

## Voter Responsiveness to the Spatial Distribution of Goods

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How do inequalities in the spatial distribution of public goods shape the way people think about government? Are voters more responsive to particular kinds of public investment – for instance, in infrastructure? We examine the effect of a sudden influx of government spending, the 2009 American Recovery and Reinvestment Act (ARRA), on support for the President’s party. We find that stimulus spending had a positive effect on Democratic vote share, but only in counties that were already Democratic-leaning. Contrary to our theoretical expectations, however, more visible investments did not appear to have a more significant effect than their less visible counterparts regardless of the partisan valence of the county. We discuss possible reasons for these results and directions for future research.

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## *Introduction*

Upon signing the 2009 American Recovery and Reinvestment Act into law, President Obama said, “We expect you, the American people, to hold us accountable for the results” of the new legislation.<sup>1</sup> Political science can tell us relatively little, however, about whether and how voters hold elected officials accountable for their spending choices. In particular, we have little insight into whether particular types of government spending are more likely to benefit the governing party in following elections.

Two different literatures—pork and the submerged state—explore these questions. While the pork scholarship has clearly defined the electoral benefits of public spending, it tends not to sharply distinguish between types of public spending. Research on the submerged state, in contrast, clearly defines policy visibility; its primary interest, however, is not in the electoral outcomes of visible policy spending, but rather, in how this category of spending shapes policy attitudes and institutional configurations.

Moreover, while the pork scholarship clearly addresses partisanship and the link between spending and party benefits, research on the submerged state almost entirely ignores the role that partisanship might play in driving: (1) which policies are visible, and (2) whether those visible policies might have potent political effects. Given the rising salience of partisanship in America’s polarized politics (Fiorina et al. 2004, McCarty et al. 2006, Abramowitz 2010), it seems clear that any account of policy visibility must take partisanship and ideology into account.

We therefore combine insights from these lines of scholarship to develop a novel theoretical framework of visible policy effects. This paper proceeds as follows. First, we discuss the theoretical foundations of our paper, including what other research has suggested about voter responsiveness to government spending. We then define policy visibility in terms of proximity and ease of attribution, and use infrastructure spending and medical research as clear, prototypical examples of visible and invisible spending respectively. Taking advantage of a sudden influx of government spending courtesy of the 2009 American Recovery and Reinvestment Act (ARRA), we estimate the effects of visible and invisible policy spending on support for the President’s party.

We find that ARRA investments have a positive effect on county Democratic vote share only in those counties that are already Democratic-leaning. Contrary to our expectations, however, we uncover few consistent differences in the effects of visible and non-visible spending, either in House or Presidential elections. We discuss the implications of these results for future research.

## *Policy Visibility and Political Effects*

To have an effect on political behavior, a policy must presumably be *visible*—that is, participants in the political system must realize that a particular policy is, in fact, shaping outcomes that are important to them. This realization then leads these voters to either endorse or oppose the political party that promulgated these policies. This intuitive logic

leads us to a fairly straightforward prediction: more visible spending in a district should lead to greater support for the political party that spurred the infusion of money.

This hypothesis, however, does not offer researchers a lot of analytical leverage. For example, what is a visible policy? What kinds of initiatives should we theoretically expect to be visible? While there is an ample political science literature that centers on visibility in government spending, differing norms and empirical focuses preclude this research from generating a fully developed theoretical framework that distinguishes between kinds of government investment.

### *Pork, Submerged State, and the Definition of Policy Visibility*

Both the *pork* literature and the *submerged state* literature consider how citizens respond to government spending. They approach this question, however, with almost diametrically opposite normative assumptions: in the *pork* literature, voter responsiveness to local spending is assumed to be a negative outcome, with voter support essentially purchased by entrepreneurial and manipulative politicians. Researchers in this tradition typically have an eye on Washington, interested in identifying what government spending politicians can manipulate, rather than what spending citizens notice. The *submerged state* literature, by contrast, suggests that voter responsiveness to public spending is a positive. As Suzanne Mettler (2011) notes, democracy “requires that people should be reasonably aware of what representatives do on their behalf.” With citizen engagement as their theoretical motivation, researchers of the *submerged state* look at the other side of the accountability equation, primarily focused on citizens’ perceptions of benefits, rather than the political calculations that decided the allocations in the first place.

These differing perspectives lead to important deficits in each line of research. While the *pork* literature has clearly defined the electoral benefits and consequences of government spending, it spends little time distinguishing between the effects of different kinds of spending. Indeed, David Mayhew’s seminal research (1974) illustrates the vagueness inherent in describing *pork*: he defines “particularized benefits” as those given to a small enough group of recipients that “allows a single congressman to be recognized” as the source of the benefit, and that is “given out in an apparently ad hoc fashion.” As Mayhew notes, the classes in which these particularized benefits can be grouped are “vaguely defined.” *Pork* is very much in the eye of the beholder. What one person might deem wasteful might appear to another as public-interested. Indeed, there is an old joke in Washington that *pork* is defined as “money spent in any district but my own.”

Unsurprisingly, more recent research examining *pork* uses widely varying definitions of the term. Some scholars narrow their focus to spending they deem to be relatively manipulable by ambitious politicians (e.g. Levitt and Snyder 1995, Berry et al. 2010, Crespin and Finocchiaro 2012, Kriner and Reeves 2012), such as federal grants or line-item appropriations. Others specifically exclude discretionary project grants from their definition of *pork*, focusing instead on entitlements and “contingent liabilities,” such as loan guarantees (Bickers and Stein 2000). Across the board, the definition of *pork* tends to be fairly broad: Kriner and Reeves (2012), for example, use a measure of “federal

grant spending” which amounts to 11-14.4% of total federal spending. It does not, notably, take into account how constituents would be made aware of spending and does not distinguish by concrete function, like transportation, education, or health.

In contrast, authors participating in the relatively new submerged state literature concentrate extensively on how citizens perceive specific programs, and how the *structure* of those programs shape voter perceptions. This line of research focuses more explicitly on the distinction between “visible” and “invisible” spending (Hacker 2002). Mettler (2010), for example, finds that a surprising number of social benefits are not perceived as government assistance, leaving citizens unaware of the ways in which they have benefited from government spending, and therefore less able to hold legislators accountable for those programs’ successes or failures. Program administration has a large effect on citizens’ awareness; tax expenditures and programs run through a private entity are less easily perceived by program beneficiaries. Soss and Schram (2007) add to this distinction the additional and critical division between *distant* and *proximate* policies, with proximate policies affecting citizens more directly, whether or not the benefits are perceived. Social Security is a program proximate to many Americans whose benefits are clearly attributable to the government; foreign aid is likewise easily connectable to the government, but is distant to the lives of most Americans.

Thus, taken in concert, research on the submerged state provides two particularly useful means of distinguishing the electoral visibility of a particularly policy. The first is whether the policy is relatively easy to connect with the government. If many Americans believe that a policy is provided by the private sector, it is unlikely, by definition, to be visible as a government policy. Second, a visible policy must be proximate: an initiative that directly affects the day-to-day lives of voters is more likely to be visible in the sense of credit/blame attribution than a more distant policy whose effects are far-flung.

This literature, however, suffers from a relatively narrow focus on social spending and an almost complete avoidance of electoral outcomes. Indeed, submerged state research is almost exclusively centered on social programs—in contrast to pork’s broader focus—and ignores many spending categories, like infrastructure, that may have profound political effects. More importantly, however, this line of scholarship’s dependent variables rarely include electoral outcomes. Instead, researchers primarily estimate the effects of social policies on policy attitudes and institutional and policy frameworks. We consequently know very little about whether *visible* spending, as defined by scholars like Hacker (2002), Mettler (2010), and Soss and Schram (2007), produces any real political benefits for the governing party—an issue of central importance in the pork literature.

### *A Broader Definition of Visible and Invisible Spending*

We therefore bring together these two literatures on government spending to form hypotheses regarding the electoral rewards of different types of spending. The pork literature suggests that we should generally expect heightened voter turnout and support for the governing party in districts that receive greater spending. Submerged state

research complicates this story by suggesting that the *visibility* of spending—at least in the realm of social programs—might condition these results. Moreover, it provides some specifics on what a visible policy might look like, emphasizing proximate and government-run spending.

To draw clear distinctions in what visible spending might look like—and to move beyond the submerged state’s focus on social programs—we center our definition of visible spending and hypotheses on two different categories of spending: infrastructure spending on transportation and scientific spending. We view these two categories of spending as extreme cases of *visible* and *invisible* spending, and therefore particularly useful for developing a theoretical framework and testing hypotheses about the relative effects of these two categories. We do not, of course, consider infrastructure and medical spending as exhaustively representative of the many different kinds of government spending that American citizens experience. Rather, their extremeness as examples of visible and invisible spending render them theoretically and methodologically helpful.

Infrastructure spending on transportation should be a classic case of visible spending: it is proximate in the sense that most residents who leave their homes on a regular basis are apt to encounter literal concrete examples of transportation investment. Moreover, relative to many other categories of spending, it is readily understood as government spending, with the quality of interstate highways, local roads, and mass transit systems heavily linked to government investment.

Conversely, spending on medical research is an extreme example of invisible spending. Though medical research is certainly relevant in the day-to-day lives of all Americans, it is not particularly proximate: most Americans do not regularly interact with, say, clinical trials or medical research facilities. Moreover, most Americans outside of the research community do not connect medical research with the federal government. Indeed, few Americans are well acquainted with the federal system of scientific grants from the National Institutes of Health and the National Science Foundation. While money spent on roads is visible to most people in the surrounding area, money spent on research is rarely visible outside of the laboratory.

Given these sharp contrasts in proximity and attribution, we anticipate that infrastructure and medical research should have distinct effects on political support for the governing party. This leads us to **Hypothesis 1 (Visible Policy Effect)**: *More visible policies, like infrastructure, that are both proximate to the lives of most voters and easily attributable to the governing party should increase support for the governing party. Conversely, less visible policies, like medical research, which are both more distant and less clearly linked to the government, should have a modest effect on support for the governing party, at best.*

## *Partisanship and Motivated Reasoning*

While *Hypothesis 1* clearly links the pork and submerged state literatures, it is missing two of the most prominent variables in American politics: partisanship and ideology. The American political sphere has seen a marked increase in partisan and ideological polarization in recent years (e.g., Fiorina et al. 2004, McCarty et al. 2006, Abramowitz 2010). Moreover, a multitude of studies exploring information effects have uncovered a potent relationship between partisanship/ideology and information input: in short, individuals are hesitant to believe information that is not consonant with their partisan/ideological priors (Lord et al. 1979, Bullock 2007, Lebo and Cassino 2007, Nyhan and Reifler 2010, Slothuus and de Vreese 2010).

Applying this research to the realm of estimating visible and invisible policy effects, we suspect that the visibility of policies may be further enhanced by partisan and ideological consonance. If, say, a transportation spending program is promulgated by a Democratic president, we should anticipate vote share effects to be particularly pronounced in liberal and Democratic-leaning areas. Conversely, we do not expect this partisan interaction to have any effect on invisible spending categories, like medical research. These policies—neither proximate nor attributable to a particular party—are unlikely to trigger partisan priors. This logic generates **Hypothesis 2 (*Partisan-Visible Policy Effect*)**: *More visible policies, like infrastructure, will increase support for the governing party only when voters in areas receiving this spending are ideologically aligned with the governing party. Invisible policies will have no political effect, regardless of the ideological and partisan leanings of spending recipients.*

Previous pork research on the responsiveness of Democratic areas to federal spending suggests that we should be cautious, though, in describing the psychological mechanisms underpinning voter reactions to spending by Democratic administrations. In particular, prior scholarship reveals that Democrats and ideological liberals are, in general, more likely to reward direct spending (Kriner and Reeves 2012, Lazarus and Reilly 2010). This result could pose some problems in the interpretation *Hypothesis 2* if the federal spending is implemented by a Democratic administration. Indeed, if we find that Democratic-leaning counties are more responsive to visible spending by a Democratic administration, this result could be a consequence of one of two psychological mechanisms: (1) voters see those policies that align with their prior viewpoints, or; (2) Democrats are simply more likely to see and respond to federal spending. While the predictions of *Hypothesis 2* remain the same—both logics suggest a partisan interaction with spending—the mechanisms undergirding the findings differ.

This difficulty in distinguishing psychological mechanisms does turn out to be relevant for this paper, since, as described below, we use data from the American Recovery and Reinvestment Act of 2009, a massive spending initiative promulgated by President Obama's administration. Thus, if we find a partisan-visible spending effect interaction, it could be a consequence of either of the mechanisms outlined above. Since our primary theoretical focus is in understanding what types of policy spending are and are not visible, we are less concerned with identifying the exact psychological process by which

partisanship might shape voter responsiveness to spending. Nonetheless, we caution here that a partisan interaction could be the consequence of multiple processes whose distinction is beyond the scope of this paper.

### *Data and Methods*

To evaluate these two hypotheses, we need a policy initiative that spurred large investments in both infrastructure and medical research at the same time. Fortunately, the American Recovery and Reinvestment Act of 2008 (ARRA) provides a perfect lens through which to evaluate our hypotheses.

#### *The American Recovery and Reinvestment Act*

The American Recovery and Reinvestment Act of 2009 (ARRA) was a major economic stimulus package passed in the first weeks of the Obama Administration. The Stimulus, as it was commonly known, was an immense investment, estimated to cost \$787 billion at the time of its consideration.<sup>ii</sup> ARRA included a wide range of expenditures, including additional funding for states and localities' health, education, and transportation projects; extensions of unemployment insurance and welfare programs; direct federal infrastructure investments; and tax expenditures for individuals and businesses.

The precise economic impact of ARRA is the subject of debate, but several major studies suggest the effects have been substantial. The Congressional Budget Office (2012) estimated that ARRA raised GDP between .2 and 1.5%, and created over 2 million jobs (see also CEA 2011). Feyrer and Sacerdote (2011) find similar results, suggesting that the cost of each additional job created was between \$170,000 and \$400,000. Not all aspects of ARRA produced similar job-creation results, however; support for low-income individuals, in the form of unemployment insurance extensions and nutritional assistance programs, has a particularly high rate of return (CBO 2012, Feyrer and Sacerdote 2011).

The data on ARRA spending is readily available at a very high level of detail. Geo-coded information for all Stimulus projects is available at the federal website [www.recovery.gov](http://www.recovery.gov). Our dataset does not include every dollar spent through the Stimulus; we use data gathered between February 2009 and September 2012, for over 102,000 Stimulus-funded projects in total, for which just over \$205 billion was spent. Distributed by 28 different federal agencies, the projects are primarily grants, but include over 28,000 contracts and 1800 loans. Note that projects do not include entitlements spending or tax credits, which respond strongly to annual changes in economic and demographic conditions in the counties and therefore would create a substantial endogeneity problem.

Using this fine-grained information about Stimulus projects, we can examine in detail what effect ARRA spending had on voting behavior in the following elections. The following section lays out our research design.

#### *Visible and Invisible Government Spending Measures*

To evaluate spending in a community, we use several different variables. First, we look at the effect of total ARRA spending. We always use per capita measures, and log all spending estimates in order to minimize the impact of outliers (spending in each category is right-skewed, even after a per capita transformation). To test what kinds of spending are visible to voters, our data provide us with a surfeit of possible categorization schemes. As a starting point, we have chosen two different kinds of spending, one likely to be visible to voters (highway repair), and one likely invisible (scientific research).

To measure scientific research—our invisible category—we use ARRA funding allocated by the National Science Foundation (NSF) and National Institutes of Health (NIH). To date, the National Science Foundation has awarded almost \$3 billion from ARRA for scientific research and investment. For instance, the University of Alaska Fairbanks received \$3 million to study “the effects of climate change on fresh-water resources and communities in Alaska and Hawaii.”<sup>iii</sup> The National Institutes of Health received \$10.4 billion from ARRA, and devoted those funds primarily to medical research. One Stimulus-funded project allowed researchers at the University of Florida to explore new methods to regenerate injured spinal cords. Though scientific studies are likely to have an immense effect on American well-being in the long term (e.g. Murphy and Topel 2010), the allocation of additional federal spending in America’s research facilities is perhaps unlikely to be perceived by the average voter.<sup>iv</sup>

In contrast, the \$26.6 billion Federal Highway Administration (FHA) spending is among the most visible of ARRA investments.<sup>v</sup> Not only is road repair something that can readily be seen by passers-by, but ARRA highway projects were often accompanied by large signs reading, “Project Funded by the American Recovery and Reinvestment Act,” and “Putting America To Work.” As federal spending goes, one would expect this to be among the easiest for voters to recognize.

One important difference between FHA and NIH/NSF funding is that FHA funding went to a larger number of counties. This is not to say that NIH/NSF funding was narrowly targeted; over 600 counties in our dataset received NIH/NSF funding. But far more counties benefitted from highway spending; almost 2500 counties received funding from the Federal Highway Administration. FHA grants were also larger, unsurprisingly. Among counties receiving NIH/NSF funding, the median award was about \$680,000. For FHA awards, the median was slightly over \$3 million (again, among counties receiving an award).

Though the awards are not equivalent in size or spread, the comparison of these two kinds of funding offers one significant advantage. Economists suggest that these two types of spending provide similar levels of economic stimulus (CBO 2012).<sup>vi</sup> Any difference support for the President’s party can therefore more easily be ascribed to perceptions of spending, rather than the empirical reality of the investment’s economic value.

One of the major challenges in using stimulus data is the level of geographic aggregation at which they are collected: the zip code. Our key dependent variables—the various voting measures described below—are all available at the county level. The zip code, however, is not a census geography that can be easily merged with counties. Instead, it is a measure used by the U.S. Postal Service (USPS) for their own statistical purposes, and not meant to be linked with any other agency’s measures. Fortunately, the Department of Housing and Urban Development (HUD) provides a helpful crosswalk file that allows researchers to rigorously match zip codes with counties and other census geographies. Using USPS Vacancy Data, HUD allocates zip codes to counties based on the location of occupied and unoccupied residential addresses, taking into account the spatial distribution of an area’s population and residences.<sup>2</sup> The file is updated quarterly. We thus use this crosswalk file to allocate ARRA spending to counties.

### *Voting Data*

There are several potential dependent variables that might, theoretically, be affected by Stimulus spending. Perhaps most importantly, there are two different kinds of elections to consider: House and presidential. Previous research suggests that we might see a larger effect if we look at support for the President, rather than local representatives (Kriner and Reeves 2012, p. 348). Indeed, while a wealth of previous research has sought to connect the electoral success of a member of Congress to his or her capacity to direct spending to the district, these efforts have largely proved unsuccessful (for a review of the literature see Lazarus and Reilly 2010).

We therefore evaluate two dependent variables—2012 presidential election Democratic vote share and 2012 House election Democratic vote share—and anticipate, consistent with previous research, larger effects in the presidential contests. All voting data are obtained from David Leip’s Atlas of US Presidential Elections (2013). To calculate Democratic vote share, we simply divide the total number of Democratic votes by the total number of votes cast in a county.

### *Evaluating Hypotheses*

If *Hypothesis 1 (Visible Policy Effect)*, proves accurate, we expect that counties receiving more highway spending will vote more Democratically in the 2012 presidential and House elections. Conversely, those counties receiving more medical research spending should exhibit no political effects.

*Hypothesis 2 (Partisan Visible Policy Effect)* argues that this effect will be conditioned by whether voters in a particular area endorse the governing party. Since the Stimulus is unambiguously connected with President Obama and the Democratic Party, this hypothesis therefore predicts that, in more liberal, Democratic-leaning counties, we should anticipate that more visible spending will have the impact postulated in *Hypothesis 1*. Conversely, in more conservative, Republican-leaning counties, even highly visible, infrastructure spending should have little to no effect. Invisible spending

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<sup>2</sup> For more information, see: [http://www.huduser.org/portal/datasets/usps\\_crosswalk.html](http://www.huduser.org/portal/datasets/usps_crosswalk.html).

should continue to have no effect, regardless of the ideological leanings of spending recipients.

To operationalize this interaction term, we use 2008 county Democratic vote share and multiply it by visible and invisible spending. By its very definition, the 2008 vote share captures the partisan leanings of its county. Moreover, there is some evidence that presidential vote share is also a useful proxy for a geographic area's ideology leanings. Indeed, Tausanovitch and Warshaw (2013) find that presidential vote share in a locality tends to be highly correlated with local preferences. Similarly, scholars of local politics frequently use presidential vote share as a proxy for local preferences to combat the dearth of good public opinion data at lower levels of geographic aggregation (see for example Choi et al. 2002; Craw 2010; Hajnal and Trounstein 2010; Minkoff 2012; Einstein and Kogan 2013).

### *Models*

We examine whether variation in Stimulus spending in a county correlates with a change in voter support for the President's party between the 2008 and the 2012 general elections. We use a mixed-effects least-squares model with county fixed effects and an additional control for year of observation. The county fixed effects account for time-invariant differences between counties, thus soaking up variation in the Democratic vote share that is due to differences such as urban/rural divisions. To the extent that variables such as racial composition and relative per capita income only change slowly, much of the impact of these variables is also controlled for. We also include a control for 2012, to account for nation-wide fluctuations in the popularity of the two parties. The fixed-effects model thus allows us to compare differences-in-differences between counties, moving from the 2008 election cycle to the 2012 election cycle.

Along with county and year fixed effects, we include two additional controls. To take into account the possibility that Stimulus funding would be directed to areas particularly hard-hit by the economic downturn, which in turn may impact the electoral fortunes of the two main parties, we include a control for unemployment in 2008. Because unemployment at later dates was itself influenced by ARRA, we do not include controls for later unemployment rates. It is also possible that Stimulus money would be directed to counties based on their partisanship, while we are interested in estimating (as closely as possible with observational data) the impact of ARRA spending as if it were assigned orthogonally to pre-existing political variation. We therefore include a control for Democratic vote percentage in 2008, even in models where it is not being used as an interaction term. Finally, we include our variables of interest: ARRA spending, both as a total, and broken down into "visible", "invisible" (as defined above) and "unclassified" (the remainder of projects that were not classified as either visible or invisible). Having controlled for time-invariant characteristics of the counties, as well as for two possible confounders, we assume that any remaining variation in changes to the Democratic vote share between 2008 and 2012 can reasonably be explained by ARRA spending.

## Results

Table 1 presents the results of our simplest model, looking at the relationship between Stimulus spending received and Democratic vote share in the 2012 House and Presidential elections. The largest estimate, unsurprisingly, is for the Democratic vote share from 2008; its size and direction are as would be expected. When it comes to the effect of the Stimulus, however, the results are somewhat more surprising. For the House models, we find a positive and significant effect for total ARRA spending and NIH/NSF spending. For the Presidential models, we find a positive and significant effect for NIH/NSF spending, and for federal highway spending, but not for total ARRA spending.

	2012 House Democratic Vote Share				2012 Presidential Democratic Vote Share			
	<i>All ARRA</i>		<i>ARRA By Type</i>		<i>All ARRA</i>		<i>ARRA By Type</i>	
Intercept	61.7696	**	61.7512	**	15.2900	**	15.9618	**
	2.9997		2.6587		0.5617		0.5005	
Year: 2012	-0.0307	**	-0.0307	**	-0.0076	**	-0.0080	**
	0.0015		0.0013		0.0003		0.0002	
Unemployment rate (2008)	0.0044	**	0.0051	**	0.0010	**	0.0012	**
	0.0007		0.0007		0.0001		0.0001	
House Democratic vote share in 2008	0.7677	**	0.7567	**				
	0.0068		0.0068					
Presidential Democratic vote share in 2008					1.0190	**	1.0152	**
					0.0021		0.0022	
All ARRA project spending	0.0061	**			0.0000			
	0.0017				0.0003			
Unclassified spending			0.0057	**			-0.0004	
			0.0015				0.0003	
NIH/NSF research spending			0.0357	**			0.0050	**
			0.0036				0.0007	
FHA infrastructure spending			-0.0007				0.0008	**
			0.0015				0.0003	

**TABLE 1: Correlates of Democratic Vote Share, House 2010 and President 2012, Total Stimulus and Stimulus By Type**

\*  $p < .05$ , \*\*  $p < .01$ . All models include county-level fixed effects. All coefficients signify the impact of the log of \$10 in per capita spending in a given county.

The estimates on the variables of interest look very small, of course. But because the Stimulus represents such a large amount of money, some of these estimates represent non-negligible effects. The median county in our dataset received \$209 in per capita spending through Stimulus projects (the mean amount received was \$641 per capita). We estimate that moving from the 25<sup>th</sup> percentile of total ARRA project spending (\$91 per capita) to the 75<sup>th</sup> percentile (\$491 per capita) increased the Democratic vote share by 0.97 percentage points. In 2012, House election outcomes in 45 counties had a margin equal to or smaller than this. In the 2012 presidential elections, however, we uncover no impact of total ARRA spending. Finding an impact for House elections, but not for Presidential elections is surprising in light of previous research (Kriner and Reeves 2012, Lazarus and Reilly 2010). We do not have a strong theoretical explanation for why this may be.

When we break the spending down into subtypes, research spending surprisingly has the largest positive effect on the Democratic House vote share. Only 627 of 3108 counties received any spending in this category; among recipients, the median county received \$5.30 per capita and the mean per capita spending was \$42.85. Our model predicts that moving from not receiving any spending in this category (the modal outcome) to receiving the mean amount among recipients (\$42.85 per capita) yields an additional 3.2 percentage points for the Democratic candidate in House elections. In 2012, House elections in 5% of counties had margins below this. The predicted impact of the same spending change on Presidential election outcomes is a smaller increase of 0.4 percentage points; just below 1% of counties had a 2012 Presidential election margin that was small enough to be swayed by this difference. Once again, there is a larger impact in House than in Presidential elections.

Infrastructure spending, contrary to *Hypothesis 1*, exhibits no significant effect in the House elections. While the coefficient on infrastructure spending is statistically significant for Presidential elections, the substantive impact is small: moving from the 25<sup>th</sup> percentile to the 75<sup>th</sup> percentile of infrastructure spending adds just 0.16% to the Democratic vote. A similar pattern holds for our category of “other”, or unclassified, ARRA spending: the coefficient is not significant for Presidential elections, and while the coefficient is significant for House elections, substantively the predicted changes are very small. In conclusion, we find that *Hypothesis 1* is not supported. In fact, we find a directly opposite pattern from what we predicted: the most invisible category of spending appears to have the strongest impact on support for the governing party. While there is an overall impact from ARRA spending that helped the Democrats in 2012, this impact does not appear to have come primarily through the visible and proximate spending on infrastructure.

We turn then, to our next prediction, *Hypothesis 2*, which suggested that the effect of visible spending might be conditioned by county partisanship. We thus test an interaction between the amount of spending and Democratic support for the President in 2008. Table 2 presents our results from this interaction model.

	2012 House Democratic Vote Share				2012 Presidential Democratic Vote Share			
	All ARRA		ARRA By Type		All ARRA		ARRA By Type	
Intercept	54.1800	**	54.9089	**	14.9597	**	15.6003	**
	2.7320		2.4468		0.5553		0.4963	
Year (2012)	-0.0270	**	-0.0273	**	-0.0075	**	-0.0078	**
	0.0014		0.0012		0.0003		0.0002	
Unemployment rate (2008)	0.0000		0.0002		0.0011	**	0.0012	**
	0.0007		0.0007		0.0001		0.0001	
House Democratic vote share in 2008	0.6053	**	0.6063	**				
	0.0077		0.0077					
All ARRA project spending	-0.0090	**			-0.0057	**		
	0.0027				0.0005			
Presidential Democratic vote share in 2008	0.4172	**	0.4156	**	0.9981	**	0.9981	**
	0.0153		0.0151		0.0027		0.0026	
Interaction: All ARRA x Presidential Dem vote in 2008	0.0233	**			0.0129	**		
	0.0050				0.0010			
NIH/NSF research spending			-0.0043				0.0055	.
			0.0158				0.0032	
FHA infrastructure spending			0.0043				-0.0005	
			0.0036				0.0007	
Unclassified spending			-0.0129	**			-0.0065	**
			0.0035				0.0007	
Interaction: Research x Presidential Dem vote in 2008			0.0143				-0.0055	
			0.0260				0.0053	
Interaction: Infrastructure x Presidential Dem vote in 2008			-0.0121				0.0031	.
			0.0083				0.0017	
Interaction: Unclassified x Presidential Dem vote in 2008			0.0342	**			0.0135	**
			0.0075				0.0015	

**TABLE 2: Correlates of Democratic Vote Share, House 2010 and President 2012, Total Stimulus and Stimulus By Type Interacted with Prior Democratic Support**  
. p<0.1 \* p<0.05, \*\* p<0.01. All models include county-level fixed effects. All coefficients signify the impact of the log of \$10 in per capita spending in a given county.

In this model we find that the positive effects for both total ARRA spending and “other” ARRA spending are indeed primarily in the more Democratic parts of the country, a finding somewhat consistent with *Hypothesis 2’s* partisan predictions. For House elections, the overall impact of ARRA spending somewhat negative in heavily Republican counties, becoming positive in Democratic counties. The point estimate for the tipping point (where the total effect is estimated to be zero) is a 38% Democratic county. Assuming a county with a 50% Democratic vote share in 2008, we estimate that moving from the 25<sup>th</sup> to the 75<sup>th</sup> percentile of per capita investment boosts the Democratic vote share in House elections by 0.4 percentage points, and by 0.1 percentage points in Presidential elections, neither of which is a statistically significant estimate. The impact of additional total ARRA spending becomes conventionally significant only at the point where a county is at least 56% Democratic; in other words, the gains in Democratic vote share appear to occur in already Democratic-leaning counties. This observation is consistent with the expectation that Democratic voters are more likely to notice and/or reward public spending by Democratic politicians. However, this effect does not appear to be large enough to swing otherwise close elections in the favor of Democratic contestants.

When we break down the spending into its subtypes, the results once again contradict our predictions regarding the impact of visible and invisible spending. Though the interaction between infrastructure spending and partisanship is positive and significant at the .1 level, the effect is not substantively significant. The only spending subtype that shows a significant impact is the unclassified “other” type spending. Both infrastructure and research spending have no impact on the vote share in either House or Presidential elections. The finding that infrastructure spending does not have a significant effect echoes the finding from Table 1. Given the relatively small number of counties that received research funding, it may be that our analysis lacks power to establish the breakdown of its impact between left- and right-leaning counties, even though there was a significant impact before the inclusion of the interaction terms.

The previous positive results for the impact of unclassified spending are upheld and follow the same pattern as overall ARRA project spending: unclassified spending has a negative impact on Democratic vote share in heavily Republican counties, and a positive impact in Democratic counties. For House elections, we estimate that the county needs only to be 50.6% Democratic for the impact of ARRA spending to become conventionally statistically significant. If a county that is evenly split (exactly 50%) between Democrats and Republicans were to move from the 25<sup>th</sup> to the 75<sup>th</sup> percentile of “other” ARRA project spending, we expect to see an increase in the Democratic vote share of 0.9% ( $p < 0.10$ ). In Presidential elections, this effect is smaller and becomes conventionally significant only when a county reaches 55% Democratic vote share in the 2008 elections.

### *Discussion and Next Steps*

Our results suggest that ARRA spending in Democratic districts is correlated with a significant increase in support for Democratic House candidates and for the President in 2012. Contrary to our hypotheses, research funding appears to exert a larger influence on voting behavior than highway spending, at least in the non partisan-interaction models.

As recipients of NSF funding (at least at the writing of this paper), political scientists might be tempted to conclude that research is, in fact, more visible in the local community than we expected and a great boon to elected officials who seek reelection. Sadly, there exist several other, perhaps more plausible, explanations for our findings.

Counties that received NIH/NSF funds may be substantively different from non-research counties in a way that increased their relative 2012 Democratic vote share, and that this effect was not fully absorbed by the county fixed effects. For instance, research funding likely went primarily to counties containing a large institution of higher learning. Voters in these counties may have tended to be young college and graduate students, an Obama stronghold in both 2008 and 2012. If Obama's 2012 support saw less of a drop-off in these counties, compared to other, older and less educated counties, the estimate of the effect of NIH/NSF funding may be spurious or inflated. (In future versions of this paper, we will test this possibility.)

When it comes to highway funding, a better model specification may produce a more intuitive result. Most simply, it may be that road spending per capita is a poor measure of investment when compared to spending per mile of road. Taking into account road density is one possible improvement to the specification we have used so far. In addition, our results may be complicated by the fact that road spending per capita is very likely highest in the least populated areas of the country, including rural areas unlikely to support the Democratic Party.

For future versions of this research, there are several avenues to explore. One mechanism by which stimulus spending might increase support for incumbents is by driving up voter turnout. We have conducted some preliminary tests, but have not yet found any evidence for this hypothesis. Another possibility is that what we are identifying as voter perceptions is actually simply voters' response to the improved economy in high-Stimulus areas. In addition, there are two other controls that might be worth including. It is possible that Stimulus spending is correlated with other federal spending, and therefore our variables are picking up the effect of other federal investments. Finally, we could include a control for counties including the state capitol, which tend to receive extremely high rates of support across funding categories.

In sum, our findings suggest that more work is needed to bring together the pork and submerged state literatures. When it comes to democratic accountability, there may be important differences between the spending citizens recognize when asked, and the spending for which they reward politicians. Voters are in many ways myopic (e.g. Achen and Bartels 2004, Bartels 2008), and may not reward their legislators for crises that are averted. For instance, voters do not reward disaster preparedness, only disaster relief (Healy and Malhotra 2009). It may be, therefore, that parts of the Stimulus intended to

offset budgetary shortfalls in the states, for instance in education, would not be recognized and rewarded by the voters benefiting from that local spending. Much more must be done to plot the road between a citizen's recognition of benefits they have received and political advantages for the politicians who ensured those benefits.

### *Conclusion*

In 2009, Republicans strongly resisted the use of the ARRA highway signs. "These signs are simply for political self-interest, and it's high time we stop using stimulus dollars to fund them," announced Senator Judd Gregg, Republican from New Hampshire. Politicians clearly believed that the visibility of Stimulus spending would have an electoral impact; our preliminary results suggest that they did, indeed, have reason to worry – but not about highway spending. It is clear that much more work must be done to understand the kinds of spending are visible to the public, and how we theorize the relationship between government investment and democratic accountability.

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## Endnotes

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<sup>i</sup> Remarks by the President and Vice President at the signing of The American Recovery and Reinvestment Act, Denver Museum of Nature and Science, Denver, Colorado, February 17, 2009. Available at: [http://www.whitehouse.gov/the\\_press\\_office/Remarks-by-the-President-and-Vice-President-at-Signing-of-the-American-Recovery-act](http://www.whitehouse.gov/the_press_office/Remarks-by-the-President-and-Vice-President-at-Signing-of-the-American-Recovery-act).

<sup>ii</sup> Though the Congressional Budget Office originally estimated the budget effect of ARRA at \$787 billion, it later revised the estimate to \$831 billion. CBO 2012.

<sup>iii</sup> Summary drawn from recipient reports, available at:

<http://www.recovery.gov/Transparency/RecoveryData/pages/RecipientProjectSummary508.aspx?AwardIdSur=13542>

<sup>iv</sup> Details of NIH's ARRA spending is available at <http://recovery.nih.gov/>.

<sup>v</sup> Detail of FHA spending at <http://www.fhwa.dot.gov/economicrecovery/>

<sup>vi</sup> Purchases of goods and services by the federal government, including NIH investments, are estimated to have a multiplier effect between 0.5 and 2.5. Transfer payments to state and local governments for infrastructure improvements, including spending on highway construction, is estimated to have a multiplier effect between .4 and 2.2. These are relatively substantial multipliers; as a point of comparison, one of the major tax credit policies in the Stimulus, the increase in the Alternative Minimum Tax exemption, is estimated to have a maximum multiplier effect of 0.6. CBO 2012.