, transportation facilities, housing, waterpower, community services and attitude, sources of raw materials and destination of the finished products, and the general relation of the new plants to the

Table 1: **Evolution of Procurement Policy and Agencies, 1939-1945**

1939

Spring	Third revision of Industrial Mobilization Plan completed.
15 Jul	Crowell Board on Educational Orders established.
9 Aug	War Resources Board formed "to assist Army and Navy Munitions Board with plans for industrial mobilization."
1 Sep	Germany invades Poland.
24 Nov	War Resources Board disbanded after issuing its report.

1940

16 May	Roosevelt calls for 50,000 war planes.
28 May	Roosevelt establishes National Defense Advisory Commission.
19 Jun	Roosevelt forms War Cabinet—appoints Republicans Henry Stimson Secretary of War and Frank Knox Secretary of the Navy.
28 Jun	Act to Expedite National Defense passes, allowing for negotiated contracts in place of competitive bidding.
22 Aug	Reconstruction Finance Corporation forms Defense Plant Corporation.
29 Dec	Roosevelt's "Arsenal of Democracy" speech.

1941

7 Jan	Office of Production Management established to replace NDAC.
1 Mar	Senate creates "Truman Committee" to investigate defense program.
11 Mar	Lend-Lease Act approved.
17 Mar	OPM Plant Site Committee (later Board) established.
28 Aug	Supply Priorities and Allocation Board formed with power over OPM.
3 Dec	Production Requirements plan introduced.
7 Dec	Pearl Harbor attacked—U.S. enters War.

1942

16 Jan	War Production Board formed to replace SPAB.
18 Apr	War Manpower Commission established.
28 Apr	Office of Price Administration "freezes prices."
9 Jun	Smaller War Plants Corporation established.
10 Oct	WPB directs procurement agencies to avoid "Critical Labor Areas."
2 Nov	Controlled Materials Program announced.

1943

27 May	Office of War Mobilization established to "harmonize government activities."
5 Nov	Truman Committee Report issued.
30 Nov	WPB announces reconversion policy.

1944

3 Oct	Office of War Mobilization and Reconversion established to replace OWM.

1945

8 May	V-E Day.
2 Sep	Formal V-J Day.
4 Oct	WPB terminated, remaining functions transferred to Civilian Production Board.

Sources: U.S. Civilian Production Administration, Bureau of Demobilization, "Chronology of the War Production Board and Predecessor Agencies, August 1939 to November 1945," Historical Reports on War Administration: War Production Board, Misc. Publ. No. 1 (June 20, 1945) and *Industrial Mobilization for War: History of the War Production Board and Predecessor Agencies, 1940-45* Vol. I *Program and Administration*, Historical Reports on War Administration: War Production Board, General Study No. 1 (Washington, DC: GPO, 1947)

that specialized labor was available in the case of complicated and precise manufacturing.[11]

Nonetheless, there is an extensive record of political meddling in the process.[12] Most histories of the agencies and officials involved in contracting note that the spending process, especially plant location decisions, induced a torrent of lobbying from politicians and business and community leaders. For example, Nelson, who headed the OPM plant location efforts in 1941, observed: "We were operating in a democracy which was still at peace and subject to the pressures of politics. Platoons of Senators and Representatives stimulated by their constituents, descended upon us. Hundreds of briefs were submitted by towns all over the United States, and, since we were thinking about defense only, I suppose that our selection of sites pleased nobody."

Placement authorities responded to such complaints by creating Plant or Site Location boards. This counter-move of addressing the problem by adding more bureaucracy is clear in the case of the Maritime Commission. Criticism of its site selection process received a full airing in the hearings of the Truman Committee on June 3 and July 9, 1941. (Lane (1947), 152-54.) Within a few weeks, the Commission established the Shipyard Site Planning Committee to "determine the suitability of projects from the standpoint of geographical position, availability of labor, power, and transportation, and the financial and technical experience of the applicants..." The OPM responded even earlier. In early 1941 "a movement arose in Congress to establish by legislative action a Plant Site Board to pass upon the location of

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over-all distribution of manufacturing facilities in the country were carefully examined. The board was anxious to avoid, if possible, the building of plants in already highly industrialized and congested areas" (U.S. Civilian Production Administration, Bureau of Demobilization (1945), 56). "The Plant Site Board did endeavor to locate new facilities away from highly industrialized areas. In part the location of new facilities was determined by strategic reasons... According to Nelson, supply contracts followed the location of industry; but new facilities were planned to follow at least partial decentralization" (58).

The OPM's Plant Site Board "was aware on the undesirability of further concentrating aircraft facilities in southern California, of expanding plant facilities in the Detroit area, of enlarging shipbuilding plants around Camden, New Jersey, and of locating more plants at Bendix, Philadelphia, Rochester, and other highly industrialized centers" (60-61). It acted primarily as a "negative planning unit" which frequently initially vetoed proposed sites and urged the procurement officials to look in less congested areas. "In view of the urgency for speeding up production, however, the Plant Site Board was reluctant to exercise this (veto) power for fear of impeding the defense effort" (59-61). The Plant Site Board and other civilian authorities generally allowed the military procurement officers to contract where they pleased, and in turn, the procurement authorities allowed their manufacturing suppliers to produce and invest where they saw fit.

[11]The OPM's Plant Site Board had a policy called for preserving "the area north of the Mason-Dixon line and east of the Mississippi River for defense manufacturing requiring highly skilled labor, such as aircraft engines, and indicating that approval for other types of facilities in this area would, in general, be given only in exceptional circumstances."

[12]It is unclear if having executives from manufacturing and retail firms created a self-dealing problem with the various agencies.

plant sites for Government defense facilities in order to bring about a greater decentralization of industry (U.S. Civilian Production Administration, Bureau of Demobilization (1945), 40)." Noting the "disadvantages of Congress rigidly fixing standards," Knudsen suggested the OPM take preemptive action. On 17 March, the Office established a Plant Site Committee "to review and approve or disapprove proposed locations for additional plant or facilities required for the national defense." The Committee, which was converted into a more permanent Board on May 6, 1941, was to work in close cooperation with representatives of the Ordnance Department, the Army Air Corps, and the Navy Department (pages 40-42).

Politics or peacetime objectives played crucial roles in some decisions. In 1938, the U.S. Maritime Commission received congressional permission to grant contracts to shipyards in the South and West despite their higher cost structures (Lane (1947), 102-104). Although the performance of southern shipbuilders remained below eastern levels in the early 1940s, the Commission followed the administration's wishes by granting some wartime contracts to southern yards. Costs and productivity on the West Coast did reach parity with the east by the early 1940s, leading to the placement of a large share of contracts there during the war. But the pre-war West possessed no modern integrated steel plants and hence no capacity to produce ship plates locally. In response, Roosevelt had the federal government help finance two new steel plants (at Geneva, UT and Fontana, CA).

In addition, there were numerous accusations of influence peddling, kickbacks, and conflicts of interest regarding defense spending. Notable contracting scandals involved Thomas Corcoran, a New Deal political operative, General Bennett Meyers of the Army Air Crop, Representative Andrew May of Kentucky, chair of the House Committee on Military Affairs, and Senator Theodore Bilbo of Mississippi.

As these points suggest, voters valued local war spending. This might be surprising, since as the war commenced jobs were plentiful and there were also private-sector industry jobs. War-related employment was truly a premium job. Between 1939 and 1943, it paid between 30-40% more per hour and 40-60% more in total annual compensation than non-war industries. It was also superior to all manufacturing jobs, paying 15% more per hour and 20% more in annual compensation of the same period (U.S. Department of Commerce, Bureau of Foreign and Domestic Commerce (1943)). And as we discussed earlier, voters urged their Congressmen to try to get spending in their towns. There was active lobbying to influence the geographic allocation of war spending, which would only happen if spending

was perceived as benefiting the area where it is located.

With this as a backdrop, how did production proceed? The goal of serving as the Arsenal of Democracy was met, with a vast output of every kind of munition. Over the course of the war, 300,000 military airplanes (including 100,000 each of bombers and fighters) were made, 7,000 large ships and 65,000 landing ships were built, 88,000 tanks were produced (over three times what Germany made), 2.5m trucks, and tens of millions of guns. Production costs also fell and speed increased over the course of the war (that is, there were learning economies or economies of scale in production). In their first two years of production, the time to build Liberty cargo ships fell by three-fifths and destroyers shrunk by three-fourths. The cost of building fighter planes (dollars per pound) fell by a quarter over the course of the war, and bombers costs fell by two-thirds. One reason for this was the emphasis on using pre-existing manufacturing capacity (rather than building new facilities), since this took less time, leveraged the local specialized labor force, and avoided new construction costs.

At the same time there were many glaring examples of inefficiencies. For example, there were regional bottlenecks in production due to manpower shortages. While the War Manpower Commission was specifically tasked to aid in worker allocation, in 1943 there were extreme shortage of workers on the Pacific Coast which had large boat and aviation production plants and at the same time there was a surplus of farm workers or those in higher paying but non-essential industries; it took over a year for the commission to ameliorate this and reduce production delays. One reason for the delay was the political influence of the farm bloc—agricultural workers were deferred from the draft over much of the war, so many workers moved to or stayed on farms to maintain their deferral status. Similarly, each year during the war there were thousands of labor strikes resulting in millions of lost man-days.

4   Data and Summary Statistics

The analysis employs data collected from a variety of primary and secondary sources. The state-level monthly (approx.) military spending variables—contract and facilities spending—are from various economic reports published by the National Industrial Conference Board, hearings of the U.S. House Select Committee Investigating National Defense Migration, and the U.S. War Production Board, Statistics of War Production. The Data Appendix, Section 10.1 lists the specific sources and provides details on how the variables are constructed.

For economic efficiency we consider pre-war capacity measures. The manufacturing em-

ployment variables, including the number of wage-earners in total, in aircraft (SIC 372) and shipbuilding (SIC 373) in 1939 are from U.S. Bureau of the Census, Census of Manufactures: 1947, Vo. 3, Area Statistics (Washington, DC: GPO, 1950). The state-level data on elections for U.S. president, U.S. senator, and state governor are from ICPSR study number 2 (Candidate Name and Constituency Totals, 1788-1990).

Table 2 presents key summary statistics—mean, median, standard deviation—used in the state-level survey analyses below. One important point is that the dependent variables of interest are not massively skewed. Table 3 presents summary statistics for the variables used in the individual-level analyses. The next section discusses these variables, and how they are used, in more detail.

Table 2: **Summary Statistics for State-Level Analyses**

	N	Mean	Std. Dev.	Min	Max
Manufacturing Employment					
Total Manufacturing PC	48	49.5681	36.288	4.0576	148.7924
Aircraft Manufacturing PC	48	0.3125	0.859	0	4.2680
Shipbuilding Manufacturing PC	48	0.4926	0.901	0	3.1464
Spending (thousand $)					
1942 Spending PC	48	0.4674	0.560	0	2.6477
1943 Spending PC	48	0.3205	0.333	0	1.6954
1944 Spending PC	48	0.1998	0.183	0	0.8133
1945 Spending PC	48	0.0996	0.127	0	0.6125
Spending PC (Through Oct 1944)	48	0.9640	0.988	0.0062	4.1141
Spending PC (Jan-Oct 1944)	48	0.1761	0.169	0	0.7905
Spending PC (Sep-Oct 1944)	48	0.0172	0.021	0	0.0787
Spending PC (Aug-Oct 1944)	48	0.0188	0.062	0	0.1017
Spending PC (Jul-Oct 1944)	48	0.0490	0.058	0	0.1952
Spending PC (Jun-Oct 1944)	48	0.0714	0.071	0	0.2545

5 Spending and Votes: Gallup

The next two sections frame our analysis for how political motivation (vote-seeking) would shape the geographic distribution of World War II spending. We focus on state-level allocation decisions and their connection to the presidential election. This section provides an empirical estimate of one of the key factors in this decision, how such spending would alter voting. The following section develops a formal framework for identifying which states would

Table 3: **Summary Statistics for Individual-Level Analyses**

Spending Variables (thousand $)	N	Mean	Std. Dev.	Min	Max
Full sample					
Cumulative Spending PC	39566	0.8263	0.806	0	4.1913
Spending PC	39486	0.0986	0.106	0	0.6707
Vote Intention data available (1942-44)					
Cumulative Spending PC	27318	1.0561	0.835	0	4.1913
Spending PC	27266	0.1011	0.103	0	0.6707
Vote Approval data available (1941-43)					
Cumulative Spending PC	12223	0.0778	0.112	0	0.5828
Spending PC	12248	0.3138	0.405	0	2.7332

Voting variables	N	-2	-1	0	1	2
Vote Intentions (1942-44)						
V	24456			45.2%	54.8%	
$\triangle V$ (2-point scale)	20042		10.2%	84.4%	5.4%	
$\triangle V$ (4-point scale)	27090	7.6%	9.3%	66.8%	12.4%	4.0%
Vote Approval (1941-43)						
V	19108			21.0%	79.0%	
$\triangle V$ (2-point scale)	15689		3.2%	74.6%	22.2%	
$\triangle V$ (4-point scale)	21001	2.4%	4.4%	58.6%	18.0%	16.6%

These tables will help in interpreting the regressions of votes on spending (discussed in Section 4). Spending panel: these are statistics based on matching spending to Gallup Poll respondents, so larger states will receive more weight. The bottom rows present values conditional on the availability of the listed voting variable. Voting panel: $V = 1$ means intend to vote/approve Roosevelt (FDR), $V = 0$ means intend to vote against/not approve FDR (there are also respondents who have no preference). $\triangle V$ (2-point scale) and $\triangle V$ (4-point scale) are defined in Note 14, and they reflect how intentions/approval of FDR differ relative to how the poll respondent voted in 1940 (the more positive the values, the more the voter is changing their vote in favor of FDR). The Data Appendix lists the specific Polls which are used.

provide the greatest political return from spending. This in turn is based on how "pivotal" each state is: how likely the spending will change the state presidential election outcome and whether that change will alter the electoral college winner.

5.1   Background

A central issue for the pivot probability calculation discussed in the next section is the responsiveness of votes to spending. The more elastic are votes, the more attractive it will be to allocate funds for political gain. We will consider specifications of the form

$$V_{ist} = \beta S_{st} + \epsilon_{ist} \tag{1}$$

where i is an individual voter living in state s at time t, V is a measure of voting, and S is a measure of spending (we will also consider various additional controls discussed below). We are primarily interested in the estimated parameter β.

Estimating this effect is challenging for several reasons. First a suitable measure of voting with geographic granularity is needed. Second we need to deal with the potential endogeneity of the observed spending allocation, namely that it might be targeted to areas which have voters of certain characteristics or at times when voters are especially responsive. For example, if spending is targeted to areas which have more responsive voters, then regressing votes on spending will yield estimates which overstate the average responsiveness of votes. Finally, what actually matters for the allocation decision is politicians' expectations of the responsiveness, which might differ from the actual *ex post* measure.

We can deal with each of these issues to some degree. For the voting data we use Gallup Polls archived at the Roper Center for Public Opinion Research (see Data Appendix, Section 10.2 for full list of studies, sample sizes, and field survey dates). Gallup was among the first to conduct scientific polling of representative samples of likely voters, who were asked about vote intentions, vote preferences, retrospective voting, demographics, state of residence and other questions such as opinions about the war. The first Gallup poll available at Roper is from 1936, and new polls of roughly 3,000 respondents were conducted roughly every two weeks (though the same questions are not asked in all polls, and in particular vote questions are often omitted). Gallup data is non-panel, with new respondents in each wave. This means we cannot use actual voting and at the same time exploit the rich time variation in spending discussed earlier. Instead we use various measures of vote intentions or candidate approval and see how these are influenced by contemporaneous spending. To

do this we match the Gallup polls to various spending programs at the state-date level (1941–1944 for war spending, and earlier polls for other spending discussed below).

The second issue of spending endogeneity is more difficult. Contracts might be allocated based on some characteristic, such as demographic information or local economic conditions like unemployment which in turn are related to how people vote, or at times when individuals are deciding how they will vote, say right before the election. That is, spending is not random but may be targeted to places or times when it is most effective at changing votes. We can partly address this by taking differences and including state fixed effects, both of which will account for time invariant heterogeneity, as well as including time fixed effects, which accounts for temporal targeting in spending. This leads to the following alternative to (1):

$$\Delta V_{ist} = \beta \Delta S_{st} + \nu_s + \omega_t + \epsilon'_{ist} \tag{2}$$

Here $\Delta V_{ist} \equiv V_{ist} - V_{is0}$ where the latter term represents the actual vote in the last presidential election (recall the vote data is from a non-panel source so vote preference is unobserved, but Gallup does ask about retrospective voting), ΔS_{st} is the level of spending in the state in period t (non-differenced spending is the cumulative spending), and ν_s and ω_t are fixed effects. This specification exploits the fact that we have many different Gallup polls at different times. Thus, for example, we can compare voters who live in the same state, one who is interviewed *before* a large inflow of spending in the state and one who is interviewed *after* the spending has occurred.

There remains the possibility that voter responsiveness to spending varies over time, and that politicians understand this and target spending to the most responsive periods-locations. This would require that politicians have a large amount of fine-grained information. But if true, our difference-in-differences specification will likely overstate the effectiveness of spending. We therefore view our estimates as an upper-bound of the true effect.[13]

On the final issue, while it is not possible to literally measure politician expectations we instead consider multiple spending programs. In addition to the World War II military spending, we also consider New Deal spending. New Deal spending is helpful since it is also quite large, sustained over several years, and occurs shortly before the War and so politicians are likely familiar with its magnitude and its resulting impact on voting patterns (here we

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[13]Spending could also be allocated for other political goals. For example, it could be targeted to areas with loyal voters, and this would have an ambiguous bias (while loyal voters are less likely to change their votes, the money could induce turnout and this approach would motivate relatively few loyalists of the other party).

use polls over the period 1936-40). The New Deal spending data is from Price Fishback.

5.2 Estimates

In this section we present estimates of the main specification (2). Most of the results focus on World War II contract spending over the period 1941-1944, and consider its relation to the evolution of voter preferences for the 1944 presidential election between Roosevelt (FDR) and Dewey. Table 3 contains the summary statistics from the Gallup file as well as the associated spending variables.

Table 4 presents the main estimates of Equation (2) which focuses on WWII contract spending per capita. We use the voter's stated vote in the 1940 presidential election for V_{is0}, and we consider two versions of the differenced vote variable.[14] Gallup asks different vote-type questions and so there are two separate sets of results, one based on voter approval of FDR (available in 1941-1943) and a second based on a voter's intended vote in the 1944 election (available in 1942-1944). In the top panel which presents results for voter approval, the first two columns focus on cumulative spending. A one thousand dollar per capita increase in cumulative contract spending (equivalent to over \$100 billion in spending and a bit more than either the mean or standard deviation over the entire war for this variable) leads to a 0.08 shift in votes to the Democrats on the two point scale (which omits previous non-voters and ranges from -1 to 1) and 0.15 on the 4-point scale (which ranges from -2 to 2). Under a simple model of preference distribution this would correspond to a 4 percentage point increase in FDR's percent vote in a state, a non-trivial amount but relatively modest considering the magnitude of funds involved (and again recall this is an upper bound effect, and the second value is not statistically significant).[15] The estimates in the next two columns

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[14]The two vote difference variables treat non-voters in the previous period differently. In the two-point scale, we omit previous non-voters and $\Delta V_{ist} \in \{-1, 0, +1\}$ with -1 indicating a previous Democrat voter who now votes Republican, +1 a previous Republican voter who now votes Democrat, and 0 someone who does not change their vote. In the four-point scale we include the previous non-voters, and $\Delta V_{ist} \in \{-2, -1, 0, +1, +2\}$ where -2 is a previous Democrat voter who now votes Republican, -1 is a previous non-voter who now votes Republican, 0 is a voter who does the same as in the last elections, etc.

[15]Consider first the 2-point scale which ignores non-voters. Suppose voters have ideal points, x, which are uniformly distributed along the unit interval, and that they vote for the Democrats if $x < X$ where X is a cut-point that accounts for non-policy valence ($X = 0.5$ if the candidates are equally attractive for non-policy reasons). The estimates suggest that spending shifts each ideal point to the left by 0.04 after taking into the scaling of the dependent variable, and will change aggregate FDR vote by the same amount. With the 4-point scale, suppose that individuals only vote if they have strong preference between the candidates so voters with $X_1 < x < X_2$ abstain where the X_i are the cut point for voting for the Democrat or Republican. The same reasoning for the 2-point scale and recalling the larger scale here implies that spending again will increase FDR's vote share by 0.04.

show that a \$250 per capita increase in annual contract spending (again about \$100 billion over the all years, and twice the mean or standard deviation) leads to a shift in voters to the Democrats that is only about half as large.

The bottom panel of Table 4 repeats this using vote intentions as the dependent variable. Here there are no positive and significant results, and some of the values are even negative. In all cases the economic effects are much smaller, suggesting a very limited voter response to war spending.

Table 4: **WWII Contract Spending: Change in Vote Intention or FDR Approval, Equation (2)**

Dep Var = Change in FDR Approval (Time Period = 1941–1943)				
	2-point	4-point	2-point	4-point
Cumulative Spending PC	0.0813	0.1497		
	(0.036)	(0.073)		
Spending PC			0.2079	0.3275
			(0.113)	(0.245)
N	9053	12158	9036	12133
R^2	0.01	0.01	0.01	0.01

Dep Var = Change in FDR Vote Intention (Time Period = 1942–1944)				
	2-point	4-point	2-point	4-point
Cumulative Spending PC	-0.0458	-0.0754		
	(0.013)	(0.028)		
Spending PC			0.0339	0.0977
			(0.059)	(0.122)
N	20036	27082	19992	27031
R^2	0.00	0.00	0.01	0.01

Robust standard errors in parentheses. State fixed-effects and year fixed-effects included in all specifications. Data are roughly at quarterly frequency and are at the person-state-time period level. Cumulative Spending includes all contract spending from the start of the war through the current period, and Spending includes spending in that period only (e.g., the per-period difference in Cumulative Spending); both are in per capita terms. Vote-Approval and Vote-Intention are for individual respondents and come from Gallup Polls. In the 2-point scale the dependent variable $\triangle V \in \{-1, 0, 1\}$ and under the 4-point scale the dependent variable $\triangle V \in \{-2, -1, 0, 1, 2\}$ (see Note 14). The Data Appendix lists the specific Polls which are used.

As a robustness check we considered various modifications of these specifications as well as all two-way permutations of these modifications, and in all cases we continue to find small economic effects (these estimates are omitted). These include looking at spending in level rather than per capita terms, using new facilities spending, using non-differenced voting rather than netting our previous vote patterns (and estimate using either a linear probability model or a logit), omitting various combinations of fixed effects, including both cumulative and annual spending to allow for diminishing returns (voters respond primarily to the first increment of spending), and interacting spending with individual-level demographics such as age, race, religion, parent's country of origin, urban location, occupation, education, and phone- or car-ownership (wealth proxies). The latter is especially important since it is a more direct control for geographic-targeting of funds based on local characteristics.

Table 5 examines New Deal spending over 1936-1940, which might reflect information politicians had when they started allocating the war spending monies. We repeat the specifications and approach from the previous table. We use the voter's stated vote in the 1936 presidential election for V_{is0}, except the very first poll which occurs before that election and so the vote in 1932 is used there. Except in one case the parameters are not statistically different from zero, though the standard errors are modest as the sample size is relatively large. We begin again with voter approval (unlike with the war polls, the voting variables are evenly spread across the sample period). Using the point estimates and the same model from the last paragraph, a two hundred and fifty dollar increase in annual spending per capita increases FDR's vote share by three and a half to five and a half percent. This is quite close to the values from war spending. Cumulative spending per capita has a negative association, with a thousand dollar increase associated with about a one to four percent reduction in FDR votes. If instead vote intentions are used, the estimates in the final four columns indicate the effect on FDR votes is about twice as large for annual spending and about the same (negative) effect for cumulative spending. Echoing the earlier results, there is little evidence that spending yields large positive shifts in voting, and again the estimates here are likely upper bound effects.[16]

Overall, there is little support from either the World War II spending or New Deal spending that votes are highly responsive to government resource allocations. For example,

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[16]These results are consistent with previous research that finds mixed evidence regarding the impact of New Deal spending on local economic conditions. See, e.g., Fishback, Horrace and Kantor (2005), Fishback (2017).

Table 5: **New Deal Spending: Change in**
Vote Intention or FDR Approval, Equation (2)

Dep Var = Change in FDR Approval (Time Period = 1936–1940)				
	2-point	4-point	2-point	4-point
Cumulative Spending PC	-0.0436	-0.1748		
	(0.060)	(0.124)		
Spending PC			0.2731	0.9278
			(0.258)	(0.602)
N	19209	27031	19209	27031
R^2	0.02	0.02	0.01	0.01
Dep Var = Change in FDR Vote Intention (Time Period = 1937–1940)				
	2-point	4-point	2-point	4-point
Cumulative Spending PC	-0.0987	-0.1899		
	(0.064)	(0.111)		
Spending PC			0.9424	0.9155
			(0.292)	(0.586)
N	13170	17789	13170	17789
R^2	0.05	0.04	0.03	0.03

Robust standard errors in parentheses. State fixed-effects and year fixed-effects included in all specifications. Data are roughly at quarterly frequency and are at the person-state-time period level. Cumulative Spending includes all contract spending from the start of the war through the current period, and Spending includes spending in that period only (e.g., the per-period difference in Cumulative Spending); both are in per capita terms. Vote-Approval and Vote-Intention are for individual respondents and come from Gallup Polls. In the 2-point scale the dependent variable $\triangle V \in \{-1, 0, 1\}$ and under the 4-point scale the dependent variable $\triangle V \in \{-2, -1, 0, 1, 2\}$ (see Note 14). The Data Appendix lists the specific Polls which are used.

the top panel of Table 4 suggests that if all of the war spending arrived in one burst, then the effect on FDR's approval would only be about half as large as the "rally around the flag" increase which followed the Japanese attack on Pearl Harbor (see Figure 9 below). It suggests that politically strategic allocation of war monies is unlikely to be successful at shaping electoral outcomes. Still, this is just one input in the allocation calculus, and we return to the importance of politics in the allocation process in the next section.

6   Pivotal States in the Electoral College

We now turn to a formal model of election-motivated spending allocation decisions. We focus on how to distribute spending across states with the goal of maximizing the probability of winning the presidential election. This in turn is equivalent to determining which states have the highest return: spending there has the greatest chance of swinging the overall election winner. We will use the estimates from the previous section regarding the impact of spending on vote outcomes to help choose a key parameter.

6.1   Calculating Pivot Probabilities

Our procedure for estimating the political value, or "pivot probability" of each state in the 1944 presidential election, is similar in spirit to that in Strömberg (2008). The goal is to answer the following question: For each state i, how likely is it that a marginal change in supply contract spending state i (either up or down) would change the electoral college outcome? Note that we focus on the incumbent party's allocation decision. This is because it is not clear what assumptions to make regarding voters' beliefs about what the challenging Republican party would do in power. The Republicans had not held power nationally for more than a decade, and had no previous record governing during a crisis similar to WWII since the Civil War.

First, for each state we calculate the Democratic share of the two party vote in all elections for U.S. president, U.S. senator, and state governor that took place between 1932 and 1943.[17] Denote this by D_{ijt}, where i indexes states, j indexes offices, and t indexes years. Next we

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[17]We drop cases in which a third party candidate received more than 15% of the total vote. We also drop cases where the Democratic share of the total vote was less than 5% or greater than 95%. We also ran the analysis dropping the elections held in 1942 and 1943, and the results are quite similar to those presented below.

estimate the following model, using OLS:

$$D_{ijt} = \alpha_i + \theta_t + \epsilon_{ijt} \tag{3}$$

where α_i denotes a vector of state-specific fixed-effects and θ_t denotes a vector of year-specific fixed-effects (national shocks). This yields the "normal Democratic vote" in state i ($\hat{\alpha}_i$), and the "idiosyncratic electoral variability" in state i (standard deviation of the residuals $\hat{\epsilon}_{ijt}$ for state i). Call these D_i^{mean} and D_i^{sd}, respectively. Also, let E_i be the number of votes state i has in the electoral college, and let P_i be state i's population.

The next step is to calculate how spending would change vote outcomes, and in turn whether these changes would alter the election outcome compared to the no spending case. We must make an assumption about two parameters. The first is the expected national electoral shock or "national tide" in the 1944, which we denote D^N (positive values being in favor of Democrats and negative values being against).[18]

The second is the effect of military spending on the share of votes won by the Democrats in 1944. As noted above, the standard deviation of contract spending per capita was about \$1,000, and the average was also about \$1,000. The average state population was about 2.7 million. So, we consider changing a state's total contract spending by \$2.7 billion. How does that translate into votes? This depends on voter behavior—how sensitive voters are to spending in their state when deciding how to vote—which we denote V^m (In order to avoid parameter values with many decimals, we measure contract spending in thousands of dollars).[19]

For each choice of these parameters—discussed shortly—we simulate 1 million elections, as follows (steps (i) through (iv) summarize a single election iteration):

(i) Draw an idiosyncratic shock η_i for each state i from a distribution that is $N(0, (D_i^{sd})^2)$.

(ii) Let $V_i = D_i^{mean} + D^N + \eta_i$ be the Democratic vote share in each state i.

(iii) Calculate the electoral college winner given the vector of V_i's (there were 531 members

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[18]This is akin to the fixed effect θ_t from the estimates of (3), but those values cannot be used because they are for earlier periods.

[19]Note that V^M takes on two roles: it measures both vote sensitivity to money and the amount of spending. That is, doubling its value could mean the amount of spending doubles and vote sensitivity stays constant. For our purposes focusing on vote sensitivity is reasonable since we have calibrated the spending level to match the actual amount during the war.

of the electoral college in 1944):

$$Democratic\ Win \quad \text{if} \quad \sum_{\{i|V_i>.5\}} E_i > 265$$

$$Republican\ Win \quad \text{if} \quad \sum_{\{i|V_i>.5\}} E_i < 265$$

(iv) In the case of a *Republican Win*, loop through the set of states with $V_i < .5$ (the states won by Republicans) one state at time, and add $V^m \times (2700000/P_i)$ to V_i while holding all other states' voting outcomes fixed. If doing this changes the electoral college outcome to a Democratic win, then call state i *Pivotal*.[20]

In the case of a *Democratic Win*, loop through the set of states with $V_i > .5$ (the states won by Democrats) one state at time, and subtract $V^m \times (2700000/P_i)$ from V_i while holding all other states' voting outcomes fixed. If doing this changes the electoral college outcome to a Republican win, then call state i *Pivotal*.

(v) Let *Pivot Probability$_i$* be the fraction of times that state i is *Pivotal* out of the 1 million simulated elections.

Choosing a range of values for the national tide, D^N, is relatively straightforward. The median presidential vote swing over the period 1920-1944 was about 3%, and historically swings larger than 5% are relatively rare. To keep things simple we consider three values, $D^N \in \{-.03, 0, .03\}$.

Choosing a range of values for V^m is trickier. It should represent the impact of the overall size of War spending on the Democratic vote share. Our best benchmarks are from the World War Two and New Deal spending estimates in Section 5. Recall that we consider two versions of spending (cumulative and per year) as well as four versions of vote change (omitting and including previous non-voters, and vote intention versus vote approval). As discussed in that section, in each case we can convert the parameter values into the change in

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[20]Note that for state i to be pivotal, two changes must occur. First, $V_i + V^m \times (2700000/P_i)$ must be greater than .5 (the injection of funds must change the outcome in state i from a Republican majority to a Democratic majority). Second, state i must have enough electoral college votes so that changing the state from Republican to Democratic changes the outcome in the electoral college. The first change will tend to happen more often in small states, but the second change will tend to happen more often in large states.

Democratic vote share from total war spending.[21] For the World War Two spending (Table 4) the average imputed V^M value is 0.012 with a maximum of 0.041. For New Deal spending (Table 5) the average is 0.013 and the maximum is 0.118. In addition, when $V^m = .0621801$, the average vote shift caused by military spending is equal to the average (across states) of the within-state standard deviation of vote share across years and offices. We examine a range of possible V^M, but we think the most plausible value is around 0.05 or 0.06.

We consider $V^m \in \{.01, .02, .03, .04, .06, .08, .10, .12, .15, .20, .25\}$. We include the high values in our analyses to show what the model would predict if politicians believed that military spending was highly effective at winning votes.

We ran 33 separate simulations, one for each combination of D^N (×3) and V^m (×11).

Figures 3a - 3d show how the pivot probabilities vary across states, for four values of V^m—.01, .03, and 06 ("reasonable" values), and .20 (probably implausibly large). The maps suggest that the pivotal probabilities are plausible. While the probabilities vary with V^m, the ordering of the states is relatively stable (while not shown here, they are also stable over D^N) . States with high pivot probabilities—such as New York, West Virginia, Illinois, Indiana, Missouri—are those which are not strongly aligned with one party, while those with pivot probabilities of zero—North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, Arkansas, Texas—tilt heavily towards Democrats. In fact, the states of the Solid South are essentially never pivotal.

The results also differ from simpler and more naive approaches. For example one could see which states have the most volatile historical votes. This would be an unsatisfactory measure since it ignores both the baseline partisanship of the state and the state's size. In fact historical volatility has little correlation with any of the state-level pivotal probability measures (results available upon request).[22] A more formal comparison of the pivot probability and some leading alternatives from the literature is presented in the next sub-section.

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[21]The estimated spending parameters $\hat{\beta}$ from (2), like V^M, are denominated in thousands of dollars per capita. The parameter then must be divided by certain factors depending on the combination of spending and vote variable being used. For cumulative spending roughly a thousand dollars matches the overall war total ($F_1 = 1$) while for per year spending the amount is two hundred and fifty dollars ($F_1 = 4$). For the vote scale the values should be mapped into the unit interval to give vote shares which can be applied to the 2-point ($F_2 = 2$) and 4-point ($F_2 = 4$) scales. Finally, to convert to expected voting we use a common factor for vote intentions and vote approval ($F_3 = 1$). The vote approval factor in principle could differ (since it is not literally how an individual plans to vote), but using data from OPOR surveys and regressing vote intention on vote approval shows that for the observed range of approval values that little adjustment is needed (regression available upon request). So to map the parameter estimate into a fitted V^M value we take $\hat{\beta}/(F_1 \times F_2 \times F_3)$.
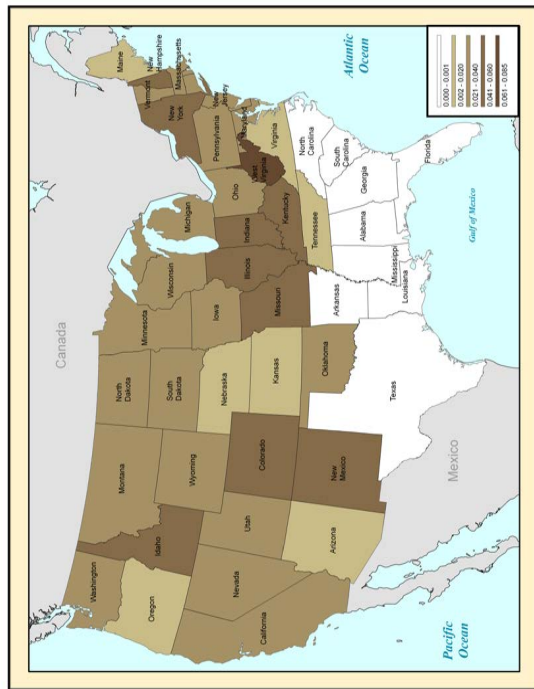
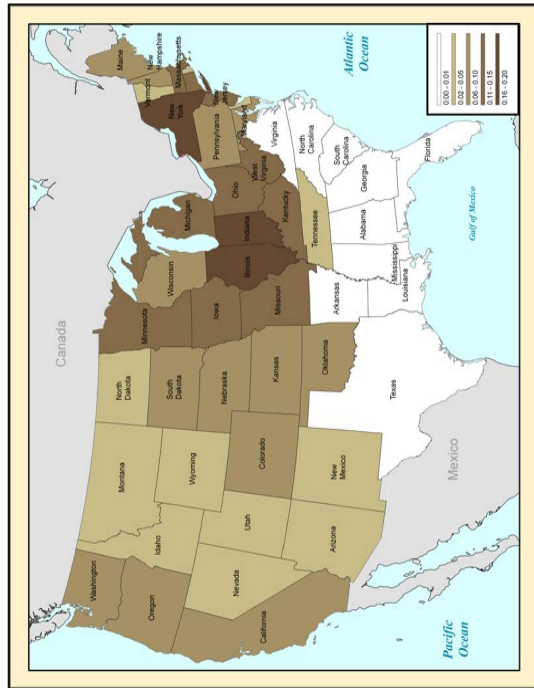[22]Volatility is the residual standard error from (3).
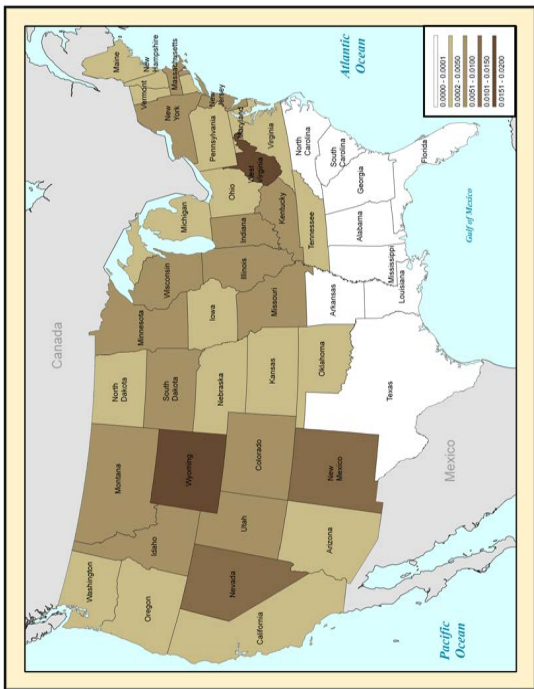
(a) Pivot Probabilities for $V^m = .01$, Neutral Tide ($D^N = 0$)
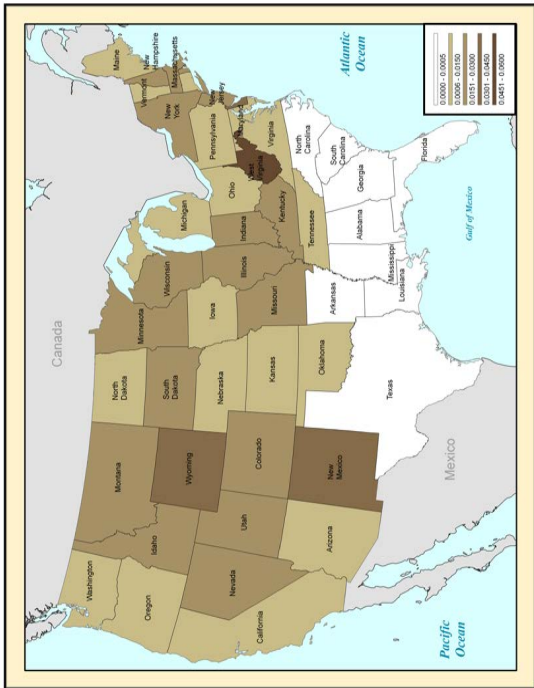
(b) Pivot Probabilities for $V^m = .03$, Neutral Tide ($D^N = 0$)

(c) Pivot Probabilities for $V^m = .06$, Neutral Tide ($D^N = 0$)

(d) Pivot Probabilities for $V^m = .20$, Neutral Tide ($D^N = 0$)

Figure 3

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6.2 A Test: Pivot Probabilities and Campaigning in the 1944 and 1948 Elections

This section provides empirical support for our measure of state political value. We conduct a horse race between *Pivot Probability* and other possible contenders from the literature. The approach is to look at an alternative ranking of state political attractiveness based on parties' spending scarce resources: campaign visits by presidential candidates (while our discussion in the last sub-section focused on spending, the model can be applied to any resource which shapes voting behavior). States visited more frequently have greater perceived electoral importance, since these trips are primarily set with the goal of winning the election. We show that campaign visits by presidential candidates are very strongly and positively associated with *Pivot Probability* for reasonable parameter values and much less so with measures used in the literature (there is also additional evidence from political betting markets supporting our preferred measure).[23]

We study two elections, 1944 and 1948. We collected the 1944 (Roosevelt versus Dewey) campaign visits data ourselves from newspaper reports.[24] The 1948 (Truman versus Dewey) data are from Runyon, Verdini and Runyon (1971). These are interesting races to consider since they include periods within and outside our main sample, outcomes that are close and lopsided, and cases where one or both candidates campaign.

Before turning to the analysis, it is worth noting an important difference between campaign visits and war spending. Campaign visits to a state have the flavor of a public good, because each visit generates widespread publicity via newspaper and radio coverage, discussion by politicians and local political elites, and so on. When Dewey travels to St. Louis to give a major speech, the message conveyed is "Dewey cares about the people of Missouri." Newspapers and radio stations across the state magnify the impact of the visit—probably, roughly linearly as a function of total circulation and the number of listeners—so the visit is

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[23]An alternative test is compare the various measures against market estimates of the political value of different states. We consider the odds shortly before the 1944 election from political betting markets (*New York Times*, 29 Oct 1944), which Rhode and Strumpf (2004) show already had an almost century long record as the best available forecast of elections. While the betting markets are based on a slightly different outcome (who will win the state), it should have a high overlap with our focus (whether spending will both change the state election and also the overall winner). Our pivot probabilities have a correlation of 0.6-0.7 with the betting market probabilities on the underdog, which is twice as high as the correlation for the alternative measures.

[24]For 1944 we also conducted an analysis for Dewey alone, because Roosevelt did little campaigning due to his poor health. The estimates are similar to those reported here. The newspaper sources include, e.g., the *Washington Post*, July 31, 1944; Sept. 28, 1944; Oct. 7, 1944; Oct. 21, 1944.

"consumed" by more than just those who actually see Dewey, shake his hand, or have their babies kissed (spending in contrast has smaller geographic spillovers: a new plant or more spending at an existing plant has primarily a local and private benefit, the jobs which get created). Thus, rather than dividing by total population as in part (iv) in the procedure above, it probably makes more sense to divide by some much smaller percentage, or perhaps not to divide by population at all.[25] What this means is that higher values of V^m might be more reasonable than lower values. There is some tentative evidence that campaign visits have a higher public goods component than does war spending.[26]

Table 6 presents a series of bivariate regression results, with $Log(Visits + 1)$ as the dependent variable. Each row shows the point estimate and standard error of the independent variable, as well as the R-square. To facilitate comparisons across rows we standardize all variables to have a standard deviation of 1.

For high values of V^m, such as .20 and .25, the correlation between $Log(Visits + 1)$ and *Pivot Probability* is above 0.7, which is quite high and nearly as high as the correlations reported by other scholars for recent elections.[27]. Even for lower values of V^m, such as .10, the correlation between $Log(Visits + 1)$ and *Pivot Probability* is relatively high, around 0.6.

A second important point is that *Pivot Probability* outperforms other measures used in the literature. In his seminal study of New Deal spending Wright (1974) studied a *Political Productivity* index, as well as a combination of three intuitive measures—electoral votes per capita, the closeness of the predicted vote to 50-50, and the historical variability of the vote measured as the standard deviation around the trend.[28] In his study of WWII

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[25]Of course, military spending might also generate goodwill via favorable newspaper or radio coverage of the incumbent, but the most important benefits—relatively high-paying jobs for workers, sales and profits for firms—are almost surely private or at least local.

[26]We examined California, which is an interesting test case both because there is significant spending in both northern and southern California and because the Republican candidate in the 1944 election separately visited San Francisco and Los Angeles (Roosevelt's health prevented him from visiting the state). Using ProQuest Historical archives for *The Los Angeles Times*, we find that 32% of the newspaper's articles covering Dewey's 1944 visit focused on stops outside of the Los Angeles region, while only 21% of the articles on war spending through the 1944 election covered areas outside of Los Angeles. This is consistent with the hypothesis that campaign visits have a larger geographic spillover then spending.

[27]Strömberg (2008) estimates that the correlation between visits and his measure of pivotality was 0.8 in both 2000 and 2004. Nagler and Leighley (1992) study the 1972 presidential election and find that expenditures were higher in states where the election was expected to be close and in states that were more likely to be pivotal.

[28]The index is $[(Electoral\ Votes)/(.01\ Votes\ Cast)] \times [\Phi((\hat{D}-.5+.01)/\hat{\sigma}(D)) - \Phi((\hat{D}-.5)/\hat{\sigma}(D))]$ where D is the Democratic share of the presidential vote, $\hat{D}$ is the predicted value of D based on a linear regression of D on $Year$, $\hat{\sigma}(D)$ is the mean squared error of the regression residuals, and Φ is the standard normal cumulative distribution function.

spending Rhode (2000) updated Wright's measures, adding the elections between 1932 and 1944. Bateman and Taylor (2003) use an *Electoral Vote Competition* index proposed by Grier, McDonald and Tollison (1995).[29]

As Table 6 shows, *Electoral Vote Competition* is positively associated with campaign visits in both years, but statistically significant only in 1948 and the correlation in 1944 is just 0.17. On the other hand, *Political Productivity* appears to be uncorrelated with campaign visits in both years. Note that we examine two versions of this index, one that follows Wright and includes all elections back to 1896 (*Political Productivity 1*) and one that includes only the elections back to 1932 (*Political Productivity 2*). We consider the second variable to make sure that results are not due to measurement error from using mainly elections prior to the New Deal electoral realignment.[30] The *Std Deviation of Vote* is essentially unrelated to campaign visits in 1944 and in 1948 the correlation is negative. The simple and intuitive "battleground state" measure, *Closeness to 50 − 50* is positively and significantly correlated with visits and clearly outperforms both the *Std Deviation of Vote* and the *Vote Competition Index*.[31] However, except for the lowest values of V^m, the *Pivot Probability* variables are even more highly correlated with visits than *Closeness to 50 − 50*. This is because the *Pivot Probability* measure also incorporates the number of votes each state has in the electoral college, and (though less important, at least judging from the data) each state's electoral volatility.

7   Main Results on Spending

This section presents the main estimates explaining the spatial distribution of spending across states. The focus is on determining the relative contributions of political incentive and economic efficiency mechanisms (For politics this section concentrates on presidential election concerns while a sub-section considers the role of Congressional influence.). We begin with a short motivational approach which gives preliminary evidence of the limited role of political factors. We then present the formal analysis. We first consider supply

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[29]The index is (*Electoral Votes*) × *Std Dev*(D)/(|D−.5|) where D is the Democratic share of the presidential vote.

[30]Since *Political Productivity 2* is based on just 3 or 4 elections, we do not de-trend D to compute $\hat{D}$ and $\hat{\sigma}(D)$.

[31]Following our construction of the *Pivot Probability* variables, for 1944 we use all elections between 1932 and 1942 to compute *Std Deviation of Vote*, *Vote Competition Index*, and *Closeness to 50 − 50*. For 1948 we use all elections between 1932 and 1946.

Table 6: **Campaign Visits in 1944 and 1948**

Independent Variable	Coeff.	Std. Error	R^2
1944 Election			
Pivot Prob, $V^m = .25$	0.74	(0.10)	0.55
Pivot Prob, $V^m = .20$	0.72	(0.10)	0.51
Pivot Prob, $V^m = .15$	0.68	(0.11)	0.46
Pivot Prob, $V^m = .10$	0.61	(0.12)	0.37
Pivot Prob, $V^m = .06$	0.47	(0.13)	0.22
Pivot Prob, $V^m = .03$	0.34	(0.14)	0.12
Political Productivity 1	-0.07	(0.15)	0.01
Political Productivity 2	-0.04	(0.15)	0.00
Electoral Votes Per Capita	-0.28	(0.14)	0.08
Closeness to 50-50	0.40	(0.14)	0.16
Std Deviation of Vote	-0.13	(0.15)	0.02
Electoral Vote Competition	0.09	(0.15)	0.01
1948 Election			
Pivot Prob, $V^m = .25$	0.72	(0.10)	0.52
Pivot Prob, $V^m = .20$	0.71	(0.10)	0.51
Pivot Prob, $V^m = .15$	0.68	(0.11)	0.47
Pivot Prob, $V^m = .10$	0.59	(0.12)	0.35
Pivot Prob, $V^m = .06$	0.48	(0.13)	0.23
Pivot Prob, $V^m = .03$	0.34	(0.14)	0.12
Political Productivity 1	-0.06	(0.15)	0.00
Political Productivity 2	-0.06	(0.15)	0.00
Electoral Votes Per Capita	-0.27	(0.14)	0.07
Closeness to 50-50	0.36	(0.14)	0.13
Std Deviation of Vote	-0.29	(0.14)	0.09
Electoral Vote Competition	0.44	(0.13)	0.20

Each row shows the estimates from a separate univariate regression. For all of the *Pivot Prob* variables we assume a neutral tide ($D_N = 0$). In all cases the number of observations is 48.

contracts which are the largest component of war spending, and then focus on new facilities. Facilities spending is only one-seventh of total outlays, which is evidence against political allocation since it should be easier to geographically target to politically beneficial states than contract spending which is tied to pre-existing manufacturing capacity. The regression estimates indicate political incentives play almost no role, and that economic efficiency is important both relative to politics and also in absolute terms.

7.1 Motivation

Before turning to the estimates, it is helpful to visualize the data. Figure 4 shows at the state-level how aggregate vote-changes (discussed in Section 5) compare with World War II spending levels over the period 1940–1944. There is a slight positive relationship between spending and votes (correlation = .32), although this seems driven in large part by a few states in the South, which shifted votes away from FDR and also received relatively few military contracts.
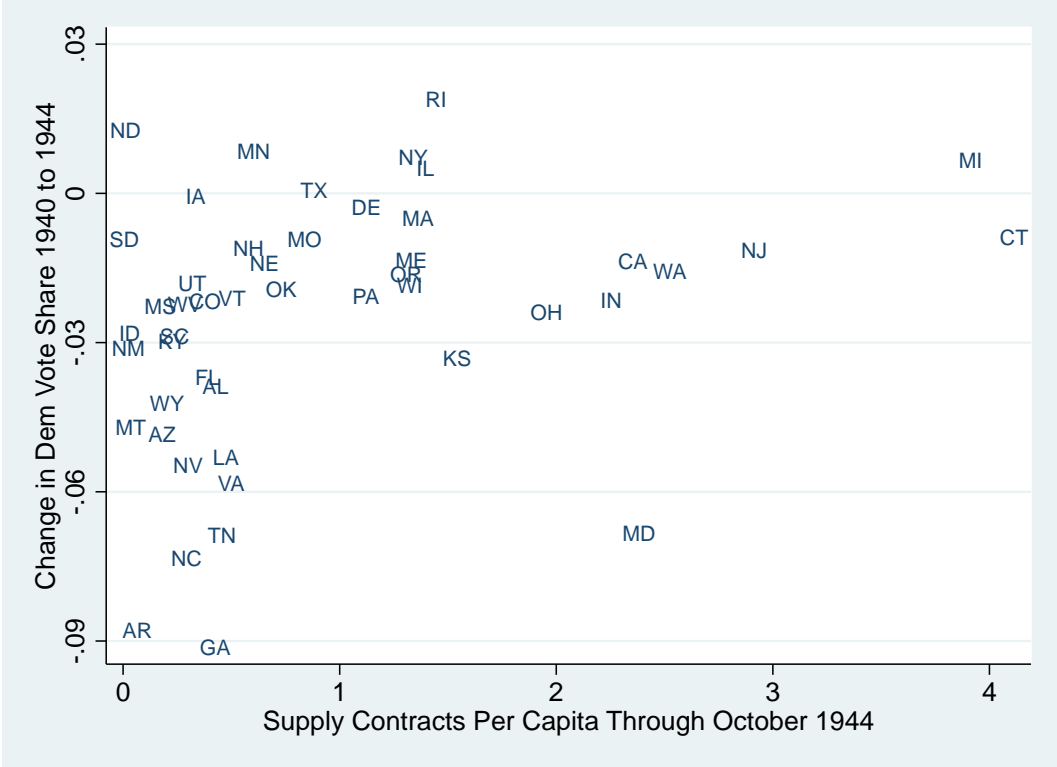
Figure 4: Change in Democratic Vote Share vs. Supply Contract Spending Per Capita

It is also useful to visualize the data spatially. Figures 5 and 6 show the annual and overall allocation of per capita contract spending across states. Spending is heavily concentrated in

the Northeast, Industrial Midwest, West Coast, as well having relatively high values in the Plains. This ranking is also relatively stable over time. While these patterns could reflect a politically motivated allocation since many of these states have high pivot probabilities (Figure 3), there are important deviations. For example, West Virginia is pivotal but it does not receive extraordinary spending. New England, Upper Midwest, Plains and West Coast states receive substantial spending and yet are not particularly pivotal. And then there is the South, which is never pivotal, and yet receives spending. Economic efficiency is a more consistent explanation for the allocation pattern. High spending states all have significant pre-existing industrial capacity (Figure 8, discussed further below). In particular, economics can explain the politically anomalous cases of high spending in less pivotal states (New England, Upper Midwest, West Coast, and South) and low spending in pivotal states (West Virginia).[32]

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[32]The high spending in many of the Plains states stems from their aircraft manufacturing facilities (Figure 8b).
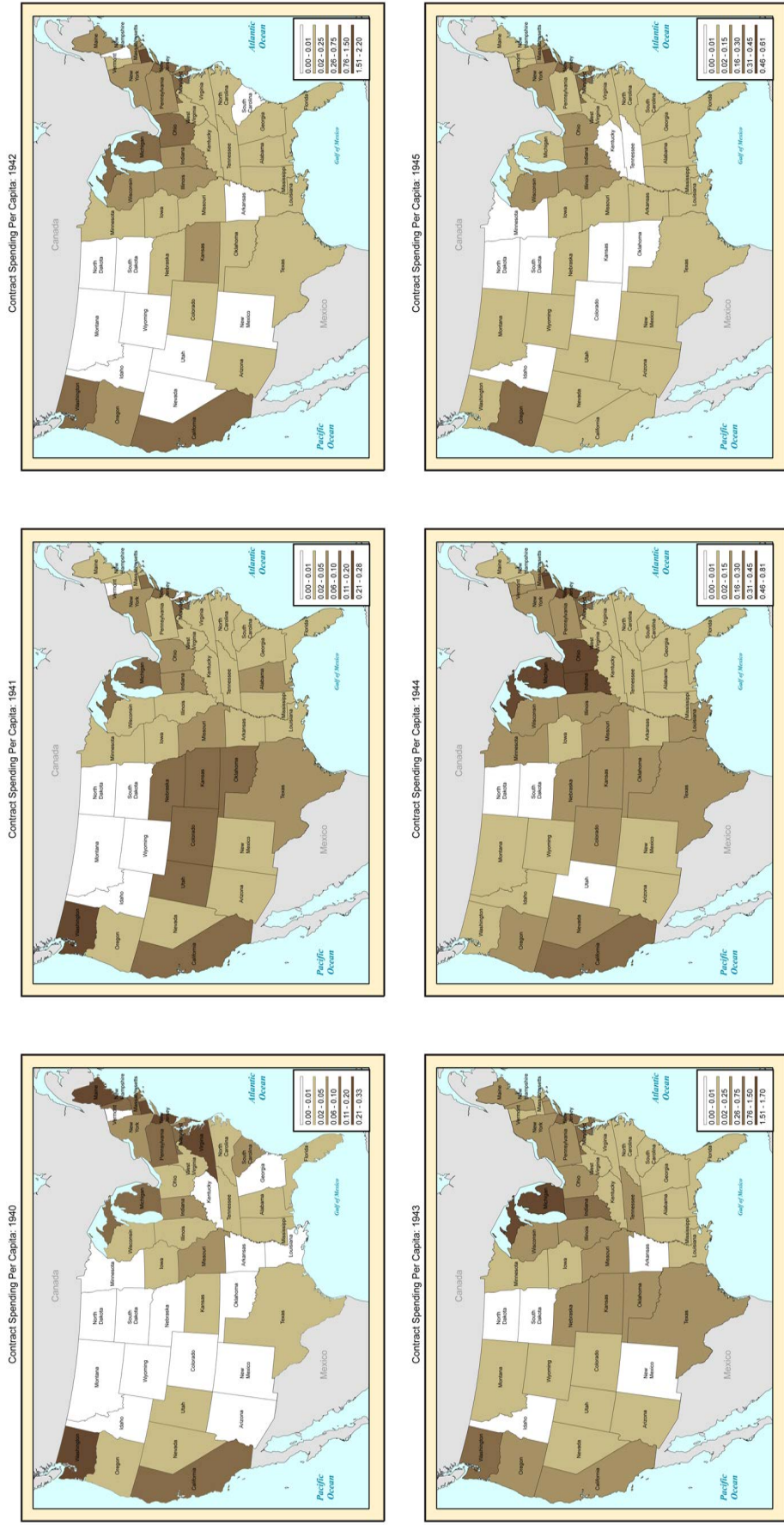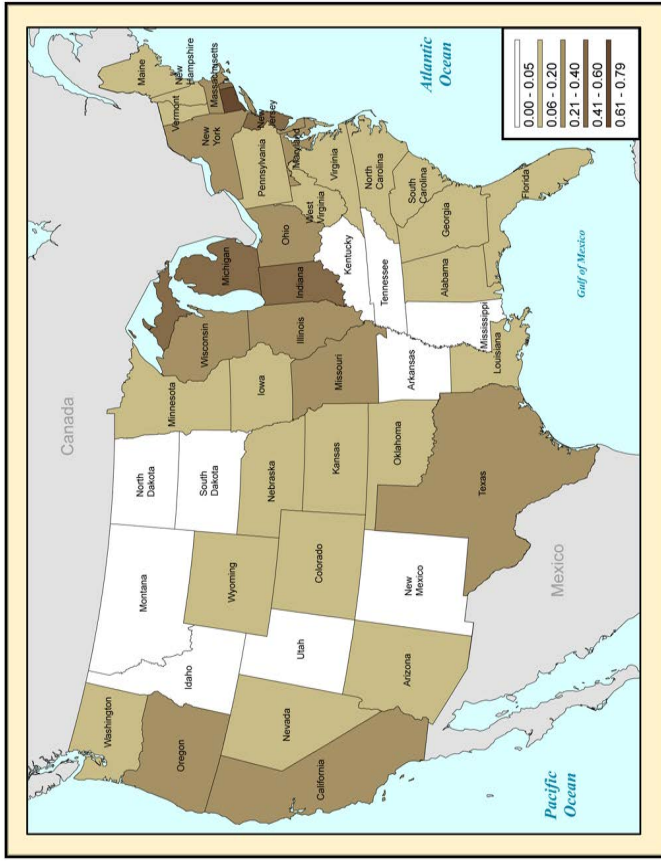
Figure 5: Annual Contract Spending Per Capita: By State
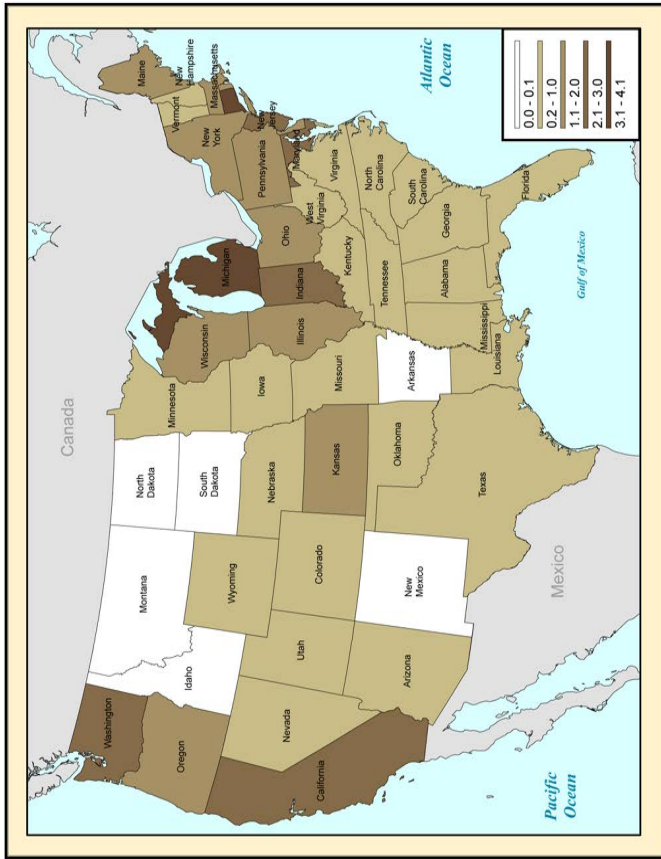
(a) Contract Spending Per Capita, 6/1940 thru 10/1944

(b) Contract Spending Per Capita, 1/1944 thru 10/1944

Figure 6: Contract Spending Per Capita: Periods of Interest

Figure 7 shows the distribution of new facilities spending per capita. In contrast to contracts spending, this money is relatively uniformly allocated. One exception is Nevada, where a large number of military bases (mainly army airfields) and mining facilities were built, and the population was low. Comparing to the far lumpier pivot probability maps in Figure 3, it seems unlikely that political calculus drove this allocation.

Figure 8 shows the distribution of the two key economic independent variables—total manufacturing employment per capita and aircraft manufacturing employment per capita—across the U.S. states. Two features stand out. First, manufacturing had important concentrations in the Northeast, the Industrial Midwest, and to a lesser extent the West Coast and portions of the South—the Carolinas, Georgia and Virginia (these points partly reflect the spatial distribution of the auto industry, see note 9). Second, aircraft manufacturing employment was highly concentrated in a few states, reflecting the need for specialized labor and plants.
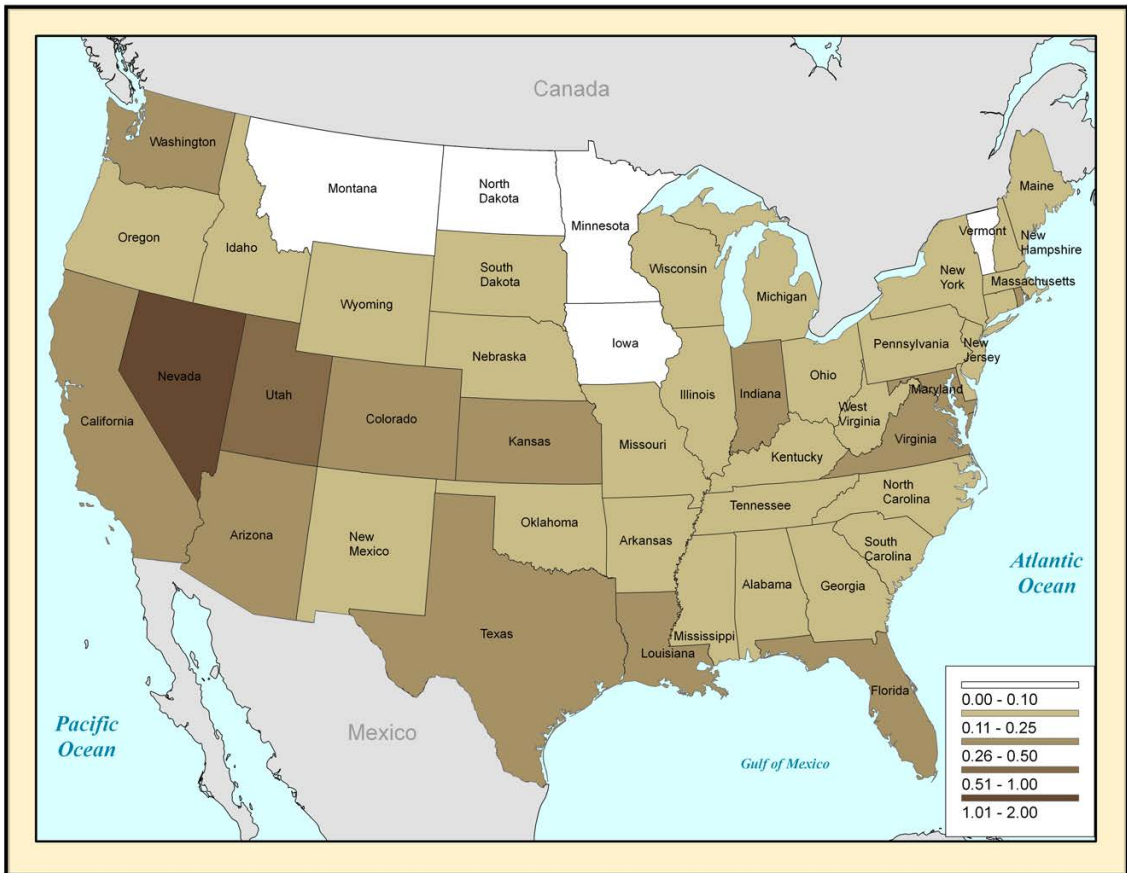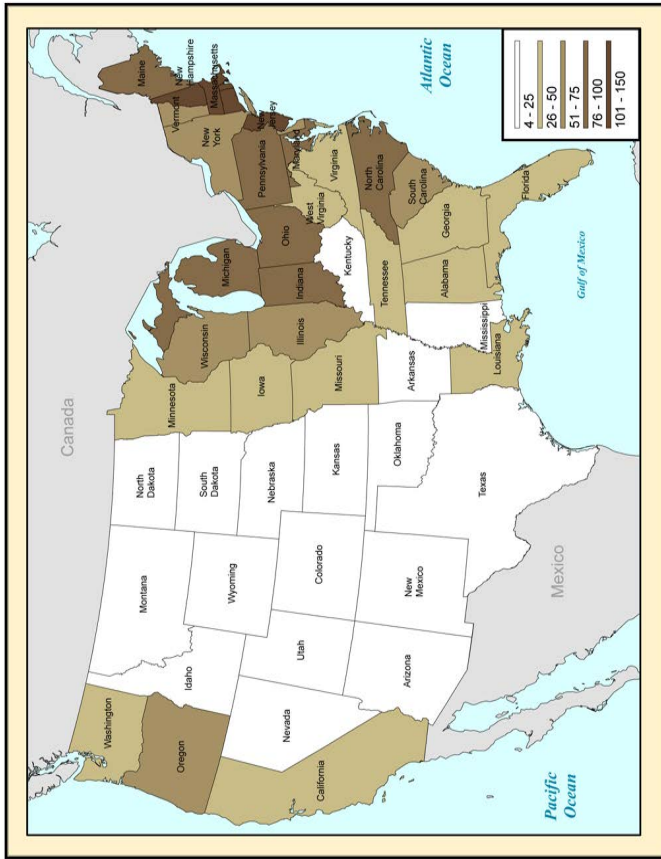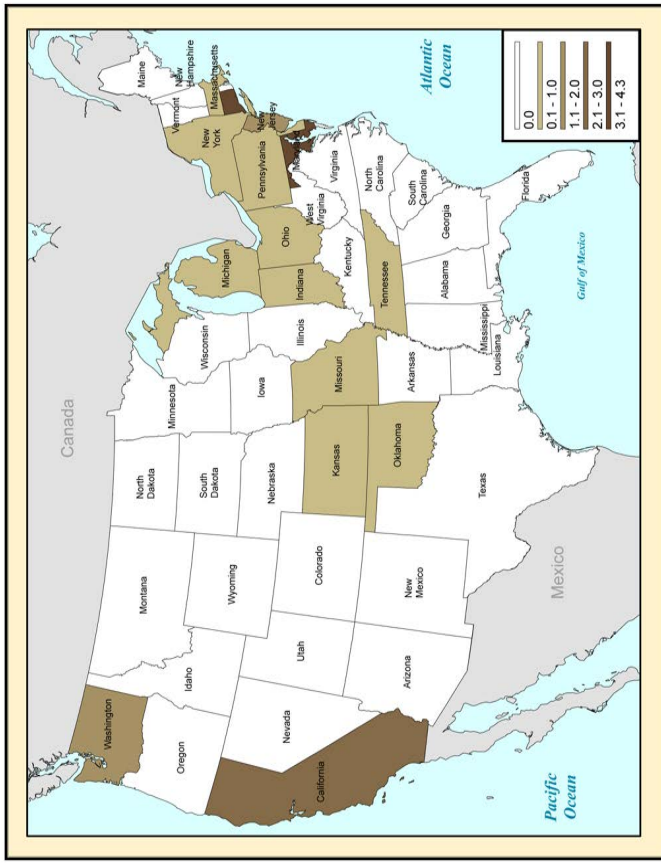
Figure 7: New Facilities Spending Per Capita, 6/1940 thru 10/1944

(b) Aircraft Manufacturing Employment Per Capita, 1939

(a) Total Manufacturing Employment Per Capita, 1939

Figure 8: Pre-Existing Manufacturing Employment

Figure 9 shows the temporal pattern of aggregate national spending per capita and voter support for FDR during the period between the 1940 and 1944 elections.[33] Spending was highest at the onset of the war in 1942, and slows down substantially just before the 1944 election. This is inconsistent with the politically strategic allocation of spending for two reasons. First, it is the period just before the election when many voters make their final choice between candidates and so spending would be most efficient at this time in gaining votes. Second, spending is smallest during the periods when FDR was most vulnerable to not getting re-elected and so political-based allocation would be most attractive (spending changes slightly lag approval changes, but they reinforce rather than offset political support). Comparing the two series, we see spending and approval move in a similar fashion—in fact, the correlation coefficient is 0.80 for the two series. Both series surge following the attack on Pearl Harbor—with FDR approval rising first—and then both dissipate and largely bottom out in the months leading up to the 1944 election. So long as these swings in voter support were largely driven by external factors such as patriotic response to the initiation of the War, this suggests political strategy was not central to the timing of war spending which would have been more beneficial in the later years where FDR's support had diminished.[34]

7.2 Estimates: Contract Spending

We now estimate the contributions of presidential-motivated politics and economic efficiency in explaining the distribution of war spending. Our political measure is based on whether spending in a state is likely to alter its election and then in turn change the overall winner, the pivot probability discussed in the last section. This sub-section focuses on the allocation of contract spending, which is the bulk of the war monies (about 86% of federal spending on the war), and the next sub-section considers new facilities spending.

We focus on the following cross-sectional model,

$$Spending_i = \beta_0 + \beta_1 Pivot\ Probability_i + \beta_2 Total\ Manuf_i + \beta_3 Aircraft\ Manuf_i + \epsilon_i \qquad (4)$$

where i represents states.[35] Several versions of this specification will be estimated using OLS,

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[33]Appendix 10.3 presents the spending time series annotated with key war events. FDR approval data is from Gallup.

[34]An alternate to using presidential support is to look at the partisan composition of Congress. Following the 1940 election the Senate was 68% and the House 61% Democratic. After the 1942 mid-term elections, the Senate and House Democratic share had fallen to 61% and 51% respectively. This suggest a larger drop in voter support than in the figure, which makes the continuing drop in war spending harder to reconcile with an election-based calculus.

[35]We also estimated several alternative models (which are omitted here for brevity). First we consider
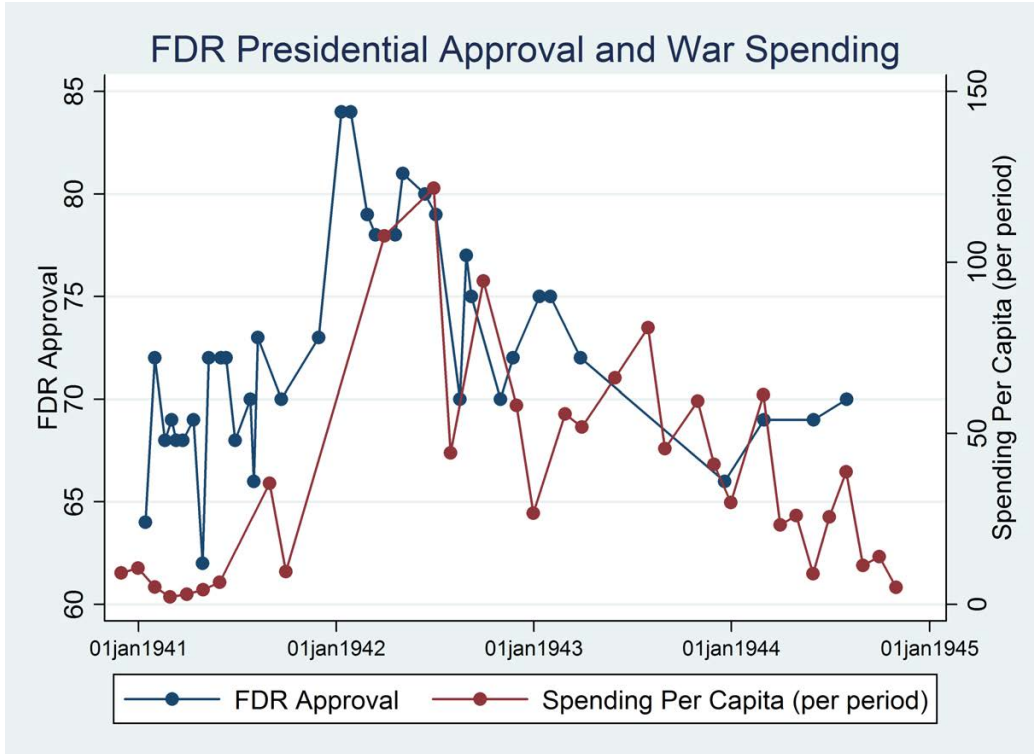
Figure 9: FDR Approval and Contract Spending, 1941–1944

based on different time periods and constructions of the variables. The goal is to compare the economic and statistical significance of the political and economic channels (β_1 versus β_2, β_3) and their contribution to explaining the variation in monies across states (using R^2). For each type of spending, we consider various measures for *Spending*. To represent political factors we consider each of the 33 separate *Pivot Probability* vectors, representing different assumptions about voter responses to spending and of the aggregate partisan leanings of the electorate, discussed in the last section. The *Manuf* covariates are measures of pre-existing (pre-war) manufacturing capacity—employment per capita in 1939—and capture the role of economic efficiency. To ease interpretation we standardize both the dependent variable and the covariates to have mean 0 and standard deviation 1, that is for each variable we subtract the mean (which has no substantiative effect since the constant term is of little interest and

a specification that included pre-existing shipbuilding capacity. However, this variable is never statistically significant, and including it does not affect the other coefficients. Second, as noted above, to the extent possible military production was supposed to be located where it could not easily be attacked by enemy forces. Thus, we also estimated models that included dummy variables indicating coastal states and border states. These variables were never positive and statistically significant. Third, we use other politics measures in the literature—*Political Productivity* or *Electoral Vote Competition*—in place of *Pivot Probability*. The estimated coefficients for these variables are never statistically significant while the estimated coefficients for the manufacturing variables, *Total Manuf* and *Aircraft Manuf*, remain large and highly significant.

there are no interaction terms) and then divide by the standard deviation. After this change, the parameters indicate the standard deviation change in the dependent variable from a one standard deviation change in the covariate. We present our estimates graphically in order to show several specifications at once, with some of the underlying estimates in Section 11 in the Appendix.

Figure 10a shows the point estimates for total per capita spending from June 1940 thru November 1944, i.e., up to the 1944 presidential election, for each of the different values of the money shift parameter V^m and for $D^N = 0$ (neutral national tide).[36] Figure 10b shows the R-square of the regression that includes all variables, as well as the R-square of a regression that includes only the *Pivot Probability* variable, and the R-square of a regression that includes only the manufacturing variables, *Total Manuf* and *Aircraft Manuf*. Figure 10c shows the point estimates and 95% confidence intervals for the *Pivot Probability* variable, for the same specifications. Figure 10d shows the point estimates and 95% confidence intervals for the *Total Manuf* variable, for the same specifications.[37]

The patterns are clear. Recall that we standardized all variables. So, Figure 10a shows that the estimated effects of the variables *Total Manuf* and *Aircraft Manuf* are both much higher than the estimated effect of the *Pivot Probability* variable, for all values of V^m. Figure 10b shows that the variables *Total Manuf* and *Aircraft Manuf* account for almost all of the regression R-square, and the contribution of *Pivot Probability* is minimal. Figure 10c shows that the estimated effect of *Pivot Probability* is not statistically significant at the .05 level even for rather high values of V_m. By contrast, Figure 10d shows that the estimated effect of *Total Manuf* is always highly significant at the .05 level.[38]

It is possible that although overall spending was not clearly targeted at pivotal states, spending closer to the election of 1944 was. In fact, this is not the case.[39] Figures 11a-11d are analogous to Figures 10a-10d, but the dependent variable is for contract spending only in 1944 (January through October). The overall patterns are quite similar: the estimated effect

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[36]In the interest of brevity we do not present the estimates for $D^N = .03$ (pro-Democrat national leaning) or $D^N = -.03$ (anti-Democrat national leaning). The pattern of results reported below continue to hold in those cases.

[37]As shown in Appendix Table 10, for very high values of V^m the coefficient on the *Pivot Probability* is larger and statistically significant. These values seem implausibly high however, both instinctively and also in light of the evidence presented in Section 5. These values are omitted from the figure.

[38]We also conducted analyses dropping the South (the eleven former Confederate states) and the patterns are similar. In fact, the estimated coefficients on *Pivot Probability* are smaller and never statistically significant while the estimated coefficients on the manufacturing variables remain large and highly significant.

[39]As further evidence, recall from Figure 2 that little spending occurs right before the election.

of the *Total Manuf* variable is much higher than the estimated effect of the *Pivot Probability* variable (though this is no longer the case for the *Aircraft Manuf* variable); the variables *Total Manuf* and *Aircraft Manuf* account for almost all of the regression R-square, and the contribution of *Pivot Probability* is minimal; the estimated effect of *Pivot Probability* is never statistically significant at the .05 level, even for the highest values of V_m; and the estimated effect of *Total Manuf* is always highly significant at the .05 level.

Figures 12a-12d zero in even closer to the election, examining the distribution of contract spending in the four months just prior to the election—July thru October 1944.[40] The bottom line is again the same. There is little evidence that contracts were allocated disproportionately towards pivotal states.[41]

Finally, Figures 13a-13d search for evidence of electorally-related targeting from a slightly different point of view, by studying the share of money spent in a state during the 2 or 4 months prior to the election, as a percentage of the total amount of money spent in the state over the whole war, or over the whole year 1944. In all figures we focus on the estimated coefficient and standard error of *Pivot Probability*. Figures 13a and 13b consider the 4-month period leading up to the November 1944 election (July through October), while figures 13c and 13d consider an even shorter 2-month period (September through October). In all cases the bottom line is the same: the estimated effect of *Pivot Probability* on the share of money spent during the election campaign is never statistically distinguishable from zero.

Overall, we find robust evidence that war contract spending is not allocated to enhance the president's electoral chances. Economic efficiency is a far more important determinant. Moreover, economics is important in absolute terms and just one variable (pre-existing manufacturing capacity) can explain sixty percent of the inter-state variation in such spending.

[40]In these regressions we drop the *Aircraft Manuf* variable.

[41]Other intervals, two, three, or five months leading up the election exhibit similar patterns.
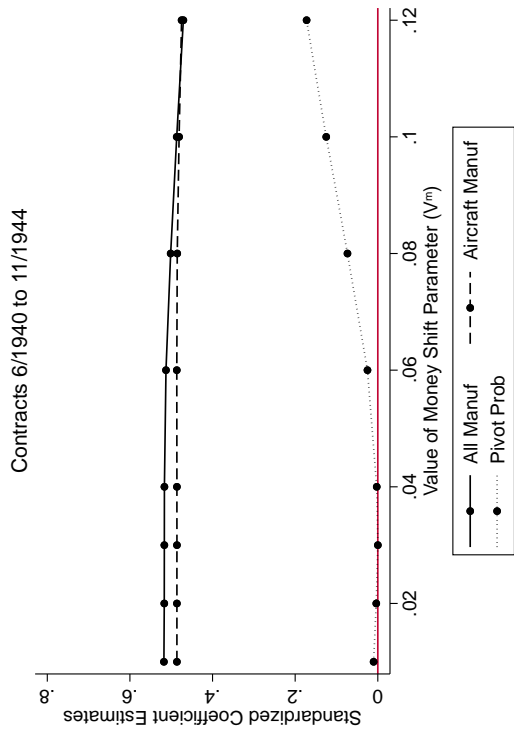
(a) Estimated Effects of Pivot Probability and
Manufacturing on Per Capita Spending, 6/1940 thru
10/1944, Neutral Tide ($D^N = 0$)
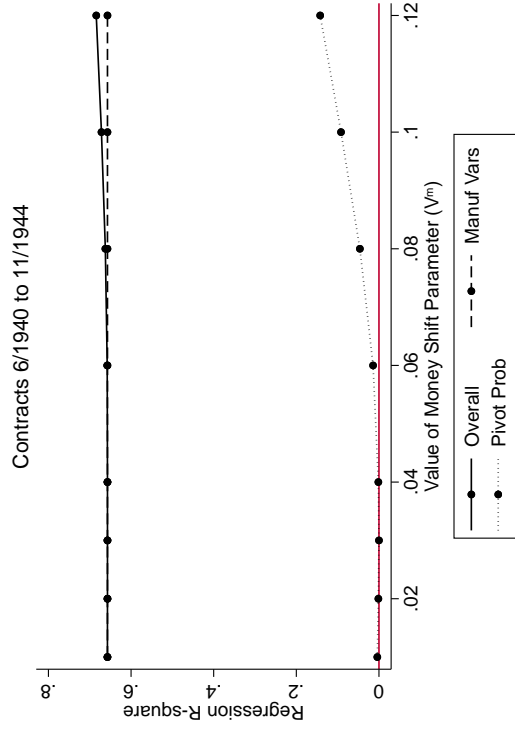
(b) Estimated R-square of Regressions on Per Capita
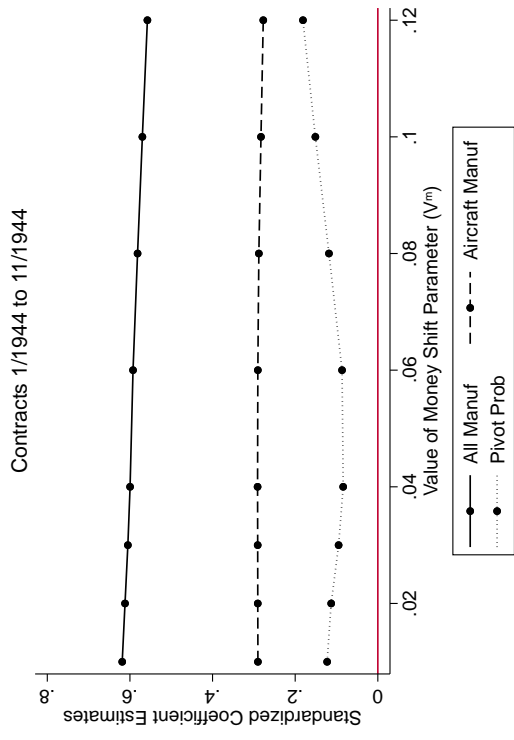Spending, 6/1940 thru 10/1944, Neutral Tide ($D^N = 0$)
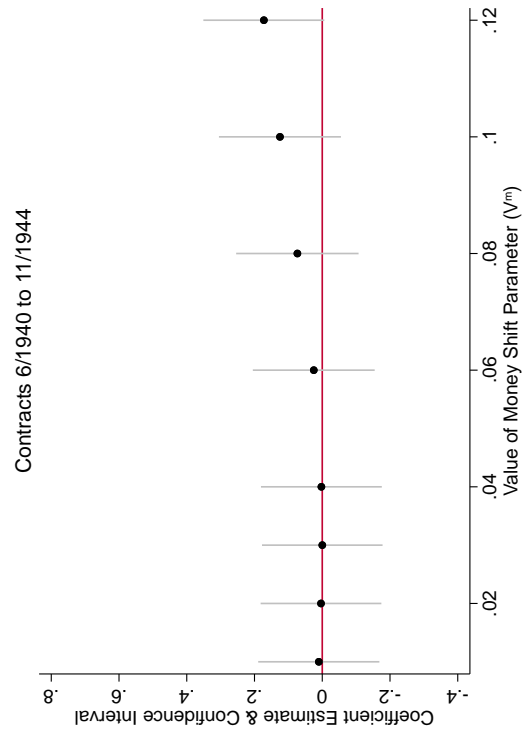
(c) Estimated Effect of Pivot Probability on Per Capita
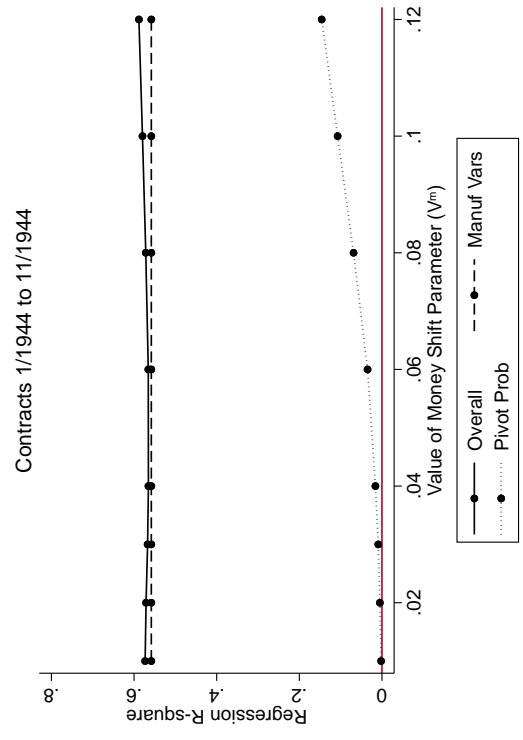Spending, 6/1940 thru 10/1944, Neutral Tide ($D^N = 0$)
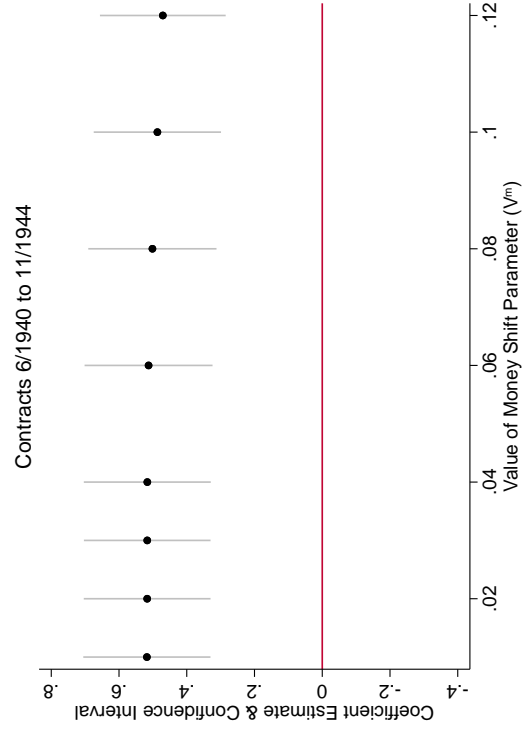
(d) Estimated Effects of Total Manufacturing on Per Capita
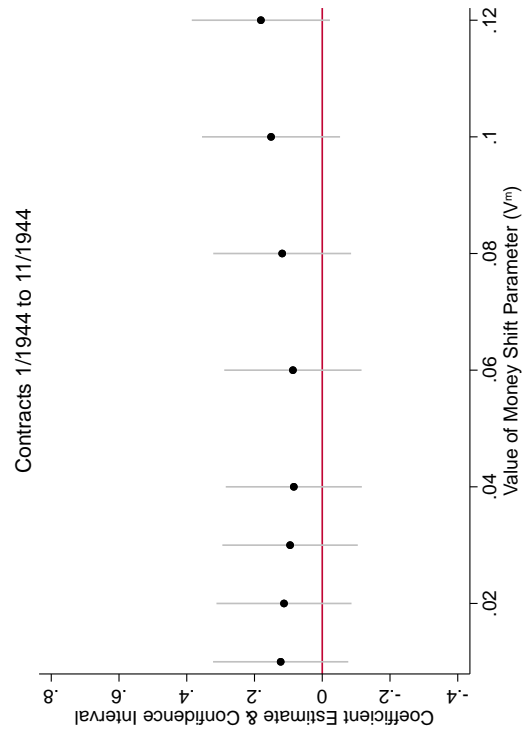Spending, 6/1940 thru 10/1944, Neutral Tide ($D^N = 0$)

Figure 10: Contract Spending: Through 1944 election

(a) Estimated Effects of Pivot Probability and
Manufacturing on Per Capita Spending, 1/1944 thru
10/1944, Neutral Tide ($D^N = 0$)

(b) Estimated R-square of Regressions on Per Capita
Spending, 1/1944 thru 10/1944, Neutral Tide ($D^N = 0$)

(c) Estimated Effect of Pivot Probability on Per Capita
Spending, 1/1944 thru 10/1944, Neutral Tide ($D^N = 0$)

(d) Estimated Effects of Total Manufacturing on Per Capita
Spending, 1/1944 thru 10/1944, Neutral Tide ($D^N = 0$)

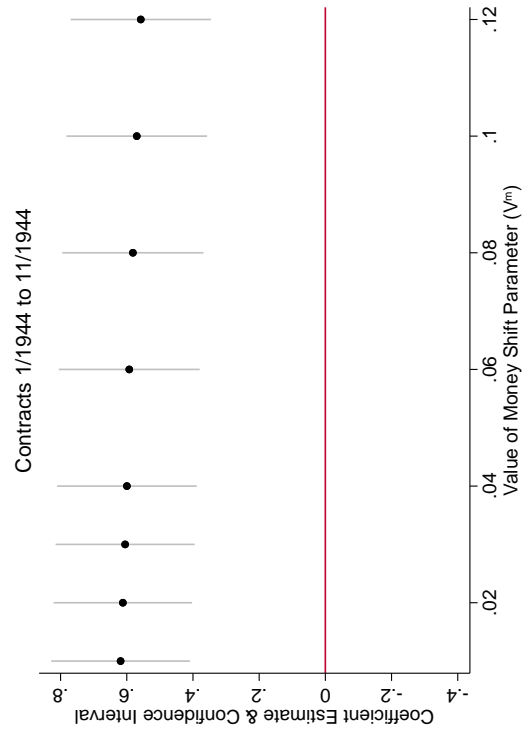Figure 11: Contract Spending: 1944, prior to election

(a) Estimated Effects of Pivot Probability and Manufacturing on Per Capita Spending, 7/1944 thru 10/1944, Neutral Tide ($D^N = 0$)

(b) Estimated R-square of Regressions on Per Capita Spending, 7/1944 thru 10/1944, Neutral Tide ($D^N = 0$)
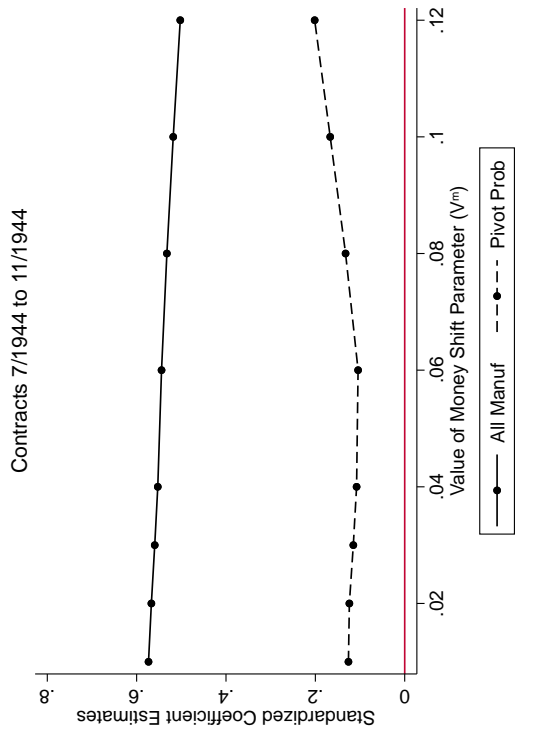
(c) Estimated Effect of Pivot Probability on Per Capita Spending, 7/1944 thru 10/1944, Neutral Tide ($D^N = 0$)
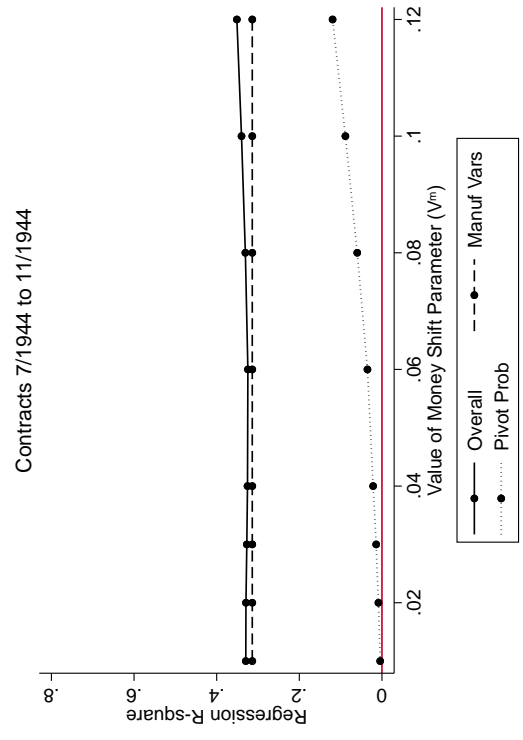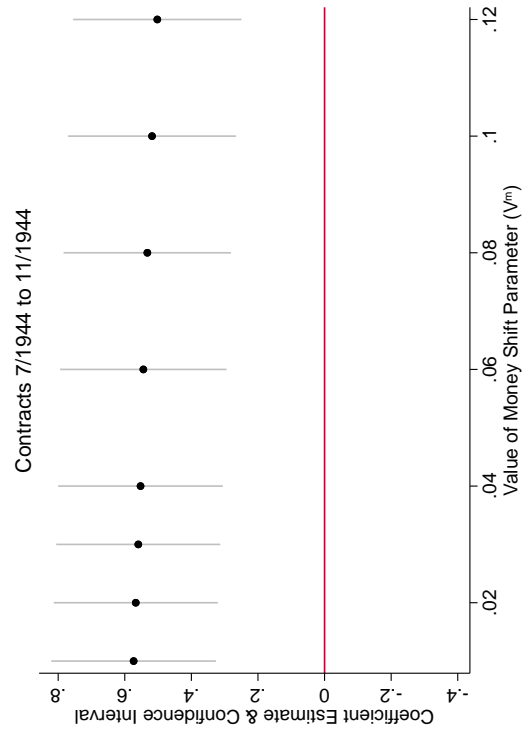
(d) Estimated Effects of Total Manufacturing on Per Capita Spending, 7/1944 thru 10/1944, Neutral Tide ($D^N = 0$)
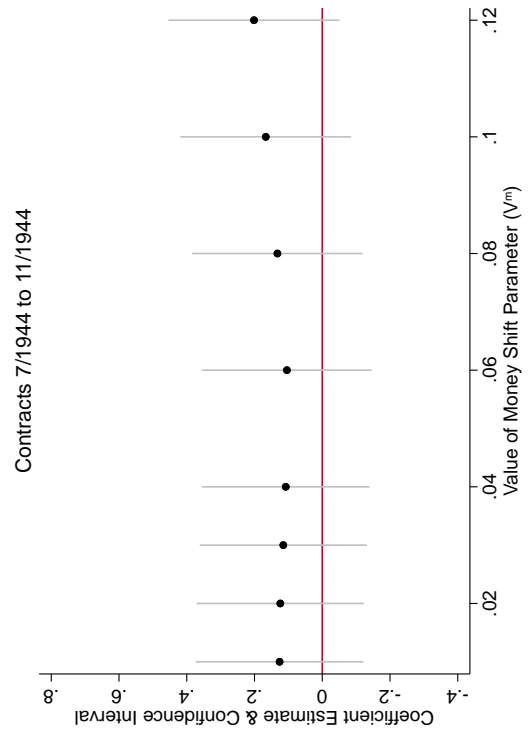
Figure 12: Contract Spending: Four months before 1944 election

(a) Estimated Effects of Pivot Probability on Pct of Total Spending for War Spent 7/1944 thru 10/1944, Neutral Tide ($D^N = 0$)

(b) Estimated Effects of Pivot Probability on Pct of Total Spending for 1944 Spent 7/1944 thru 10/1944, Neutral Tide ($D^N = 0$)
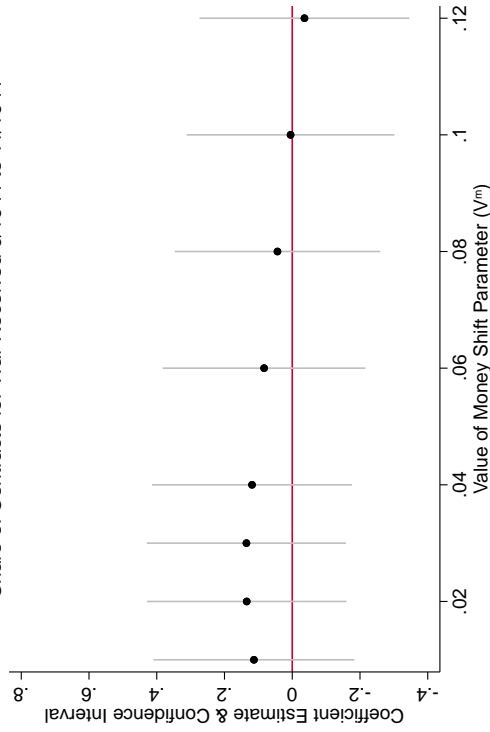
(c) Estimated Effects of Pivot Probability on Pct of Total Spending for War Spent 9/1944 thru 10/1944, Neutral Tide ($D^N = 0$)

(d) Estimated Effects of Pivot Probability on Pct of Total Spending for 1944 Spent 9/1944 thru 10/1944, Neutral Tide ($D^N = 0$)

Figure 13: Contract Spending: Percent of spending four or two months before 1944 election

7.3 Estimates: New Facilities Spending

We next turn to new facilities spending, both military and industrial. Such spending is more amenable to political manipulation than supply contracts, since it does not depend on any pre-existing items, like manufacturing plants, which might not be coterminous with political needs (While one might imagine that new facilities would have to be located near up- and down-stream suppliers, there are many examples of plants located virtually in the middle of nowhere. Some leading examples include the Basic Magnesium plant set up in Henderson, Nevada, and the Manhattan project plants constructed in Clinch River, TN and Los Alamos, NM). Given this, the far smaller scale of facilities spending– 14% of federal spending on the war– is prima facie evidence against the role of political factors. Still it is interesting to see whether this relatively limited spending is allocated to politically pivotal states.

We analyze new facilities spending and also total spending on supply contracts plus facilities. We show results for spending over the whole war and spending just in the election year. The key results are shown in Figures 14a-14d.

The bottom line is again simple. With facilities spending as the dependent variable the estimated coefficient on the *Pivot Probability* variable is always small and in most specifications negative (see Figures 14a and 14b). In most cases the estimate is statistically insignificant, and it is significant only when the point estimate is negative. This is true whether or not the *Total Manuf* and *Aircraft Manuf* variables are included (the latter results are not shown in the figure). The manufacturing variables are never statistically significant. Thus, new facilities were not placed disproportionately near existing manufacturing areas, nor does it appear that they were used to develop under-developed areas.

Note that none of the variables in our models strongly predicts the geographic distribution of new facilities spending. This is a puzzle that we leave for future research.

With total spending (contracts plus new facilities) per capita as the dependent variable the results are, not surprisingly, similar to those for contract spending alone (see Figures 14c and 14d). For the more plausible values of V^m the estimated coefficient on the *Pivot Probability* variable is small and statistically insignificant.[42] As with the regressions for supply contracts in the previous section, the manufacturing variables are always positively related to total spending and statistically significant.

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[42]For very high values of V^m the estimated coefficient is larger and statistically significant at least when the *Total Manuf* and *Aircraft Manuf* variables are excluded (the latter results are not shown in the figure).
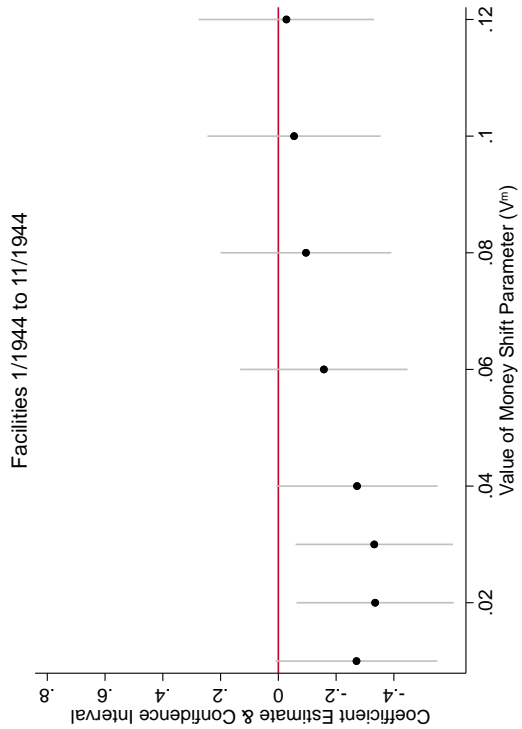
(a) Estimated Effect of Pivot Probability on Per Capita New Facilities Spending, 6/1940 thru 10/1944, Neutral Tide ($D^N = 0$)
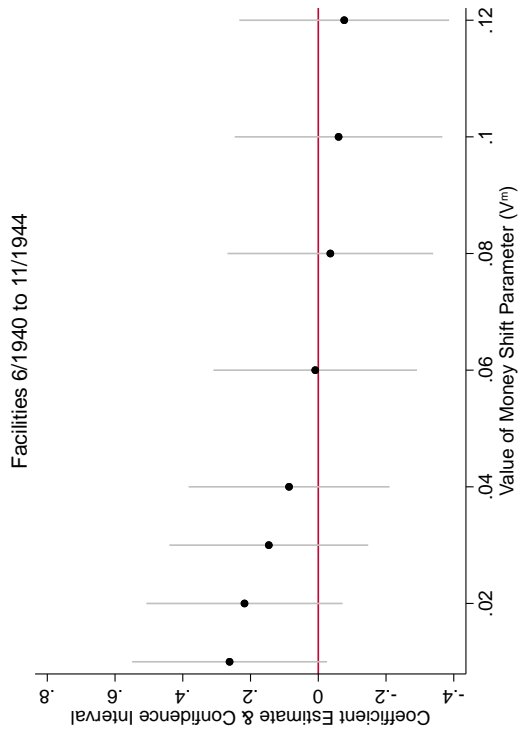
(b) Estimated Effect of Pivot Probability on Per Capita New Facilities Spending, 1/1944 thru 10/1944, Neutral Tide ($D^N = 0$)
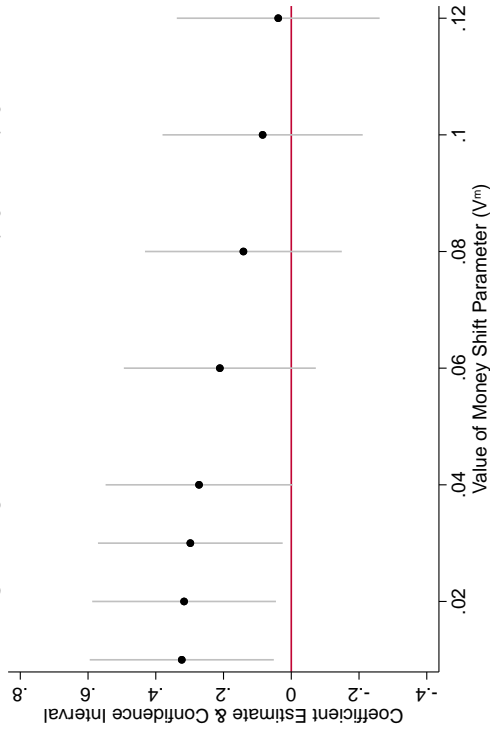
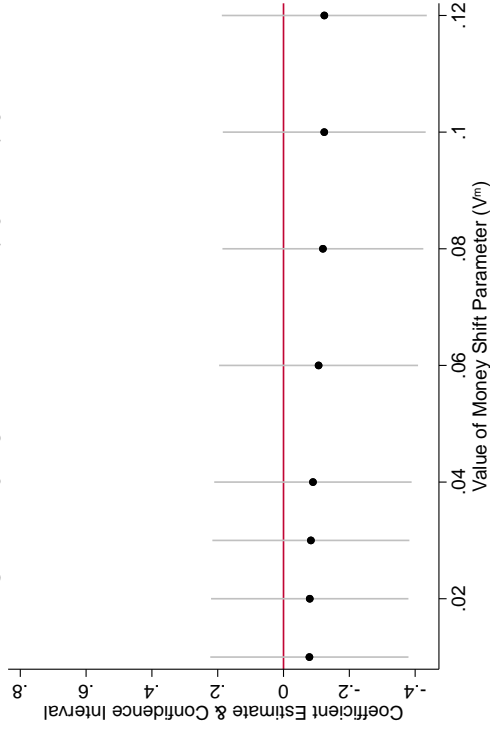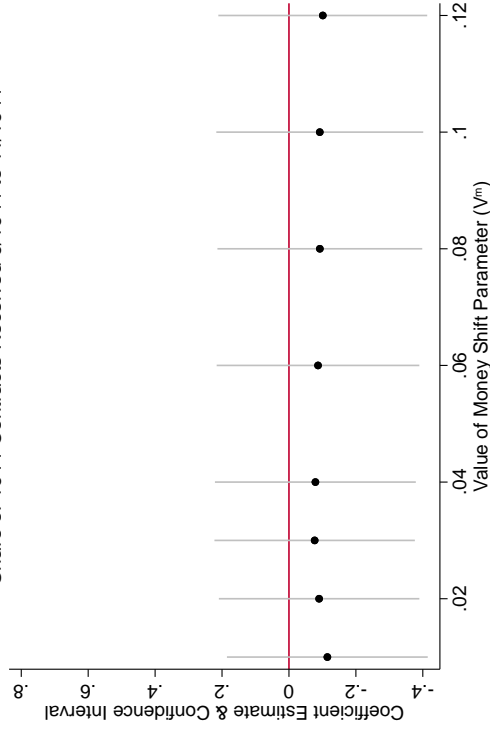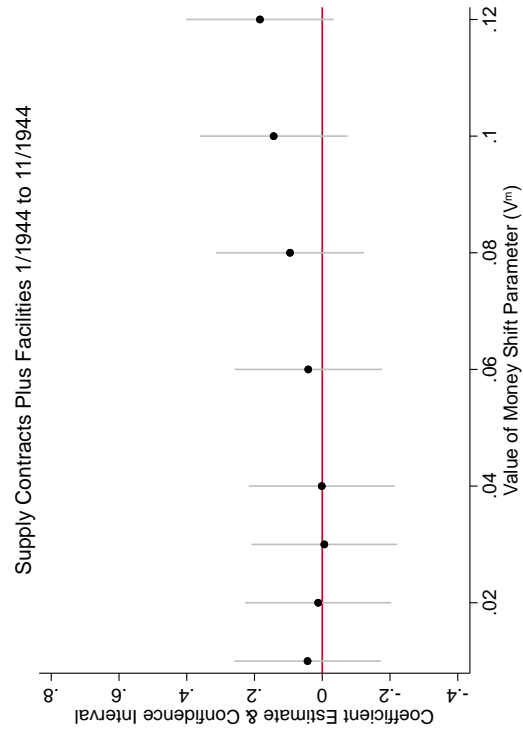(c) Estimated Effect of Pivot Probability on Per Capita Total Spending, 6/1940 thru 10/1944, Neutral Tide ($D^N = 0$)
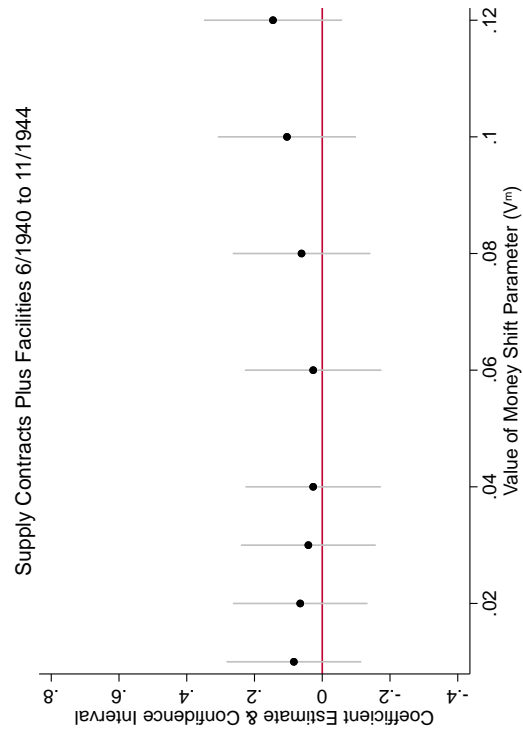
(d) Estimated Effect of Pivot Probability on Per Capita Total Spending, 1/1944 thru 10/1944, Neutral Tide ($D^N = 0$)

Figure 14: New Facilities and Total Spending: Through 1944 election

7.4 Congressional Influence on Spending

While not the focus of this paper, we also ran specifications that include variables to check for congressional influence over the distribution of spending.[43] More specifically, we constructed several indices of "institutional power" for each state and checked whether states with more powerful delegations received contract dollars. To construct the indices we use the following House and Senate positions: Speaker of the House, Majority Leader, Minority Leader, member of the House Ways and Means committee, member of the House Appropriations committee, member of the House Rules committee, member of the Senate Finance committee, member of the Senate Appropriations committee, member of the House Military Affairs committee, member of the House Naval Affairs committee, member of the Senate Military Affairs committee, and member of the Senate Naval Affairs committee. Let $H\&S$ be the set of all of these positions, let H be the set of all positions from the House, let S be the set of all positions from the Senate, and let M be the set of the four positions involving defense-related committees plus the two Appropriations committees.

The broadest index, which we denote *House and Senate Overall Power*, is constructed as follows: For each state i count the total number of positions in the set $H\&S$ held by the state's House and Senate delegation in year t. The chamber-specific indices, *House Overall Power* and *Senate Overall Power* are constructed similarly but each index considers only the positions in H and S, respectively. Finally, the more jurisdiction-specific index, *House and Senate Military Power* is constructed by counting only those positions in M. For each index we then divide by state population. Note that the indices will therefore reflect the Senate malapportionment that gives small states more representation per person than large states.

We present the estimates of interest in Table 7. In the table we present the results for separate regressions for the different power indices. If we include both indices together the results are similar.[44] The bottom line from the regression results is simple. None of these variables is statistically significant in any specification, the point estimates are more often negative than positive (all of the point estimates in Table 7 are negative), and in all cases the point estimates are substantively small.[45] Importantly, including these variables also does

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[43]This section considers how senior congressmen influence spending allocation. An alternative approach (and one that parallels the presidential-election objective) is to consider how spending could be used to elect specific congressmen or to maintain control of the two chambers. The latter objectives would require looking at spending distribution at a finer level (within-state), and we return to this point in the conclusion.

[44]As with all other variables we standardize these so they have a variance of 1.

[45]We also ran models with the separate chamber-specific variables as regressors. These are never positive

not substantially change the estimates on the other key variables. The estimated coefficients on *Total Manuf* and *Aircraft Manuf* remain large and highly significant, while the estimated coefficients on *Pivot Probability* are small and statistically insignificant except for extremely high values of V^m. If anything, adding the congressional power indices sometimes causes the estimated coefficient on *Pivot Probability* to fall and become statistically insignificant even for high values of V^m.

We also investigated whether supply contracts in 1942 were targeted more towards states with more competitive Senate or gubernatorial elections in 1942. We find no significant relationships for either office, using either the actual or the predicted vote. An analogous exercise for 1944 produces similar (non) findings.[46]

Finally, we find no systematic evidence of a bias in favor of small states, as one might expect due to their over-representation in the Senate (these estimates are omitted). If anything, the correlation between supply contracts per capita and population (in logs) is always positive and often statistically significant. The correlation between population and new facilities spending per capita is negative but this is due entirely to Nevada. The correlation between total spending and population is generally positive and statistically insignificant (although when Nevada is dropped the correlation often becomes significant).

8   Votes and the War Effort

Another possibility is that politicians might gain votes not by channeling the monies to selective places, but instead in using them to most effectively prosecute the war. The idea here is that voters are primarily concerned about winning the war, and so they would reward politicians who are successfully conducting the war. Efficient spending of money is then the optimal choice of vote-seeking politicians. We investigate this possibility below. In short we find the opposite effect: voters become more attached to the incumbent party as the war effort gets mired down, likely reflecting a preference for continuity (the conventional wisdom of not switching horses in the middle of the race).

We consider two aspects of this mechanism: how perceptions of the war status influence votes, and how the party in power is perceived to influence the status of the war. Both of

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and statistically significant (the variable *Senate Overall Power* is sometimes negative and significant).

[46]We predicted the 1942 vote in each state using previous election results for all president, governor and U.S. senator between 1930 and 1941. For 1944 we used all elections between 1930 and 1943.

Table 7: **Supply Contract Spending and Congressional Power**

Period	V^m	Other Controls	Power Index Overall		Military	
6/1940 to 11/1944		No	-0.19	(0.14)	-0.22	(0.14)
6/1940 to 11/1944	.01	Yes	-0.14	(0.09)	-0.14	(0.09)
6/1940 to 11/1944	.03	Yes	-0.12	(0.09)	-0.13	(0.09)
6/1940 to 11/1944	.06	Yes	-0.12	(0.09)	-0.12	(0.09)
6/1940 to 11/1944	.12	Yes	-0.10	(0.09)	-0.11	(0.09)
1/1944 to 11/1944		No	-0.07	(0.15)	-0.13	(0.15)
1/1944 to 11/1944	.01	Yes	-0.11	(0.11)	-0.12	(0.11)
1/1944 to 11/1944	.03	Yes	-0.07	(0.10)	-0.08	(0.10)
1/1944 to 11/1944	.06	Yes	-0.06	(0.10)	-0.07	(0.10)
1/1944 to 11/1944	.12	Yes	-0.04	(0.10)	-0.04	(0.10)

Cell entries show estimated coefficient on the relevant Congressional Power Index. For the Overall columns this is *House and Senate Overall Power* and for the Military columns this is *House and Senate Military Power*. Standard errors in parentheses. Other Controls are *Pivot Probability*, *Total Manuf* and *Aircraft Manuf*. All estimates are for Neutral Tide ($D^N = 0$).

these topics can be analyzed using questions from the Gallup polls discussed earlier.[47]

The results (cross-tabs) are summarized in Table 8.[48] The first values look at how voter behavior is related to beliefs about the war status. We use the Gallup polls which asked voters how they would vote conditional on the war continuing and on the war ending. The bottom two panels show that having the war persist leads about 10-15% of voters to shift to Democrats relative to how they would vote if the war was to end. In addition a heavy majority of voters do not change their voting based on the war status, and that these effects are comparable for those who voted Democrat or who Republican in the 1940 election.

One challenge of interpreting these estimates is that there are two reasons that the war status could influence voter support for the president. A standard argument is that voters prefer continuity in their politicians so long as the war is continuing, and are more open to a change in peace time. But if the war continues for a while that might also mean the

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[47]We cannot evaluate an intermediate step, namely how spending relates to the chance (or perceived chance) of winning the war. To do this we would need to estimate a spending production function which maps spending levels and allocations across geography into war outcomes. There is not enough variation in the data to adequately estimate such a function.

[48]An implicit assumption in the analysis is that the poll questions refer to favorable war outcomes: "war ending" and "speedier prosecution of the war" implies the Allies are victorious. This is a reasonable assumption given the context of relevant Gallup polls.

president is doing a poor job fighting the war. We explore this second possibility next by examining whether voters believe switching parties will lead the war to wind down faster.

Table 9 presents results on how voters believe the party in power will influence how quickly the war will be prosecuted. Voters believe Republicans will be slower at ending the war, and this tilt becomes more prominent as we approach the 1944 election. Still about half of all voters believe the party in power has no effect on how quickly the war will be completed, and there are clear partisan differences with prior Democrat voters being far more skeptical of the efficacy of Republicans. But more importantly the conclusion is that voters believe a Democrat government will more quickly end the war, so they seem comfortable in FDR's performance.[49]

9 Conclusion

The bottom line from our analysis is straightforward. First, we find evidence consistent with the hypothesis that supply contracts during WWII were awarded to states that had high industrial capacity already in place in 1939—most likely, states with industrial plants that could be modified relatively quickly and cheaply to produce needed war supplies. Second, we do not find consistent evidence that supply contracts were awarded to states that were especially likely to be pivotal in the 1944 presidential election. We also find little connections between new facilities spending and politics. These results are robust to adding controls for membership on key committees of a state's congressional delegation, and we show that spending that successfully impacts the war effort is not likely to directly translate into additional votes. Thus, the evidence suggests that the distribution of World War Two spending was driven more by practical concerns than by calculations of how to win future elections. This conclusion is rather surprising given the vast scale of the spending here, which would leave ample room for political meddling. Given that this conflicts with other empirical distributive politics papers, a priority going forward is to determine conditions which diminish political influence over allocations. Some leading possibilities include high stakes spending

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[49]Further support for this comes from The Office of Public Opinion Research (OPOR) which ran a number of surveys during the war. One survey (No. 6) conducted April 2-7, 1943 included questions on whether the individual would support FDR for a fourth term if the war were over, whether he or she recalled voting for Roosevelt (vs. Willkie) in 1940, and whether the United States was doing all it possibly can to win the war. Even after controlling for backing Roosevelt in 1940, there was a positive and statistically significant relationship between reporting the United States was strong and supporting a fourth term if the war was over (regression omitted).

Table 8: **Voting Conditional on War Status**

	Conditional FDR Vote			
	Vote Given War Continue	Vote Given War Over	Observations War Continue	War Over
1/28–2/3/1943	64.0%	47.4%	1368	2445
2/25–3/2/1943	58.6%	41.4%	1309	1291
5/14–5/20/1943	58.1%	28.7%	1328	1266
3/31–4/4/1944	55.4%	39.0%	2744	2666

	△FDR Vote			
	-1	0	+1	Obs.
1/28–2/3/1943	3.7%	82.2%	14.1%	1002
5/14–5/20/1943	0.6%	73.4%	25.6%	1211
3/31–4/4/1944	0.1%	86.6%	13.3%	2587

	△FDR Vote							
	△Vote Given 1940 Vote=FDR			△Vote Given 1940 Vote=Willkie			Observations 1940 Vote=	
	-1	0	+1	-1	0	+1	FDR	Willkie
1/28/1943–2/3/1943	4.8%	84.0%	11.2%	1.9%	82.0%	16.1%	437	372
5/14/1943–5/20/1943	0.7%	63.4%	35.8%	0.2%	87.6%	12.2%	547	428
3/31/1943–4/4/1944	0.2%	82.0%	17.8%	0.0%	93.5%	6.5%	1217	956

Left column is the field date for the Gallup Poll. The values are calculated from vote intentions for 1944, with Vote = +1 if plan to vote for FDR and Vote = 0 if plan to vote for GOP. In the bottom two panels △FDR Vote = Vote Given War Continue − Vote Given War Over (so +1 means the voter will vote for FDR if the war continues and for the GOP if it stops, 0 means the voter votes the same regardless of the war status, and -1 means the voter will vote for the GOP if the war continues and FDR if it stops). In the bottom panel the conditioning variable is retrospective voting for 1940. The Data Appendix lists the specific polls which are used.

Table 9: **Speed of Ending the War Conditional on Having A GOP Government**

	$\triangle$War Speed			
	-1	0	+1	Obs.
1/25–1/31/1942	19.4%	66.4%	14.2%	1121
3/20–3/25/1942	23.0%	52.2%	24.8%	2157
5/23–5/28/1942	39.3%	34.8%	25.9%	2350
2/18–2/23/1944	39.8%	35.2%	25.0%	2535
8/3–8/8/1944	47.5%	28.6%	23.8%	1132

	$\triangle$War Speed							
	$\triangle$War Speed Given 1940 Vote=FDR			$\triangle$War Speed Given 1940 Vote=Willkie			Observations 1940 Vote=	
	-1	0	+1	-1	0	+1	FDR	Willkie
1/25–1/31/1942	29.8%	66.3%	3.9%	4.8%	64.4%	30.8%	558	376
3/20–3/25/1942	36.6%	56.1%	7.2%	5.5%	43.0%	51.4%	996	760
5/23-5/28/1942	55.7%	32.6%	11.7%	16.1%	36.7%	47.3%	1144	772
2/18–2/23/1944	62.3%	31.0%	6.7%	10.2%	39.1%	50.7%	1124	939
8/3–8/8/1944	71.1%	19.6%	9.2%	10.4%	41.0%	48.6%	530	366

Left column is the field date for the Gallup Poll. The values are calculated from whether voters believe the war will end more quickly (or a close proxy of this concept such as winning the war) if there was GOP government (it is typically not specified what level of government this refers to, but it presumably would include the presidency). $\triangle$War Speed = +1 the voter thinks the war will end more quickly under a GOP government, = -1 if they believe the war will end more slowly under GOP government, = 0 if the war will end at the same time regardless of the party in power. In the bottom panel the conditioning variable is retrospective voting for 1940. The Data Appendix lists the specific polls which are used.

(fighting a significant threat to national security rather than, say, infrastructure spending), external oversight (the civilian advisors in the programs discussed here), crowd-out (some government spending displaced private manufacturing, such as the full conversion of civilian auto plants to war-time use, and voters respond to the net change in public plus private production), or specific environmental factors (voters might be less responsive to spending in the midst of a war than, say, during a depression).

There are several avenues to further explore World War II spending. First, it is possible that other political factors were at play, including inter-party competition for control of Congress, re-election concerns of individual congressional incumbents (such as powerful senior members or vulnerable junior members), or allocating funds to areas where Democrats had more supporters to reward loyalists and increase turnout of friendly voters. To do this money would have to be steered to the jurisdictions of individual congressmen or specific areas in the state. Similarly, one could generate local measures of pivot probabilities with respect to presidential, gubernatorial or Senate elections to examine the within-state allocation of war spending. Second, another objective of the war spending was to locate plants where they could not easily be attacked by enemy forces. This would push spending far from borders and coasts, both between and within-states. Third, we could get a more localized measure of the economic incentive to allocate spending. Proximity to pre-war military bases, pools of under-employed and unemployed workers (which likely vary by city), might increase the efficacy such spending. Finally, what were the long term consequences of such extensive federal spending? One could examine whether this led to higher levels of income or industrial development say twenty or thirty years later (a challenge would be to account for the endogeneity of such spending, since we have seen it tends to be located near pre-existing manufacturing plants). This would contribute to the growing literature which seeks to measure such local multipliers of government programs, but typically must consider far smaller outlays. A careful investigation of each of these topics requires more fine-grained data (spending at the congressional district or county-level), and we leave this for future work.

While the limited role of political allocation may seem surprising, the same may hold with some contemporary major defense projects. For example, the F-35 is the fifth generation combat plane which is planned to be the focus of manned aircraft for the Air Force, Navy and Marines for the next several decades. As of this writing, the cost of building is expected

to be $350b and a lifetime cost of $1.5t making it the most expensive military weapons program in US history (additional spending will accrue to manufacture planes for other countries). Conventional wisdom holds that the primary contractor, Lockheed-Martin, is allocating assembly across states in a way to gain political support. The evidence on this point is actually mixed. While the main contractors did give over $10m in donations over two election cycles to key members of Congressional committees overseeing the program, the spending is actually concentrated in non-pivotal states (half the jobs are in Texas and California), many swing states (including Missouri, Virginia, North Carolina, Pennsylvania, and Wisconsin) are not even in the top twenty among jobs created, and eleven states get no or almost no spending.[50] In short the spending seems to be allocated across states in large part due to non-political factors such as pre-existing manufacturing capacity though there may be a role for supporting senior Congressmen.

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[50]Business Insider, 20 August 2014, "This Map Shows Why The F-35 Has Turned Into A Trillion-Dollar Fiasco," `http://www.businessinsider.com/this-map-explains-the-f-35-fiasco-2014-8`; Hartung, William (2014). "Promising the Sky: Pork Barrel Politics and the F-35 Combat Aircraft." Center for International Policy report, `https://www.ciponline.org/images/uploads/publications/Hartung_IPR_0114_F-35_Promising_the_Sky_Updated.pdf`.

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10   Data Appendix

10.1   World War II Spending Data

The state-level monthly (approx.) military spending variables are from the following reports: National Industrial Conference Board, Economic Report, Nov. 23, 1940, p. 442 (ending Oct. 31, 1940); Dec. 24, 1940, p. 482 (ending Nov. 30, 1940); Jan. 23, 1941, p. 31 (ending Dec. 31, 1940); Feb. 25, 1941, p. 71 (ending Jan. 31, 1941); March 24, 1941, pp. 117-18 (ending Feb. 28, 1941); Apr. 24, 1941, p. 159 (ending Mar. 31, 1941); May 24, 1941, pp. 206-08 (ending Apr. 30, 1941); June 25, 1941, p. 273 (ending May 31, 1941); Oct. 24, 1941, pp. 435-36 (ending Aug. 30, 1941); Nov. 25, 1941, pp. 497-98 (ending Sept. 27, 1941); June 1942, p. 171 (ending March 31, 1942); Sept. 1942, p. 298 (ending June 30, 1942); Dec. 1942, p. 419, (ending Sept. 30, 1942); U.S. Congress. House. Select Committee Investigating National Defense Migration. Hearings before the Select Committee Investigating National Defense Migration, House of Representatives, Seventy-seventh Congress, first[-second] session, pursuant to H. Res. 113, a resolution to inquire further into the interstate migration of citizens, emphasizing the present and potential consequences of the migration caused by the national defense program. Part 11: Washington, DC Hearings, March 24, 25, 26, 1941 (Washington, DC: GPO, 1941) (data for Feb. 1941); U.S. War Production Board, Statistics of War Production (Washington, DC: GPO). We use Nov. 1942, pp. 15-16 ($63,167m ending July 31, 1942); Dec. 1942, p. 16 ($77,085m ending Sept. 30, 1942)[51]; Jan. 1943, pp. 19-20 ($84,978m ending Nov. 30, 1942); Feb. 1943, pp. 19-20 ($84,978m also ending Nov. 30,

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[51]Projected order included.

1942)[52]; March 1943, p. 19 ($89,572m ending Dec. 31, 1942); April 1943, p. 18 ($97,941m ending Feb. 28, 1943); May 1943, p. 19 ($97,941 also ending Feb. 28, 1943); June 1943, p. 19 ($104,953m ending March 31, 1943); July 1943, p. 20 (same also ending March 31, 1943); Aug. 1943, p. 20 ($114,222m ending May 31, 1943); Sept. 1943, p. 19 ($125,957m ending July 31, 1943)[53]; Oct. 1943, p. 18 ($132,295m ending Aug. 31, 1943); Nov. 1943, p. 21 ($140,688m ending Sept. 30, 1943); Dec. 1943, p. 21 ($146,224m ending Oct. 31, 1941); Jan. 1944, p. 21 ($148,620m ending Dec. 31, 1943); Feb. 1944, p. 22 ($148,620m also ending Dec. 31, 1943); March 1944,p. 25 ($156,523m ending Feb. 29, 1944);]April 1944, p. 24 ($159,248m ending March 31, 1944); May 1944, p. 27 ($162,644m ending April 30, 1944)[54]; June 1944, p 26 (same also ending April 30, 1944); July 1944, p. 26 ($164,477m ending May 31, 1944); Aug. 1944, p. 26 ($167, 236m ending June 30, 1944); Sept. 1944, p. 26 ($172,188 ending July 31, 1944); Oct. 1944, p. 26 ($173, 421m ending Aug. 31, 1944); Nov. 1944, p. 27 ($175,075m ending Sept. 30, 1944); Dec. 1944, p. 27 ($175,751m ending Oct. 31, 1944); Jan. 1945, p. 26 ($177,375m ending Nov. 30, 1944); Feb. 1945, p. 26 ($178,983m ending Dec. 31, 1944); March 1945, p. 26 ($182,915m ending Jan. 1945); April 1945, p. 26 ($186,979m ending Feb. 1945). US Office of Domestic Commerce, State and Regional Market Indicators, 1939-45, Econ. Series. No. 690, U.S. GPO 1947 (ending June 1945).

10.2   Gallup

In analyzing the connection between spending and voting, we considered all Gallup studies over the period 1936-1944 (all codebooks and data files are available from The Roper Center, https://ropercenter.cornell.edu). We then limited the studies to those which had information about voting (either vote intentions or voter approval), or had specific questions related to other topics we focus on such as how war status influenced voting. Some studies listed below are omitted in certain analyses when they are missing key variables, or in some cases only a portion of the sample can be used (the studies often use two different forms, and respondents

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[52]Projected orders to GOCO excluded, foodstocks excluded. Text Dec. 1942, p, 14 "Supply data include prime awards over $50,000 reported to the WPB by the Army, Navy, Maritime Commission and Treasury Department since June, 1940 and by the British Empire and other foreign purchasing missions since September, 1939. Treasury Contract cover defense aid awards of the Procurement Division. Awards for foodstuffs are excluded. Project orders issued to Government-operated establishments are excluded, but awards made by those establishments to private industry are included. Contracts for which work location is not known are included in the 'off-continent and undesignated' total."

[53]This report has a discussion of delays in reporting and cancelations.

[54]The data here has been subject to some revisions.

only see one set of questions).

For the pre-1940 election period when we analyze New Deal spending we used the following Gallup studies: USAIPO1936-0053 ("Gallup Poll # 1936-0053: Teachers' Oath/Government Loans for Farmers/Employers Insurance Contributions/Presidential Candidates," Field Dates: September 28-October 2, 1936, Sample Size: 5,599); USAIPO1937-0077 ("Gallup Poll #1937-0077: Government," Field Dates: April 7-12, 1937, Sample Size: 2,907); USAIPO1937-0095 ("Gallup Poll # 1937–095: Presidential Terms/Government Power/China/Presidential Election," Field Dates: August 11-16, 1937, Sample Size: 2,969); USAIPO1938-0108 ("Gallup Poll #1938-0108: Business and Employment/Unions/Movies/Automobiles/Presidential Election," Field Dates: January 13-18, 1938, Sample Size: 3,020); USAIPO1938-0117 ("Gallup Poll # 1938-0117: Business/War/Taxes/Presidential Elections," Field Dates: April 2-7, 1938; Sample Size: 3,136); USAIPO1938-0129 ("Gallup Poll # 1938-0129: Roosevelt and his Son James/Labor Unions," Field Dates: July 29-August 3, 1938, Sample Size: 3,081); USAIPO1939-0144 ("Gallup Poll # 144," Field Dates: January 12-17, 1939, Sample Size: 3,063); USAIPO1939-0154 ("Gallup Poll # 1939-0154: Presidential Election/Sources of News/Wagner Labor Act," Field Dates: April 8-13, 1939, Sample Size: 3,098); USAIPO1939-0166 ("Gallup Poll # 1939-0166: Business Conditions/Japan/Roosevelt/1940 Presidential Election," Field Dates: August 10-15, 1939, Sample Size: 3,117); USAIPO1939-0179 ("Gallup Poll # 1939-0179: Prohibition/World War II /1940 Presidential Election/Movies," Field Dates: December 15-21, 1939, Sample Size: 3,141); USAIPO1940-0186 (""Gallup Poll # 1940-0186: Health/South America/War in Europe/Presidential Election," Field Dates: March 8-14, 1940, Sample Size: 3,180); USAIPO1940-0205 ("Gallup Poll # 1940-02015: Military Service/Colonel Lindbergh's Radio Speech/1940 Presidential Election/Movies," Field Dates: August 10-16, 1940; Sample Size: 5,825); USAIPO1940-0222 ("Gallup Poll # 222," Field Dates: November 5-10, 1940, Sample Size: 6,349).

For the period between the 1940 and 1944 elections when we analyze World War II spending we used the following Gallup studies: USAIPO1941-0229 ("Gallup Poll # 1941-0229: Newspapers/Presidential Election/Lease-Lend Bill/War in Europe," Field Dates: January 24-29, 1941, Sample Size: 3,124); USAIPO1941-0234 ("Gallup Poll # 1941-0234: World War II /Defense Industry Strike/Politics," Field Dates: April 10-15, 1941, Sample Size: 3,113), USAIPO1941-0243 ("Gallup Poll # 243," Field Dates: July31-August 4, 1941, Sample Size: 3,048); USAIPO1941-0254 ("Gallup Poll # 1941-0254: War in Europe/Price Con-

trols/Strikes/Exercise," Field Dates: November 27-December 2, 1941, Sample Size: 3,033); USAIPO1942-0262 ("Gallup Poll # 1942-0262: Military Draft/Employment/World War II ," Field Dates: February 25-March 2, 1942, Sample Size: 3,106); USAIPO1942-0270 ("Gallup Poll # 270," Field Dates: June 11-16, 1942m Sample Size: 2,932); USAIPO1942-0276 ("Gallup Poll # 1942-0276: Military Draft/Elections/Effects of the War/Movies," Field Dates: September 5-10, 1942, Sample Size: 3,025); USAIPO1942-0284 ("Gallup Poll # 1942-0284: Politics/World War II ," Field Dates: November 19-26, 1942, Sample Size: 2,862); USAIPO1943-0288 ("Gallup Poll # 288," Field Dates: January 28-February 3, 1943, Sample Size: 3,095); USAIPO1943-0294 ("Gallup Poll # 1943-0294: Peace terms with Germany/War Effort/Labor Unions/Presidential Election," Field Dates: April 29-May 5, 1943, Sample Size 2,967); USAIPO1943-0300 ("Gallup Poll # 1943-0300: Voting Age/Presidential Election/Political Parties/World War II /Taxes," Field Dates: August 19-25, 1943, Sample Size: 3,065); USAIPO1943-0306 ("Gallup Poll # 1943-0306: Civil Service/World War II /1944 Presidential Election/movies," Field Dates: November 11-17, 1943, Sample Size: 3,049); USAIPO1944-0311 ("Gallup Poll # 1944-0311: Scrap Paper Drive/Roosevelt/Presidential Election," Field Dates: February 3-9, 1944, Sample Size: 3,009); USAIPO1944-0318 ("Gallup Poll # 1944-0318: Gardening/1944 Presidential Election/Montgomery Ward Plants in Chicago/War," Field Dates: May 11-17, 1944, Sample Size: 2,648); USAIPO1944-0325 ("Gallup Poll # 1944-0325: War Workers/1944 Presidential Election/U.S. Army Leaders/Sidney Hillman," Field Dates: August 18-23, 1944, Sample Size: 4,321); USAIPO1944-0335 ("Gallup Poll # 335," Field Dates: November 17-22, 1944, Sample Size: 2,529).

For estimates relating to the war effort between 1941 and 1944 we used the following studies (as well as some from the previous paragraph): USAIPO1942-0259 ("Gallup Poll # 1942-0259: Education/Prohibition/War Industries in Europe/Supply Shortages/Politics," Field Dates: January 25-31, 1942); USAIPO1942-0264 ("Gallup Poll # 1942-0264: War Effort/Congress/1944 Presidential Election/Recreation," Field Dates: March 20-25, 1942, Sample Size: 2,738); USAIPO1942-0268 ("Gallup Poll # 268," Field Dates: May 23-28, 1942, Sample Size: 3,000); USAIPO1942-0283 ("Gallup Poll # 1942-0283: Prohibition/Employment/Republican Presidential Candidates/Federal Income Taxes," Field Dates" November 12-17, 1942, Sample Size: 3,019); USAIPO1943-0290 ("Gallup Poll # 1943-0290: Food Rationing/Military/Income Taxes," Field Dates: February 15-March 2, 1953, Sample

Size: 3,004); USAIPO1943-0295 ("Gallup Poll # 1943-0295: Gardening/Farming/Canada/ Taxes/Labor Unions/Women," Field Dates: May 14-20, 1943, Sample Size: 3,095); USAIPO1943-0296 ("Gallup Poll # 1943-0296: Presidential Election/World War II /Political Parties," Field Dates: June 4-10, 1943, Sample Size: 2,953); USAIPO1943-0301 ("Gallup Poll # 1943-0301: Military Service/1944 Presidential Election/World War II /International Police Force," Field Dates: August 26-September 2, 1943, Sample Size: 3,056); USAIPO1944-0312 ("Gallup Poll # 1944-032: War Effort/Politics/Taxes," Field Dates: February 18-23, 1944, Sample Size: 2,963); USAIPO1944-0315 ("Gallup Poll # 1944-0315: Military Wages/Draft/1944 Presidential Election/War Bonds," Field Dates: March 31-April 4, 1944, Sample Size: 3,014); USAIPO1944-0317 ("Gallup Poll # 1944-0317: Sacrifices for the War/Presidential Elections/World War II ," Field Dates: April 27-May 3,1944, Sample Size: 2,995); USAIPO1944-0324 ("Gallup Poll # 1944-0324: Germany/1944 Presidential Election/U.S. Army Leaders," Field Dates: August 3-8, 1944, Sample Size: 4,574).

10.3 Spdending and Wartime Events

ARMS AND AMERICA

WAITING WAR | THE DEFENSIVE WAR | ON THE OFFENSIVE

IS THIS OUR FIGHT? | GUNS AND BUTTER TOO | RAISING THE SIGHTS | IS IT FEASABLE? | PRODUCTION PUSH; LABOR PINCH | FIRST CUT-BACKS | RECON-VERSION PLANNING | CRITICAL PRO-GRAMS

MUNITIONS PRODUCTION - BILLIONS OF DOLLARS (August 1943 Prices)

1939 | 1940 | 1941 | 1942 | 1943 | 1944

War Resources Board — National Defense Advisory Commission — Office of Production Management — Supply Priorities and Allocations Board — War Production Board — Office of War Mobilization — Office of War Mobilization and Reconversion

Source: Somers, 8

U.S. MUNITIONS OUTPUT

IN STANDARD MUNITIONS DOLLARS

BILLIONS OF DOLLARS MONTHLY

INVASION OF PHILIPPINES (IS. OF LEYTE)
INVASION OF NORMANDY
INVASION OF ITALY
BATTLE OF THE BULGE
V-E DAY
V-J DAY
INVASION OF NORTH AFRICA
GUADALCANAL
PEARL HARBOR
FALL OF FRANCE
Actual
Schedule

1940 | 1941 | 1942 | 1943 | 1944 | 1945 | 1946

Source: Wartime Production Achievements, 13

Sources: p. 8 in Herman M. Somers (1950). *Presidential Agency OWMR: The Office of War Mobilization and Reconversion.* Cambridge: Harvard University Press; p. 13 in United States. War Production Board (1945). *Wartime production achievements and the reconversion outlook: report of the chairman, October 9, 1945.* [Washington]: The Board.

11 Results Appendix

Table 10: **Coefficent Estimates and F-Tests**
Contracts 6/1940 to 11/1944
Neutral Tide ($D^N = 0$)

Money Shift (V^m)	All Manuf	Aircraft Manuf	Pivot Prob	R^2	p-value of F
0.01	0.518	0.486	0.010	0.657	0.000
	(0.093)	(0.093)	(0.089)		
0.02	0.517	0.486	0.004	0.657	0.000
	(0.093)	(0.093)	(0.088)		
0.03	0.517	0.486	-0.000	0.657	0.000
	(0.093)	(0.093)	(0.088)		
0.04	0.517	0.486	0.003	0.657	0.000
	(0.093)	(0.093)	(0.089)		
0.06	0.513	0.487	0.025	0.658	0.000
	(0.094)	(0.093)	(0.089)		
0.08	0.501	0.485	0.073	0.662	0.002
	(0.094)	(0.092)	(0.090)		
0.10	0.487	0.481	0.125	0.672	0.012
	(0.093)	(0.091)	(0.089)		
0.12	0.471	0.475	0.172	0.684	0.042
	(0.092)	(0.089)	(0.089)		
0.15	0.451	0.466	0.227	0.703	0.138
	(0.090)	(0.087)	(0.087)		
0.20	0.431	0.460	0.277	0.725	0.314
	(0.087)	(0.083)	(0.084)		
0.25	0.418	0.461	0.300	0.735	0.407
	(0.086)	(0.082)	(0.083)		

Standard errors in parentheses. F-Test for null hypothesis that coefficients on Pivot Prob and All Manuf and Aircraft Manuf are equal.