Buying Votes with Public Funds in the US Presidential Election
Are Swing or Core Voters Easier to Buy Off?[1]

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Note: This paper contains multi-colored maps on pages 41-42. Please access the original from: http://www.stanford.edu/~jowei/fema/chen.pdf

Abstract:

In the aftermath of the summer 2004 Florida hurricane season, the Federal Emergency Management Agency (FEMA) distributed $1.2 billion in disaster aid among 2.6 million individual applications for assistance. This research measures the relative costs and benefits of using FEMA aid to buy votes from swing voters and core voters. First, I compare precinct-level vote counts and individual voter turnout records from the post-hurricane (November 2004) and pre-hurricane (2000 and 2002) elections to measure the effect of FEMA aid on Bush's vote share. Using a two-stage least squares estimator, with hurricane severity measures as instruments for FEMA aid, this analysis reveals that core Republican voters are most electorally responsive to FEMA aid – $7,000 buys one additional vote for Bush. By contrast, in moderate precincts, each additional Bush vote costs $21,000, while voters in Democratic neighborhoods are unresponsive to receiving FEMA aid. Additionally, by tracking the geographic location of each aid recipient, the data reveal that FEMA favored applicants from Republican neighborhoods over those from Democratic or moderate neighborhoods, even conditioning on hurricane severity, average home values, and demographics. Collectively, these results demonstrate the Bush administration's disproportionate distribution of FEMA disaster aid toward core Republican areas was the optimal strategy for maximizing votes in the Presidential election.

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Can politicians use public spending to buy off ideologically opposed voters? For example, does a Republican President gain electoral support from left-wing or moderate voters by offering them public benefits? Or does the vote-buying logic of clientelism, patronage, and pork barreling apply only to voters who are ideologically predisposed to supporting a politician? A substantial body of work in political economics has argued that targeting distributive benefits to core ideological constituents maximizes electoral returns (eg, Cox and McCubbins 1986). On the other hand, a similarly voluminous theoretical literature has advanced the swing voter logic, arguing that moderate voters are more easily swayed by monetary transfers because of their ideological indifference between opposing parties (eg, Dixit and Londregan 1996; Persson and Tabellini 2000, Stokes 2005). However, empirical work has yet to evaluate the relative veracity of these competing arguments and measure whether core or swing voters are easier to buy off.

This article exploits an unusually detailed set of household-level records of 2.6 million applications for Federal Emergency Management Agency (FEMA) disaster assistance filed during the summer 2004 hurricane season, just prior to the November 2004 Presidential election. During summer 2004, Florida suffered through four severe hurricanes, residents filed over 2.6 million applications for federal disaster assistance, and FEMA awarded over $1.2 billion in aid to these applicants. The household-level records of these FEMA applications, along with data on the amount of money awarded to each applicant, became available as a result of the 11th US Circuit Court of Appeals' June 2007 ruling on a Freedom of Information Act (FOIA) lawsuit.

In this article, I match these household-level FEMA application records to publicly available voter registration records, voter turnout history files, and precinct-level vote counts from the 2004, 2002, and 2000 general elections. The empirical results show that in historically Republican precincts, an increase in FEMA aid causes an increase in Republican turnout and

thus an increase in President Bush's 2004 vote share. In Republican precincts, $7,000 of FEMA aid purchases one new vote for Bush, a result comparable to Levitt and Snyder's (1997) estimate that every $14,000 of federal pork spending corresponds to one additional vote for a congressional incumbent. Additionally, to address the possibility of omitted variable bias, I instrument for FEMA aid using hurricane severity measurements in each precinct, demonstrating that *predicted* FEMA aid is positively associated with increased Bush vote share.

By contrast, these vote-buying effects are either significantly smaller or absent in moderate and Democratic precincts. Figure 1 graphically summarizes these main findings by comparing the electoral effects of FEMA aid in Republican, moderate, and Democratic precincts as estimated by coefficients from the regression models detailed later in this article. The upper graphs in Figure 2 show that FEMA aid's effect is largest in Republican precincts, where a 25% increase in aid significantly boosts voter turnout and increases Bush's share of the two-party vote by 0.38 percentage points. Among ideologically moderate precincts, FEMA aid is significantly less effective at increasing turnout and buying new Bush votes; a 25% increase in aid boosts Bush's vote share by 0.13 percentage points, implying a $21,000 per vote cost of buying new Bush supporters. In Democratic precincts, increasing FEMA aid has no significant effect on either turnout or support for Bush.

[FIGURE 1 ABOUT HERE]

Collectively, these findings reveal a partisan asymmetry in vote-buying opportunities: Voters reward the Bush administration for delivering public benefits only in precincts that are ideologically aligned with Bush. As Republican voters are easier to buy off, this asymmetry suggests that the optimal vote-buying strategy is to award more FEMA aid to Republican neighborhoods than to moderate or Democratic areas.

Did the Bush administration employ such a strategy? I examine the geographic distribution of FEMA aid in the aftermath of the 2004 hurricane season. The data reveal that, even after controlling for hurricane severity, demographic characteristics, and the number of applications from each neighborhood, FEMA awards significantly more disaster aid to conservative areas: Solidly Republican precincts receive 19% and 41% more aid than moderate and Democratic precincts, respectively. These results demonstrate that FEMA's geographic distribution of aid is consistent with a strategy of buying turnout among core voters.

Three features of this article's data are noteworthy. *First*, the geographically precise nature of the FEMA aid data allows me to estimate the costs and benefits of vote buying. I track the geographic location of each of the 2.6 million Florida FEMA aid applications. I then match individual FEMA awards to actual electoral outcomes (turnout records and precinct-level vote counts in 2000, 2002, and 2004) and use this approach to estimate the monetary costs of purchasing an additional Bush voter. This analysis reveals that vote buying is an efficacious strategy in Republican neighborhoods but less so in Democratic and moderate ones.

Second, the observed estimate of FEMA aid's effect on support for Bush's reelection potentially suffers from omitted variable bias. A possible omitted variable is that politically sophisticated voters may have been both: 1) more successful at obtaining FEMA aid; and 2) more likely to increase their support for Bush immediately before the 2004 election. Under these conditions, we might observe a positive relationship between FEMA aid and increased support for Bush, even when the former did not cause the latter.

To overcome such omitted variable bias, I instrument for FEMA aid using the geographic paths of the Florida hurricanes. The intuition behind this instrument is that hurricane disaster aid, by its inherent nature, is generally awarded to geographic areas that were plausibly close to a

hurricane. To illustrate that hurricane severity is a significant determinant of FEMA aid distribution, the model in Figure 2 regresses each precinct's FEMA aid awards (logged per capita) onto the maximum wind speed observed in each precinct during the four hurricanes. The estimated regression results reveal that precincts suffering higher hurricane winds receive significantly more aid.

[FIGURE 2 ABOUT HERE]

The specific path of each hurricane is determined by natural forces that are exogenous to politics. Using storm severity measurements as instruments for FEMA aid, I show that in solidly Republican neighborhoods, a 25% increase in *predicted* aid causes a 0.28 percentage increase in President Bush's vote share. However, in Democratic and in moderate neighborhoods, *predicted* FEMA aid has no significant effect on Bush's vote share.

Third, as explained in the following section, FEMA enjoys wide statutory discretion in distributing disaster aid among applicants within each hurricane-affected county, once that county has received a disaster declaration. There are few formulaic rules, and the statutory language that authorizes the disaster aid program is sufficiently broad to afford FEMA significant latitude in distributing its money. Hence, there is nothing unlawful about the Bush administration's apparent vote buying strategy documented in the data.

The empirical findings of this article address the persistent debate in political science on whether targeting benefits to core constituents or potential swing voters yields greater electoral rewards for politicians. The formal models of Persson and Tabellini (2000), Dixit and Londregan (1996; 1998), and Lindbeck and Weibull (1987) argue that swing or middle-income voters should be most electorally sensitive to monetary transfers because this group is ideologically indifferent between two extreme parties. Frohlich and Oppenheimer (1984) similarly argue that,

based on Downs' (1957) median voter logic, incumbent politicians may find it optimal to target income transfers to the most ideologically moderate or swing voters.

By contrast, the core voter models have generally asserted that a party's core constituents are more reliably responsive to transfers. Cox and McCubbins (1986) argue that risk-averse politicians may target transfers to core constituents because the responsiveness of swing voters to receiving transfers is less predictable than that of core voters. Cox (2007), Nichter (2008), and Dunning and Stokes (2008) further note that if monetary transfers can mobilize voters, or buy turnout, then targeting transfers to core supporters may produce greater electoral rewards.

Which of these two competing groups of models is more empirically accurate? Is the electoral payoff from targeting transfers to mobilize core supporters greater than the payoff from offering transfers to swing voters? The differences between the core and swing voter models stem from a disagreement about the expected relative responsiveness of core and swing voters upon receiving distributive benefits.

However, existing studies have yet to empirically measure the relative responsiveness of core and swing voters to monetary transfers. Some studies of distributive benefits in the US find parties target pork projects to swing districts (eg, Stein and Bickers 1994, Bickers and Stein 1996), while other studies find a bias toward core supporters (eg, Levitt and Snyder 1995, Ansolabehere and Snyder 2007). Such findings suggest that parties often conjecture about the electoral efficacy of targeting either swing or core voters. This article serves to evaluate whether these conjectures are empirically accurate. Scholars have also found that voters may reward politicians for distributive benefits with increased turnout (Ansolabehere and Snyder 2007) and increased incumbent vote share (Levitt and Snyder 1997). This article extends such analysis by

measuring whether the turnout and vote-buying effect is greater among swing voters or core supporters.

This article proceeds as follows. The following section describes the FEMA aid process in detail. Next, I compare voter turnout history files and precinct-level vote counts from pre-hurricane (2002) and post-hurricane (2004) elections to demonstrate FEMA aid's electoral effect. Finally, I analyze the determinants of FEMA aid awards, revealing that the distribution of FEMA disaster aid significantly favors solidly Republican neighborhoods.

The FEMA Aid Application Process

In the twelve weeks prior to the November 2004 Presidential election, Florida's Atlantic coast, Gulf coast, and Panhandle region were struck by four hurricanes of at least Category II strength. Hurricanes Charley (August 13; Category IV), Frances (September 4; Category II), Ivan (September 16; Category III), and Jeanne (September 25; Category III) made landfall in different locations throughout Florida, prompting President George Bush to issue disaster declarations for all 67 counties in the state at least once during the 2004 hurricane season.

These disaster declarations made all Florida residents eligible to apply for federal disaster aid under FEMA's Individuals and Households Program (IHP). Officially, IHP, authorized by the Stafford Act (P.L. 93-288) and the Disaster Mitigation Act of 2000 (P.L. 106-390), provides financial assistance to individuals to "prevent, mitigate, or overcome a disaster-related hardship, injury or adverse condition" (44 CFR 206.11). In practice, FEMA most frequently awards aid to individuals to fund temporary housing, to repair damaged housing, to replace damaged property, and to pay for medical, funeral, and other personal expenses after a disaster. In 2004, many applicants also claimed damage and received compensation for destroyed televisions, computers,

and furniture. In the aftermath of the four hurricanes, 1.1 million Florida households submitted a total of 2.6 million applications for FEMA aid, but FEMA approved only 40% of these applications, awarding over $1.2 billion in assistance. In this article, I analyze only aid awarded and delivered prior to the 2004 Election Day, or approximately $814 million of FEMA aid.

When requesting disaster assistance, residents do not apply for a specific dollar amount. Rather, the applicant simply provides a list of qualifying expenses and home damages. The FEMA inspector handling the application must physically travel to the applicant's home, where the inspector estimates the extent of damages. For example, if an applicant claims damage to household room items, then the FEMA inspector assigns a score of "X", "Y," or "Z" to each room, indicating the severity of the damage; in most cases, this score directly determines the amount of assistance to be awarded by FEMA. Moreover, FEMA inspectors are permitted, though not obligated, to accept an applicant's verbal representation of damaged property without further documentation; inspectors may even add additional line item damages not originally claimed by the applicant. Hence, inspectors have broad discretion in handling aid applications and are bound by only a few rigid statutory rules: Among other limitations, FEMA aid generally may not duplicate insurance payouts, illegal aliens may not receive assistance, and no one may receive more than $25,000 for any single disaster.

Moreover, FEMA acted on many aid applications without even performing inspections. Given the volume of applications FEMA received during a span of several weeks, visiting each applicant's home would have been logistically impossible. Hence, after Hurricane Frances, FEMA automatically awarded $726 in housing assistance, without inspection, to any Miami-Dade County applicant who claimed to be displaced from his or her home and did not have

insurance. This procedure, known as Expedited Assistance, is usually applied on a local, rather than statewide, basis and may thus produce further regional disparities in disaster assistance.

The months following the hurricane season brought numerous allegations that FEMA wastefully mismanaged disaster funds (Harris, 2004), overlooked applicant fraud (Kestin, 2005), and was motivated by electoral concerns (O'Matz and Kestin 2005; and Fisher 2005). An audit conducted by the Department of Homeland Security found multiple overpayments to Miami-Dade County residents; some FEMA aid awards "were not based on actual disaster-related damages or losses," while other aid was simply awarded "based on undocumented verbal representations" (Department of Homeland Security, 2005).

FEMA officials publicly blamed a "computer glitch" for some of the overpayments (Associated Press, 2005). But Homeland Security officials suggested, in an interview with the *Washington Post*, that "FEMA's efforts to distribute funds quickly…were undertaken with a keen awareness of the coming presidential election" (Mintz, 2005). A former FEMA executive explained the electoral motives behind FEMA's apparent largesse in Florida:

> "They're [FEMA] doing a good job. And the reason why they're doing that job is because it's so close to the election, and they can't fuck it up, otherwise they lose Florida – and if they lose Florida, they might lose the election" (Elliston, 2004).

To explore the basis of these allegations, reporters from several Florida newspapers made repeated requests under the Freedom of Information Act (FOIA) to access records on each of the 2.6 million FEMA aid applicants. FEMA officials initially refused all of the FOIA requests. However, several federal lawsuits, culminating in the 11th US Circuit Court of Appeals' June 22, 2007 decision in *News-Press v. U.S. Department of Homeland Security* (No. 05-16771 and No. 06-13306), forced FEMA to provide detailed records on the street address of each applicant as well as the amount of aid awarded to each successful applicant.

I use these records to examine the distribution of FEMA aid during the 2004 hurricane season. I track the geographic location of each aid applicant and identify the voting precinct in which the applicant is located. I then analyze the effect of the FEMA aid on voters' behavior in the November 2004 Presidential election. Finally, I analyze the relative distribution of hurricane aid throughout Florida's 6,616 voting precincts, examining whether FEMA exhibited partisan bias in its distribution of aid.

The Effect of FEMA Aid on Individual Voter Turnout in November 2004

This section analyzes the effect of FEMA disaster assistance awards on individual voter turnout in November 2004. Florida voter history files, provided by counties' boards of elections, report each registered voter's history of turnout in the 2000, 2002, and 2004 general elections. By comparing the home address of each registered voter with the residential addresses listed on the FEMA disaster aid applications, I identify all registered voters in Florida whose household applied for FEMA aid during the 2004 hurricane season.

In this section's empirical models, I examine only registered voters whose residential household applied for FEMA aid prior to the November 2, 2004 general election. Further, I include only voters who were registered to vote in all general elections from 2000-2004. In Florida, 401,860 registrants satisfied all of these criteria and are included in this analysis.

Of these registrants, 299,699 (75%) cast ballots, either in person or by mail, for the 2004 general election. *Eq. 1* predicts a registrant's 2004 turnout using the registrant's history of turnout in the previous two elections, whether the registrant's FEMA application was approved for disaster aid, and hurricane severity at the registrant's home. The full logit model is:

$$\text{logit}\left[\Pr\left(\textit{Voted } 2004_i\right)\right] = \begin{cases} \alpha + \beta_{00} \cdot \left(\textit{Voted } 2000_i\right) + \beta_{02} \cdot \left(\textit{Voted } 2002_i\right) \\ + \beta_R \cdot \textit{Republican}_i + \beta_D \cdot \textit{Democrat}_i \\ + \beta_A \cdot \textit{Aid}_i + \beta_{RA} \cdot \left(\textit{Republican}_i \times \textit{Aid}_i\right) + \beta_{DA} \cdot \left(\textit{Democrat}_i \times \textit{Aid}_i\right) \\ + \beta_W \cdot \textit{Wind}_i + \beta_{RW} \cdot \left(\textit{Republican}_i \times \textit{Wind}_i\right) + \beta_{DW} \cdot \left(\textit{Democrat}_i \times \textit{Wind}_i\right) + \varepsilon_i, \end{cases} \quad \textbf{(1)}$$

where $\textit{Voted } 2000_i$, $\textit{Voted } 2002_i$, and $\textit{Voted } 2004_i$ indicates whether registrant *i* voted in each of the three general elections, $\textit{Republican}_i$ and $\textit{Democrat}_i$ are dummy variables for registered Republicans and Democrats, respectively, and $\textit{Aid}_i$ indicates whether *i*'s FEMA application was approved – that is, whether *i*'s household was awarded any amount of FEMA aid. The final row of *Eq. 1* controls for the severity of hurricanes experienced by each voter. Using GIS hurricane wind fields maps from the National Oceanographic and Atmospheric Administration (NOAA), I identify the wind vectors at each voter's home during each of the four hurricanes in 2004. In *Eq. 1*, $\textit{Wind}_i$ is the maximum wind speed, measured in *miles per hour*, observed at voter *i*'s residential address during the 2004 hurricane season. I also include interactive terms to allow for the possibility that a voter's reaction to severe hurricanes is conditional on partisanship.

In Table 1, Model 4 estimates *Eq. 1* using the full population of 401,860 registered voters. Models 1, 2, and 3 estimate *Eq. 1* using only registered Democrats, nonpartisans (excluding third-party registrants), and Republicans, respectively. Figure 1 graphically summarizes the most salient regression coefficients estimated in *Eq. 1*. The lower left plot in Figure 1 compares the relative turnout-boosting effect of a FEMA application approval for Democratic, nonpartisan, and Republican voters; these estimated effects

The results reveal that the awarding of FEMA aid significantly increases turnout among registered Republicans but has no significant effect on turnout among non-Republicans. For example, Model 3 predicts that for a Republican registrant who experienced 100 *mile per hour* winds and who did not vote in previous elections, a FEMA application approval increases his or

her probability of turnout in 2004 from 33% to 35%. For registered Democratic and nonpartisan voters, however, the approval of a FEMA application has no significant effect on turnout. Interestingly, more severe hurricane winds also causes a slight decrease in turnout, and this negative effect is approximately equivalent for all three groups of voters.

Finally, Model 5 accounts for the monetary size of each FEMA award, rather than simply whether each FEMA application was approved. Using the full population of 401,860 voters, Model 5 estimates *Eq. 1*, except that Aid_i is measured as: $\log(Dollars_i + 1)$, where $Dollars_i$ is the total amount of aid received by voter *i*'s household prior in 2004 prior to the November 2 election. Unity is added to $Dollars_i$ prior to logging because some FEMA applicants received zero dollars of aid. The estimated model reveals a similar pattern as before: Among registered Republicans, receiving more FEMA aid increases a voter's probability of turnout. However, FEMA award size has no effect on turnout among registered Democrats and nonpartisans.

If the additional Republican voters induced by disaster aid overwhelmingly favor Bush in the Presidential election, then the distribution of FEMA aid should produce a pro-Bush electoral effect in precincts with high concentrations of registered Republicans. Due to the secret ballot, however, it is impossible to verify whether each additional Republican voter induced by FEMA aid actually voted for Bush in November 2004. Instead, the following section analyzes publicly reported precinct-level vote counts to demonstrate that FEMA aid has a pro-Bush effect in Republican precincts, but significantly less effect in moderate and Democratic precincts.

Are Swing or Core Voters More Responsive to FEMA Aid?

Does FEMA aid buy off core voters or swing voters more efficiently? This section demonstrates that among historically Republican precincts, an increase in FEMA aid per capita

causes an increase in Bush's November 2004 vote share. By contrast, FEMA aid has significantly less effect on Bush's vote share in historically moderate and Democratic precincts.

To analyze the effect of FEMA aid on President Bush's 2004 reelection votes, I compare precinct-level vote counts from the post-hurricane November 2004 Presidential election and Jeb Bush's pre-hurricane November 2002 reelection. In 2002, Governor Bush won reelection by a margin of 56% to 43% over Democrat Bill McBride, while President Bush won Florida in November 2004 by a margin of 52% to 47% over Democrat John Kerry. While Jeb Bush is slightly more popular throughout Florida than George Bush, their precinct-level vote shares in 2002 and 2004, respectively, have a correlation of .93, and a regression of George Bush's 2004 precinct-level vote share onto Jeb Bush's 2002 vote share produces a R^2 of .92. Hence, throughout the remainder of this article, I use Jeb Bush's 2002 vote share as a pre-hurricane baseline measure of support for President Bush among Florida's precincts.

Sixty of Florida's sixty-seven counties redrew their voting precinct boundaries between the 2000 and 2002 elections. Consequently, precinct-level votes from the November 2000 Bush-Gore and the 2004 Bush-Kerry elections cannot be directly compared for most of Florida. By contrast, relatively few precincts changed boundaries between 2002 and 2004. I compare vote shares from all precincts in Florida: 1) that did not change geographic boundaries between the 2002 and 2004 elections; 2) that have provided vote counts for both elections; and 3) for which a Geographic Information Systems (GIS) map of the precinct boundaries is available. 4,830 (72%) of the 6,616 precincts in Florida satisfy these criteria and are included in this section's analysis.

Before analyzing FEMA aid's effect on Bush vote share, I first reproduce the previous section's main finding – that FEMA aid boosts turnout among Republicans, but not among

Democrats – at the precinct level. *Eq. 2* regresses November 2004 turnout among Florida precincts onto November 2002 turnout. The full model is:

$$Turnout04_i = \begin{cases} \alpha + \beta_T \cdot Turnout02_i + \beta_M \cdot I(Moderate_i) + \beta_R \cdot I(Republican_i) + \beta_F \cdot FEMA\ Aid_i \\ + \beta_{MF} \cdot [I(Moderate_i) \times FEMA\ Aid_i] + \beta_{RF} \cdot [I(Republican_i) \times FEMA\ Aid_i] + \beta_W \cdot Wind_i + \varepsilon_i, \end{cases} \quad \textbf{(2)}$$

where $Turnout02_i$ and $Turnout04_i$ are measured as the number of ballots cast in precinct i, divided by the total population of the precinct (2000 Census figures); $Moderate_i$ and $Republican_i$ are indicators for precincts in which Jeb Bush won 40% – 60% and over 60%, respectively, of the 2002 gubernatorial vote share; $FEMA\ Aid_i$ is measured as $\log(Dollars_i + 1)$, where $Dollars_i$ is the dollars of FEMA aid per capita that residents of precinct i received during 2004 prior to Election Day; and $Wind_i$ is the maximum wind speed observed at the geographic centroid of precinct i during the 2004 Florida hurricanes. All observations are weighted by population.

In Table 2, Model 1 estimates *Eq. 2* with only the 2002 turnout and wind speed predictors, while Model 2 estimates the full version of *Eq. 2*. The upper left plot in Figure 1 also summarizes the salient coefficients from estimating *Eq. 2*. The results reveal that FEMA aid exhibits a significantly positive effect on voter turnout in solidly Republican precincts. By contrast, in moderate and Democratic precincts, FEMA aid has only a slightly positive and statistically insignificant effect on turnout. These results provide further support for the individual voter-level turnout-buying effects found in the previous section.

Next, I analyze whether the additional Republican turnout induced by FEMA aid produces a pro-Bush electoral effect. If the additional Republican voters overwhelmingly support President Bush, then the relationship between FEMA aid and increased Bush vote share should be strongest in heavily Republican precincts and weakest in heavily Democratic precincts. Table

2 illustrates precisely this finding. Using precinct-level vote counts, *Eq. 3* regresses President Bush's 2004 share of the two-party vote onto Jeb Bush's 2002 vote share. The full model is:

$$Bush04_i = \begin{cases} \alpha + \beta_B \cdot Bush02_i + \beta_M \cdot I(Moderate_i) + \beta_R \cdot I(Republican_i) + \beta_F \cdot FEMA\ Aid_i \\ + \beta_{MF} \cdot [I(Moderate_i) \times FEMA\ Aid_i] + \beta_{RF} \cdot [I(Republican_i) \times FEMA\ Aid_i] + \beta_W \cdot Wind_i + \varepsilon_i, \end{cases} \quad \textbf{(3)}$$

where $Bush02_i$ and $Bush04_i$ are Jeb Bush's (2002) share and George Bush's (2004) share, respectively, of the two-party vote in precinct *i*, and all other variables are measured as before in *Eq. 2*. In Table 2, Model 3 estimates *Eq. 3* with only the 2002 Bush and wind speed predictors, while Model 4 estimates the full version of *Eq. 3*. Additionally, the upper right plot in Figure 1 summarizes the salient estimated coefficients in *Eq. 3*.

The Table 2 regression estimates reveal that the additional Republican voters induced by FEMA aid indeed enhance President Bush's 2004 vote share. The relationship between FEMA aid and Bush vote share parallel the relationship between FEMA aid and voter turnout. Model 4 predicts that among solidly *Republican* precincts, a 25% increase in FEMA aid results in a 0.38 percentage increase in Bush vote share; the 95% confidence interval for the estimate is 0.31 to 0.44 percentage points. Hence, in these precincts, the distribution of FEMA aid buys new votes for Bush by inducing more registered Republicans to turn out on Election Day. The estimated coefficients in Model 4 imply that in an average Republican precinct, the cost of buying each new Bush vote is approximately $7,000 of FEMA aid.

Among *Moderate* precincts, a 25% increase in FEMA aid produces only a 0.13 percentage increase in Bush vote share, with a confidence interval of 0.06 to 0.19 percentage points. Here, FEMA aid has a relatively smaller effect because moderate precincts have lower concentrations of registered Republican voters; hence, FEMA aid's positive effect on Republican turnout is diluted by registered Democrats and nonpartisans, whose behavior appears unaffected by FEMA aid.

Finally, among *Democratic* precincts, FEMA aid has no statistically significant effect on Bush vote share. Model 4 estimates that a 25% increase in FEMA aid produces between a -0.05 to +0.03 percentage change in Bush vote. This insignificant result, combined with the individual voter-level analysis, demonstrates that FEMA aid affects neither the turnout behavior nor the actual vote choices of registered Democrats.

[FIGURE 3 ABOUT HERE]

To illustrate the striking difference in Republican versus non-Republican responsiveness to FEMA aid, Figure 3 presents three separate plots of precinct-level vote share data in Democratic, moderate, and Republican precincts. In each plot, the vertical axis measures each precinct's residual Bush vote share when George Bush's (2004) precinct-level is regressed onto Jeb Bush's (2002) vote shares. In other words, the residual vote share measures each precinct's *unexpected* support for President Bush in 2004, given the precinct's past pre-hurricane history of Republican voting. The horizontal axis in each plot measures each precinct's *FEMA Aid Per Capita*, and the dashed line in each plot represents the population-weighted least squares fit. For both Democratic and moderate precincts, the slope of the least squares line is relatively close to zero, indicating no relationship between FEMA aid and increased support for President Bush. Only the third plot, containing Republican precincts, yields a noticeably positive slope, reflecting Republican voters' unique electoral sensitivity to FEMA aid.

Hurricane Winds as Instruments for FEMA Aid

Could the main empirical finding from Table 2 – that Republican voters are more easily bought off than moderate or Democratic voters – have been caused by an omitted variable? For example, one possibility is that politically sophisticated residents were unusually aggressive in

pursuing FEMA money and were also more likely to increase their support for President Bush between 2002 and 2004. Under such circumstances, we might observe a positive correlation among Republican voters between receiving FEMA aid and increased support for Bush, even if the former did not cause the latter.

To address such omitted variables, I instrument for FEMA aid using the three spatial wind measurements collected during each of the four Florida hurricanes during summer 2004. Following Houston and Powell (2003), these measurements are the *Maximum Wind Speed* recorded during each hurricane, the *Steadiness* of the wind direction, and the *Duration*, in hours, of any wind above 50 meters per second. Collectively, these three measurements are referred to as the *Wind Fields* of each hurricane. In general, higher values of *Maximum Wind Speed* and *Duration* and lower values of *Steadiness* indicate greater hurricane severity and closer proximity to the center of each storm.

In this section, these twelve *Wind Fields* measurements (three variables per hurricane) are used to instrument for the amount of FEMA aid delivered to each Florida precinct. The regression model in Figure 2 establishes the statistically strong relationship between severe hurricane winds and the distribution of FEMA aid. The intuition behind using hurricane winds as an instrument is that political considerations may have caused neighborhood differences in FEMA aid but could not possibly have caused local differences in hurricane severity; the geographic path of each hurricane through different parts of Florida is exogenous to politics.

A regression of each precinct's *Logged FEMA Aid Per Capita* onto its *Wind Fields* measurements demonstrates that hurricane wind severity satisfies one important criterion for a valid instrument: The *Hurricane Wind Fields* variables collectively explain nearly 58% of the variation in FEMA aid, reflecting that FEMA generally awards more assistance to victims closer

to the center of each hurricane's path. To be a valid instrument, however, hurricane severity should ideally also have no causal effect on Bush's 2004 vote share, except possibly through its influence on FEMA aid.

Does hurricane severity satisfy this second criterion for a valid instrument? Achen and Bartels (2002) find that voters may irrationally punish incumbent politicians for natural disasters that occur under their watch. If Florida voters indeed reacted negatively to the mere occurrence of severe storms, then hurricane severity would not be an ideal instrument because stronger hurricane winds would have a negative causal effect on support for President Bush's reelection.

The regression estimates of Table 2 significantly support the hypothesis that greater hurricane severity causes a decrease in turnout and in support for Bush, *ceteris paribus*. Consistent with Achens and Bartels (2002), an increase in a precinct's maximum wind speed by 10 *miles per hour* is associated with a 0.005 decrease in turnout rate and a 0.009 decrease in Bush vote share. In Republican precincts, however, a generous distribution of FEMA aid can more than compensate for these turnout and vote decreases. Models 4 – 5 in Table 1 reveal that this turnout decrease is approximately equivalent for both Republicans and non-Republicans.

As wind severity appears to independently cause a decrease in Bush support, wind is therefore not an ideal instrument for FEMA aid and will not produce a consistent estimate of FEMA aid's effect on Bush votes. Instead, the fact that voters punish Bush for severe winds will cause a *downward bias* in estimating the effect of FEMA aid on Bush vote share under the instrumental variables (IV) approach. Precincts experiencing more severe winds receive more FEMA aid. By failing to account for the negative causal effect of severe winds on Bush votes, the IV approach will conservatively underestimate the positive relationship between FEMA aid and increased Bush vote share.

However, an important aim of this article is to establish the positive causal effect of FEMA aid on increased Bush votes in Republican precincts. Therefore, the downward bias of the IV estimate is a tolerable nuisance, provided that the IV estimator still reveals a positive relationship between FEMA aid and Bush support in Republican precincts. Furthermore, as noted earlier, the primary motivation for the IV approach is to address the possibility of omitted variable bias by using an instrument, hurricane wind severity, that could not have been caused by political factors. If the IV estimator still reveals a significantly positive relationship between FEMA aid and Bush support in Republican precincts, then we may conclude that omitted variable bias is not problematic. Hence, this section presents IV estimates, even if not consistent.

Table 3 presents two stage least squares (TSLS) estimates of FEMA aid's effect on Bush's 2004 vote share. In the first stage regression, *Logged FEMA Aid Per Capita* is regressed onto the twelve *Hurricane Wind Fields* variables. The second stage regression uses instrumented values of FEMA aid to predict Bush vote share. The second stage model is:

$$Bush04_i = \begin{cases} \alpha + \beta_B \cdot Bush02_i + \beta_D \cdot I(Moderate_i) + \beta_R \cdot I(Republican_i) + \beta_A \cdot Predicted\ Aid_i \\ + \beta_{MA} \cdot [I(Moderate_i) \times Predicted\ Aid_i] + \beta_{RA} \cdot [I(Republican_i) \times Predicted\ Aid_i] + \varepsilon_i, \end{cases} \quad \textbf{(4)}$$

where *Predicted Aid* represents the predicted values of *Logged FEMA Aid Per Capita* from the first stage regression. As before, $Bush02_i$ and $Bush04_i$ are Jeb Bush's (2002) share and George Bush's (2004) share, respectively, of the two-party vote in precinct *i*, and $Moderate_i$ and $Republican_i$ are indicators for moderate (40% – 60% Jeb Bush vote share in 2002) and Republican (over 60% Jeb Bush vote share) precincts.

[TABLE V ABOUT HERE.]

In Table 3, Model 4 estimates *Eq. 3* using the full set of Florida precincts, while Models 1 – 3 examine only Democratic, moderate, and Republican precincts, respectively. Overall, the TSLS estimates corroborate the previous finding that FEMA aid effectively purchases new Bush

votes in Republican precincts, whereas voters in moderate and Democratic precincts are more difficult to buy off.

Specifically, Model 3 predicts that in Republican precincts, a 25% increase in predicted FEMA aid per capita causes a 0.28 percentage increase in Bush vote share, and the 95% confidence interval for this estimate is 0.24 to 0.33. Though significantly positive, this estimate is relatively smaller than the estimated effect from Table 4, reflecting the previously discussed downward bias of the IV estimator resulting from voters' tendency to punish Bush for severe hurricanes. Nevertheless, the IV estimator demonstrates that the main result of Table 2 – the positive relationship between FEMA aid and increased Bush votes in Republican precincts – is not solely due to omitted variable bias.

Furthermore, the TSLS estimates in Table 3 echo the earlier finding that voters in Democratic and moderate precincts are relatively more difficult to buy off than voters in Republican precincts. Models 1 – 2 reveal that in Democratic and moderate precincts, predicted FEMA aid exhibits no significant effect on changes in Bush vote share. In fact, the estimated coefficients for these precincts are slightly and insignificantly negative, perhaps reflecting that voters blame Bush after experiencing severe winds. Collectively, these results confirm the earlier finding that the most efficient vote-buying strategy for the Bush administration is to offer monetary rewards to core Republican neighborhoods, rather than attempting to sway moderate voters or convert Democrats with rewards.

Pro-Republican Bias in the Distribution of FEMA Aid

Did the Bush administration exploit this partisan asymmetry in voter responsiveness to FEMA aid by strategically awarding more aid to Republican neighborhoods? This section

analyzes the amount of FEMA aid distributed to each of Florida's 6,616 voting precincts. While FEMA eventually distributed over $1.2 billion to Florida hurricane victims, only $814 million, or $50.95 per capita, was awarded prior to the November 2004 elections. Throughout this section, I analyze only pre-election FEMA assistance, as post-election awards could not have influenced voters' behavior in the presidential election. Figure 4 graphically describes summary statistics. The average precinct has a population of 2,416 residents and an area of 9.9 square miles. In Table 4, I control for hurricane severity in each precinct by including a vector of three *Wind Fields* for each of the four Florida hurricanes. I also examine the effects of partisanship and demographic factors on FEMA aid.

[FIGURE 4 ABOUT HERE]

The regression models in Figure 5 explore whether hurricane severity or resident characteristics might account for the partisan disparity in FEMA aid. I examine the amount of FEMA aid, expressed in logged per capita terms, awarded at the voting precinct level. The distribution of aid across precincts is heavily right-skewed, with areas near the eye of each hurricane receiving very large shares of the money. The basic WLS model is:

$$log\left(\frac{FEMA\ Aid_i}{Population_i}+1\right)=\alpha+\beta_R\cdot Republican_i+\boldsymbol{\beta_X}\cdot\mathbf{X}_i+\boldsymbol{\beta_W}\cdot\mathbf{Wind}_i+\varepsilon_i, \qquad \textbf{(1)}$$

where *FEMA Aid* is the total dollars of aid received by residents of precinct *i*, *Republican* is Jeb Bush's share of the 2002 Gubernatorial vote in the precinct, and *Wind* is a vector of the 12 *Wind Field* measurements for the four hurricanes; once again, observations are weighted by precinct population. The vector ***X*** includes eleven control variables. The first five of these controls are correlates of wealth; overall, wealthier individuals are less likely to qualify for FEMA aid because they are more likely to have insurance. I control for each precinct's *Median Household Income* (1999 US$), *Mean House Value*, the proportion of households occupied by *Homeowners*,

and the amount of *Welfare* received per capita. The six remaining control variables are the proportion of the precinct that is a *Racial Minority* (including Blacks and ethnic Hispanics), the proportion of households that are primarily *Spanish Speaking* or speak *Other Foreign Languages*, the proportion that is *Native Floridian*, the proportion that live in *Urban* areas, and the number of *FEMA Applications* per capita. While there is no reason to suspect racial bias, it is possible that the numerous native Spanish speakers in Florida may have more difficulty navigating the FEMA application process. Equally, native Floridians may be at an advantage because of their experiences during past hurricanes.

[FIGURE 5 ABOUT HERE]

In Figure 5, Model 1 estimate *Eq. 1*, and Model 2 additionally includes the interactive term *Republican* × *Median Household Income*. Overall, the results reveal that Republican precincts receive significantly more FEMA aid on a per capita basis, even after controlling for resident demographics and the degree of hurricane severity in each precinct. Model 1 predicts that a solidly Republican precinct (75% support for Jeb Bush in 2002) receives 74.1% more FEMA aid than a solidly Democratic precinct (25% support for Jeb Bush). In comparison to a moderate precinct (50% Jeb Bush support), the solidly Republican precinct receives 31.9% as much aid. In Model 2, the coefficient for *Republican* × *Median Household Income* is significantly positive, indicating that although the pro-Republican bias exists at all income levels, the partisan gap is even wider among wealthier precincts.

A possible explanation for the disproportionately pro-Republican distribution of aid is that Republican residents may have been more likely than Democrats to apply for FEMA assistance, given equal levels of hurricane damage. To address this possibility, Models 3 and 4 in Figure 5 examine the amount of *FEMA Aid* awarded per *Application* filed. The WLS model is:

$$log\left(\frac{FEMA\ Aid_i}{Applications_i}+1\right)=\alpha+\beta_R\cdot Republican_i+\boldsymbol{\beta_X}\cdot\mathbf{X}_i+\boldsymbol{\beta_W}\cdot\mathbf{Wind}_i+\varepsilon_i, \quad \textbf{(2)}$$

where the covariates are identical to those in *Eq. 1*, except that the vector ***X*** now excludes *FEMA Applications*. In Figure 5, Model 3 estimates *Eq. 2*, while Model 4 additionally includes the interactive term *Republican* × *Median Household Income*.

The Model 3 and Model 4 estimates reveal that a FEMA application from a Republican precinct is awarded significantly more aid than a Democratic application, *ceteris paribus*. Overall, households requesting FEMA aid received an average of $919.28 in assistance prior to the November 2004 election. However, Model 3 predicts that FEMA awards 41.9% more aid to an applicant from a Republican precinct than one from a Democratic precinct, even after controlling for hurricane severity and resident demographics. Likewise, a Republican applicant receives 19.1% more aid than an applicant from a moderate precinct. These results illustrate that the pro-Republican bias in disaster aid per capita results partially from FEMA's more favorable treatment of Republican applications.

How much disaster aid did the pro-Republican bias affect? Suppose that FEMA's distribution of aid had been blind to partisanship (but not blind to hurricane severity and resident demographics), and every precinct had been treated as if it were a solidly Democratic (25% Jeb Bush support) precinct. Then under the Model 1 estimates of Table 6, Republican precincts would have collectively received $200 million, or $19.08 per capita, less in FEMA aid. That is, the pro-Republican bias accounted for 24.6% of all pre-election FEMA aid distributed in 2004.

Discussion

The empirical results of this article demonstrate that a political party's most efficient vote-buying strategy is to target pre-election monetary awards to its core partisan supporters in

the hopes of increasing their turnout rate, thus enhancing the party's vote share. In the case of Florida, each additional $7,000 of FEMA aid purchases one new Bush vote in Republican neighborhoods. By contrast, offering monetary rewards to swing voters or to the opposing party's supporters is significantly less effective at influencing their turnout and vote choices.

While it is impossible to prove whether the Bush administration acted with electoral motives in mind, FEMA's overwhelmingly pro-Republican bias in its distribution of hurricane disaster aid is consistent with a strategy of buying the votes of core partisan supporters. Furthermore, FEMA documents reveal that agency officials were not oblivious to the electoral consequences of their handling of the Florida hurricane disasters. For example, a FOIA request by the *South Florida Sun-Sentinel* uncovered a September 2, 2004 internal memo by FEMA consultant Glenn Garcelon, written just before Hurricane Frances made landfall. Garcelon's memo, entitled "Hurricane Frances – Thoughts and Suggestions," discusses the importance of FEMA avoiding public blame for the inevitable disasters, suggesting that:

> "Communication consultants from the President's re-election campaign should be brought in…This is going to be a huge mess" (O'Matz and Kestin, 2005).

How did the Bush administration control the geographic targeting of FEMA aid? As noted earlier, FEMA enjoys significant latitude in both its policy implementation and in its handling of individual FEMA applications, hence affording many opportunities for partisan manipulation. Perhaps more importantly, though, the President may directly influence the distribution of aid through strategically selective county-by-county disaster declarations. Maps 1 and 2 describe one illustrative example.

[MAP 1 ABOUT HERE]

Map 1 illustrates the maximum wind speeds observed in Florida from Hurricane Charley and Tropical Storm Bonnie during August 9-15, 2004, the first declared disaster of the 2004

Atlantic hurricane season (FEMA Disaster #1539). The bright pink areas in Map 1 represent the highest measured winds of over 130 miles per hour, showing that Hurricane Charley entered Florida's Gulf coast through Cape Coral, traveled northeast across the state, and exited Florida's Pacific coast just south of Daytona Beach.

The green dots on Map 1 depict the geographic locations of all Florida residents who applied for and successfully received disaster aid under FEMA disaster #1539. Overall, Map 1 illustrates that most FEMA aid recipients are true victims residing relatively close to the center of Hurricane Charley's path. However, the upper left corner of Figure 3 also reveals two rural counties – Dixie County and Levy County – containing a puzzling number of FEMA aid recipients. The recipients in these two counties are puzzling because both counties are located far from Hurricane Charley's path, experiencing maximum winds of under 30 miler per hour and only mild rainfalls. Many counties closer to the hurricane center had fewer or no FEMA aid recipients. Table 4 lists weather reports from Dixie and Levy counties during August 9-15.

[TABLE 4 ABOUT HERE]

While all 67 Florida counties were declared disaster counties under Hurricane Charley, President Bush declared only 26 of the counties eligible for individual disaster aid under the Individuals and Households Program, the type of assistance examined in this article. In the remaining 41 counties, only local governments were eligible to request public assistance. Map 2 illustrates the geographic location, relative to Hurricane Charley's path, of the 26 counties whose residents were declared eligible to apply for individual FEMA aid. The map shows Dixie and Levy as two outlying counties declared eligible for individual aid, even though both counties were far away from the center of the storm. In fact, Map 2 reveals a row of counties,

immediately to the southwest of Levy County, that were closer to Hurricane Charley's path but were *not* declared eligible for individual FEMA aid.

These outlier presidential declarations explain why FEMA awarded individual aid to several recipients in hurricane-unaffected Dixie and Levy counties, while raising new questions about the disaster declaration decisions. While neither the White House nor FEMA has offered a county-by-county justification of the disaster declarations, the fact that Dixie County and Levy County are Republican strongholds, voting 69% and 63% for President Bush in 2004, respectively, raises questions concerning the partisan neutrality of the FEMA aid distribution. Such questions arise, in part, because of Garrett and Sobel's (2003) finding that presidential disaster declarations are more frequent in states of higher electoral importance, as well as Downton and Pielke's (2001) finding that presidential disaster declarations spike during years in which the president is running for reelection. The FEMA aid distribution examined in this article occurred just prior to a presidential election and in a key battleground state contested during the election campaign.

If the Bush administration directed more disaster aid to Republican applicants, then how much did this strategy affect election outcomes? As noted earlier, Model 1 of Figure 5 estimates that Republican precincts collectively received $200 million more than they would have under a partisan-blind distribution of aid. Using these estimates, the fitted coefficients of Model 4 in Table 2 imply that this excess aid to Republican precincts was responsible for increasing President Bush's November 2004 vote count by slightly under 20,000 votes. However, President Bush won Florida in 2004 by a margin of over 380,000 votes, so it is quite unfathomable that the pro-Republican bias in Florida FEMA aid could have altered the outcome of the election.

This research offers three contributions to the study of distributive politics. *First*, the empirical findings directly address the frequently disputed question of whether swing voters or core voters are more responsive to distributive benefits. In Florida, individual aid recipients included both swing and core voters because the distribution of FEMA aid is driven largely by exogenous events – the geographic paths of hurricanes. This article's findings demonstrate that the positive turnout effect from buying off core voters significantly outweighs any vote-buying effect in moderate or opposed precincts. In sum, pre-election monetary awards appear to primarily affect *whether* core supporters vote, offering empirical support for the mobilization and turnout-buying theories of Cox (2007), Nichter (2008), and Dunning and Stokes (2008).

Second, this article illustrates that the classic machine politics style of buying votes is not limited to developing democracies and can occur in spite of the secret ballot. In the case of Florida, the process of using FEMA aid to buy Republican votes is reminiscent of the Peronist party's use bags of food to buy off Argentinean voters, as documented by Stokes (2005). Additionally, this article demonstrates that the use of public spending to buy votes need not be limited to traditional pork barrel spending, such as highway construction projects (Levitt and Snyder 1995). The literature has generally considered individual entitlement programs, such as social security and welfare payments, to not be an instrument of pork barreling (eg, Kamlet and Mowery 1987). However, this article suggests that individual payouts from the federal government can be politically manipulated and can serve to efficiently buy votes at a rate comparable to Levitt and Snyder's (1997) finding that $14,000 of pork purchases one new vote in congressional elections.

Finally, these findings demonstrate that we cannot fully understand the electoral effects of distributive politics without recognizing the mediating role of voter ideology. Voters'

ideologies and their enjoyment of distributive benefits are not merely two independent forces that separately influence voters' choices. Rather, the effects of ideology and distributive benefits on voters are interactive: A party's monetary award to a voter is more likely to buy electoral support if the voter is also ideologically predisposed to supporting the party. Hence, buying turnout among core supporters is likely to be a more effective electoral strategy than attempting to convert the potential supporters of an opposing party.

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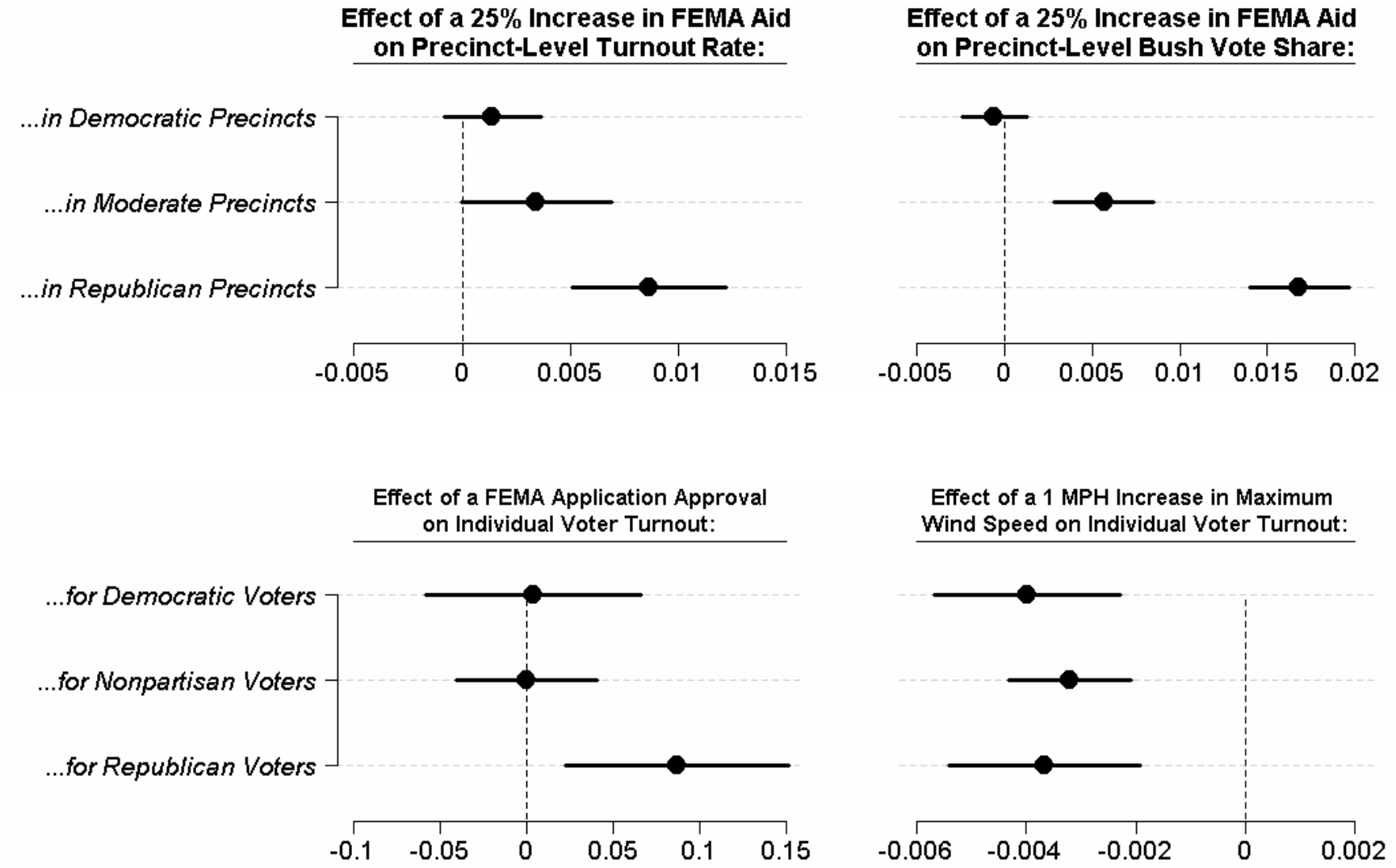
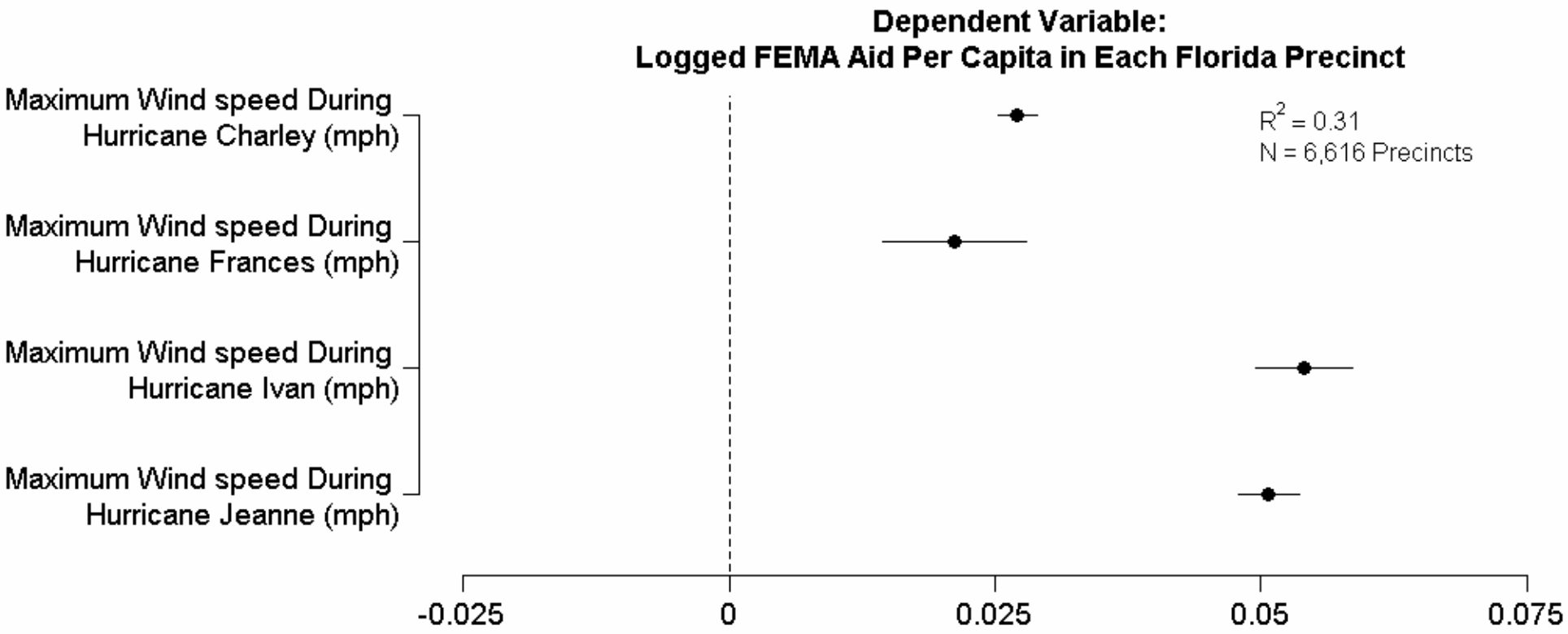
Figure 1: Regression Estimates of the Effect of FEMA Aid on Voter Behavior



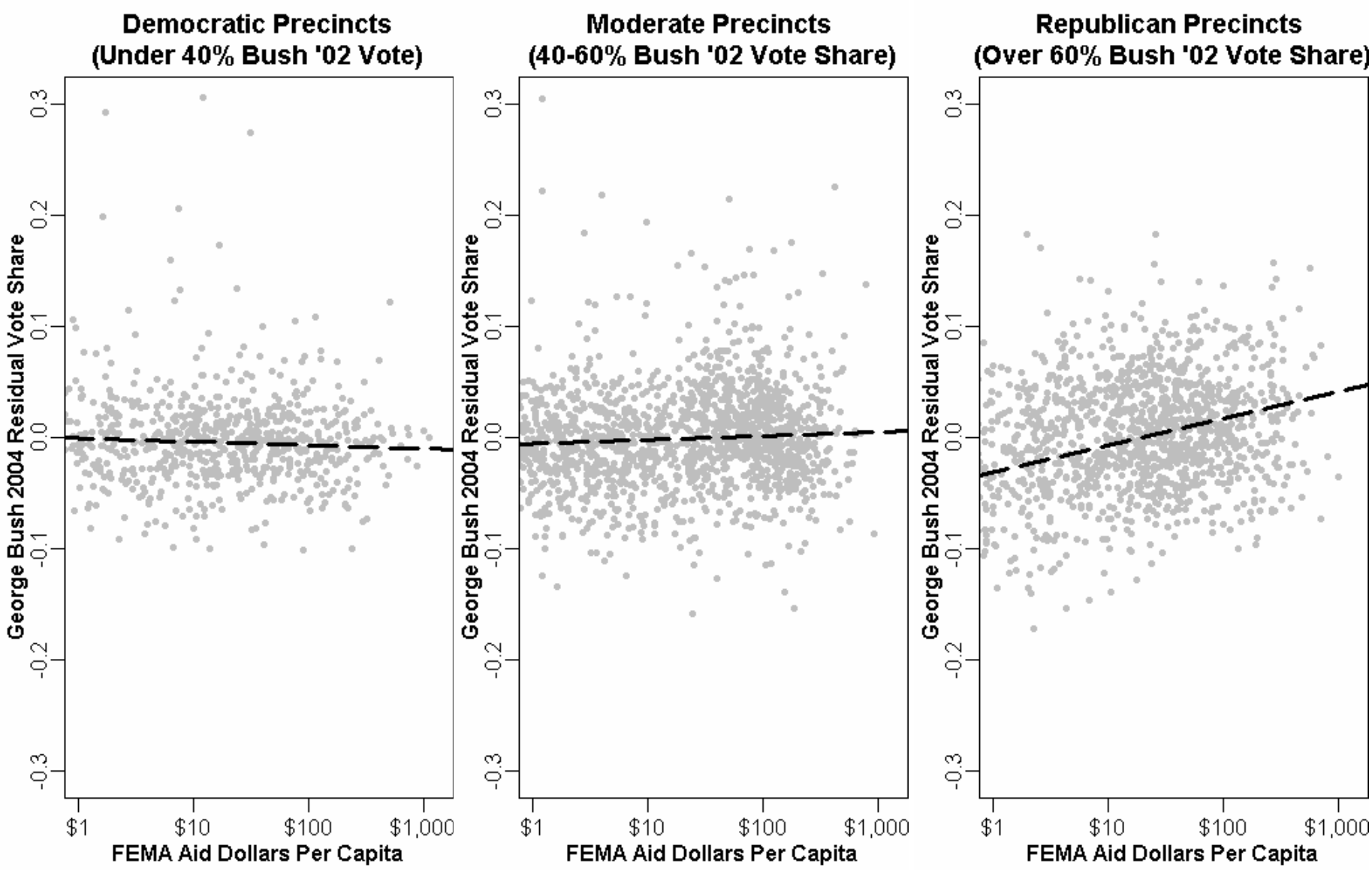
Note: The estimated effects in the upper left plot are from the regression results of Model 2 of Table 2. The effects n the upper right plot are from Model 4 of Table 2. The effects in the lower two plots comes from Model 4 of Table 1. Bars represent 95% confidence intervals.

Figure 2: Regression Estimates of the Effect of Hurricane Winds on FEMA Aid



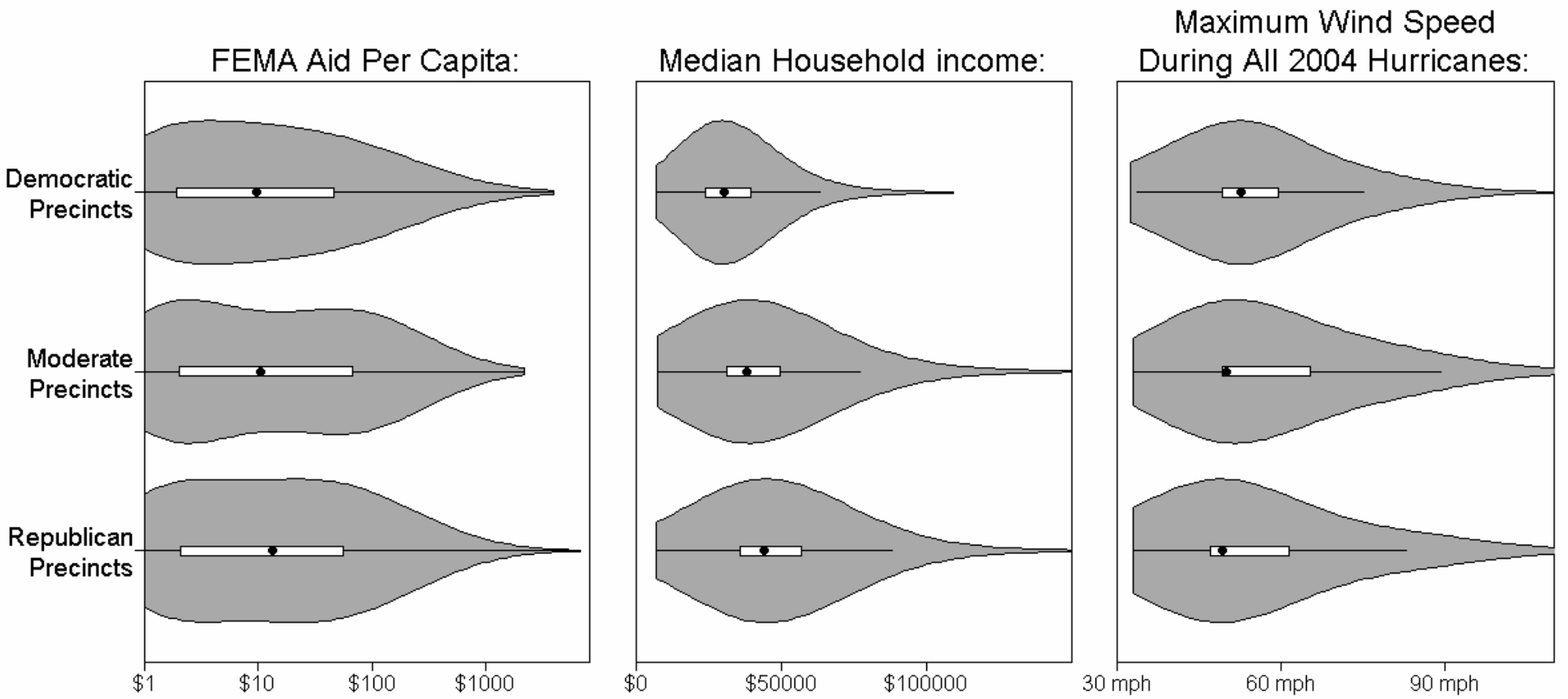
Note: This regression model illustrates that precincts that suffered more severe hurricane winds in each of the four hurricanes typically receive more FEMA aid. Observations are weighted by precinct population. The dependent variable is: $\log(Dollars_i + 1)$, where $Dollars_i$ is the number of dollars per capita in FEMA aid received by residents of precinct *i*. Plotted points are regression coefficient estimates, and bars represent 95% confidence intervals. A constant is included in the model but not reported here.

Figure 3: George Bush (2004) Vote Share Residuals



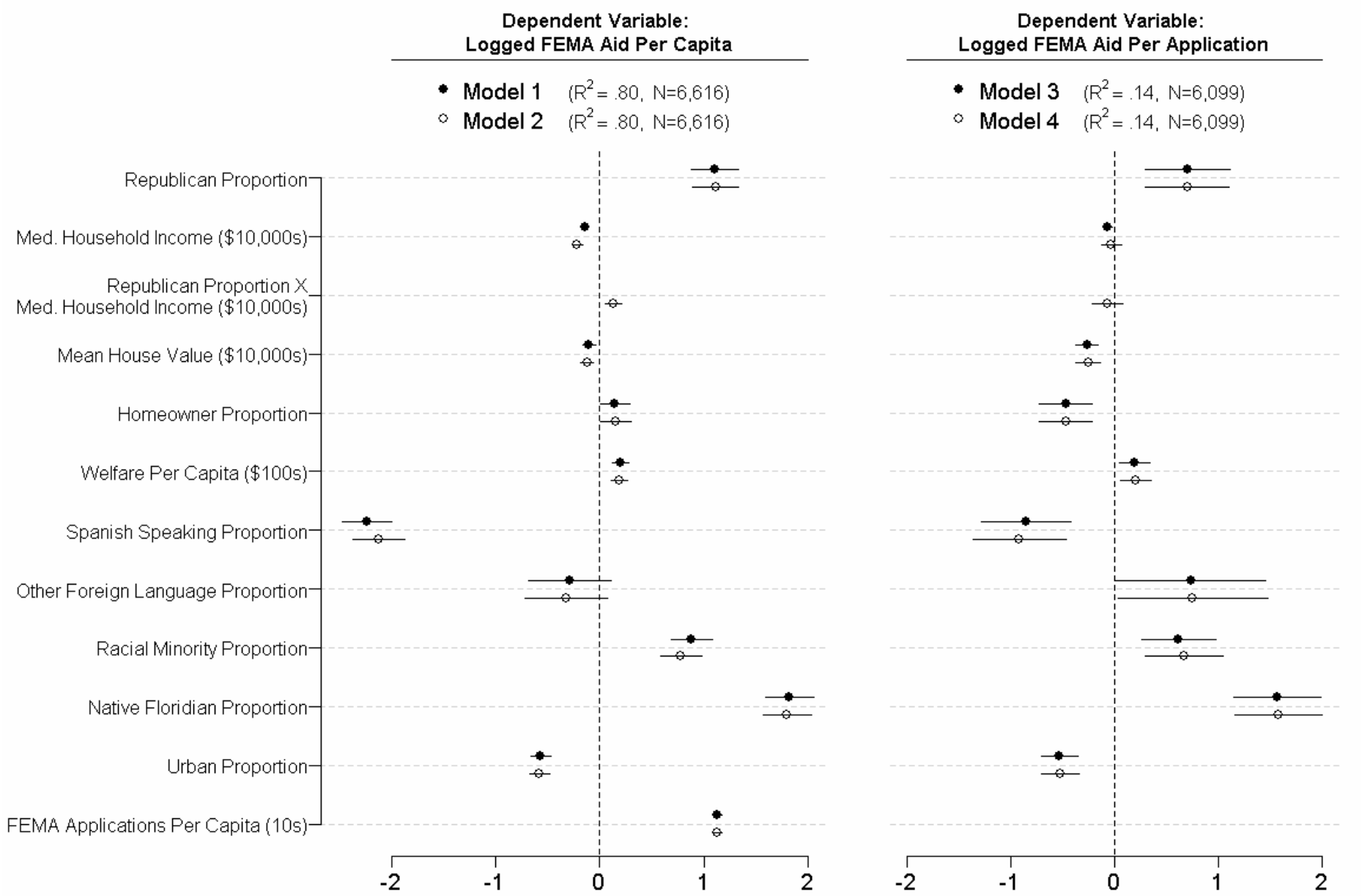
Note: The vertical axes measure the residuals from the regression: $Bush04_i = \alpha + \beta \cdot JebBush02_i + \varepsilon_i$, where *Bush*04i and *JebBush*02i are Jeb and George Bush's precinct-level vote shares from the 2004 and 2002 general elections, respectively.

Figure 4: Summary Statistics



Note: This figure illustrates the distribution of FEMA aid, income, and maximum hurricane winds across all Florida's 6,616 precincts. Republican precincts are those in which Jeb Bush won over 60% of the 2002 gubernatorial two-party vote, while Democratic precincts are those with fewer than 40% voting for Jeb Bush.

Figure 5: Regression Estimates of the Determinants of FEMA Aid in Florida Precincts



Note: Observations are weighted by precinct population. Models 3–4 include only precincts that submitted at least one FEMA aid application. Bars represent 95% confidence intervals. All models include the twelve *Wind* Field variables for the four hurricanes, but coefficients are not displayed here. A constant is included in each model but not displayed here.

Table 1: Logit Regression of Voter Turnout in Florida Among FEMA Aid Applicants

	Dependent Variable: Voted in November 2004 General Election				
	Model (1)	**Model (2)**	**Model (3)**	**Model (4)**	**Model (5)**
Voters Included:	Democrats	Nonpartisans	Republicans	All Voters	All Voters
FEMA Application Approved	0.0034 (0.0127)	0.0112 (0.0255)	0.0873*** (0.0150)	-0.0002 (0.0208)	-----
FEMA Application Approved × Registered Republican	-----	-----	-----	0.0872*** (0.0256)	-----
FEMA Application Approved × Registered Democrat	-----	-----	-----	0.0040 (0.0243)	-----
Logged FEMA Aid Dollars	-----	-----	-----	-----	-0.0052 (0.0029)
Logged FEMA Aid Dollars × Registered Republican	-----	-----	-----	-----	0.0138*** (0.0036)
Logged FEMA Aid Dollars × Registered Democrat	-----	-----	-----	-----	0.0010 (0.0034)
Voted in November 2000 General Election	1.4868*** (0.0137)	1.4913*** (0.0271)	1.4195*** (0.0164)	1.4610*** (0.0095)	1.4602*** (0.0095)
Voted in November 2002 General Election	1.7633*** (0.0141)	1.7857*** (0.0318)	1.8815*** (0.0165)	1.8160*** (0.0099)	1.8155*** (0.0099)
Maximum Wind Speed (*M.P.H.*)	-0.0040*** (0.0003)	-0.0042*** (0.007)	-0.0037*** (0.0004)	-0.0032*** (0.0006)	-0.0032*** (0.0006)
Registered Republican × Maximum Wind Speed	-----	-----	-----	-0.0005 (0.0007)	-0.0005 (0.0007)
Registered Democrat × Maximum Wind Speed	-----	-----	-----	-0.0008 (0.0007)	-0.0008 (0.0007)
Registered Republican	-----	-----	-----	0.2158*** (0.0544)	0.2132*** (0.0543)
Registered Democrat	-----	-----	-----	0.0862 (0.0510)	0.0844 (0.0510)
Constant	-0.4822*** (0.0263)	-0.4949*** (0.0513)	-0.3563*** (0.0328)	-0.5710*** (0.0442)	-0.5522*** (0.0442)
Pseudo R^2	0.38	0.39	0.36	0.39	0.39
N	184,942	38,105	158,964	401,860	401,860

***p<.001; **p<.01; *p<.05 (two-tailed)

Note: The data include all registered voters in Florida whose household applied for FEMA disaster aid in summer 2004 and who were registered to vote in all November general elections in 2000, 2002, and 2004

Table 2: WLS Regression: The Effect of FEMA Aid on Voter Turnout and Bush Votes Among Florida Precincts

	Dependent Variable: 2004 Voter Turnout ×*100*		*Dependent Variable:* *2004 George Bush Vote Share ×100*	
	Model (1)	**Model (2)**	**Model (3)**	**Model (4)**
2002 Voter Turnout	91.443*** (0.801)	89.973*** (0.836)	-----	-----
2002 Jeb Bush Vote Share	-----	-----	91.093*** (0.395)	89.722*** (0.926)
Logged FEMA Aid Per Capita × Republican Precinct Indicator	-----	0.727*** (0.141)	-----	1.739*** (0.111)
Logged FEMA Aid Per Capita × Moderate Precinct Indicator	-----	0.205 (0.135)	-----	0.627*** (0.110)
Logged FEMA Aid Per Capita	-----	0.140 (0.115)	-----	-0.058 (0.094)
Republican Precinct Indicator (*Jeb Bush Vote Share* > 0.60)	-----	-0.789 (0.428)	-----	-3.239*** (0.520)
Moderate Precinct Indicator (0.40 ≤ *Jeb Bush Vote Share* ≥ 0.60)	-----	0.622 (0.424)	-----	-1.169** (0.389)
Maximum Wind Speed (*M.P.H.*)	-0.014* (0.006)	-0.050*** (0.008)	-0.027*** (0.005)	-0.089*** (0.006)
Constant	6.357*** (0.413)	7.595*** (0.543)	3.147*** (0.388)	6.953*** (0.488)
R^2	0.73	0.74	0.92	0.93
N	4,830	4,830	4,830	4,830

***p<.001; **p<.01; *p<.05 (two-tailed)

Note: Observations are weighted by precinct population. *Voter Turnout* is measured as the number of ballots cast, divided by the total population (2000 Census figures) in each precinct.

Table 3: TSLS Second Stage Regression: The Effect of FEMA Aid on Bush Vote Share Among Florida Precincts

	Dependent Variable: 2004 George Bush Vote Share ×100			
	Model (1)	**Model (2)**	**Model (3)**	**Model (4)**
Precincts Included:	Democratic Precincts	Moderate Precincts	Republican Precincts	All Precincts
2002 Jeb Bush Vote Share	90.076*** (1.174)	102.119*** (1.879)	80.474*** (1.922)	89.503*** (0.918)
Predicted Logged FEMA Aid Per Capita (*Predicted from first stage regression*)	-0.020 (0.140)	-0.021 (0.074)	1.262*** (0.104)	0.002 (0.156)
Predicted Logged FEMA Aid Per Capita × Republican Precinct Indicator	-----	-----	-----	1.396*** (0.180)
Predicted Logged FEMA Aid Per Capita × Moderate Precinct Indicator	-----	-----	-----	0.025 (0.175)
Republican Precinct Indicator (*Jeb Bush Vote Share* > 0.60)	-----	-----	-----	-2.336*** (0.649)
Moderate Precinct Indicator (0.40 ≤ *Jeb Bush Vote Share* ≥ 0.60)	-----	-----	-----	0.234 (0.515)
Constant	1.771*** (0.421)	-4.346*** (0.977)	6.121*** (1.438)	1.839*** (0.423)
R^2	0.85	0.59	0.50	0.92
N	1,036	2,051	1,743	4,830

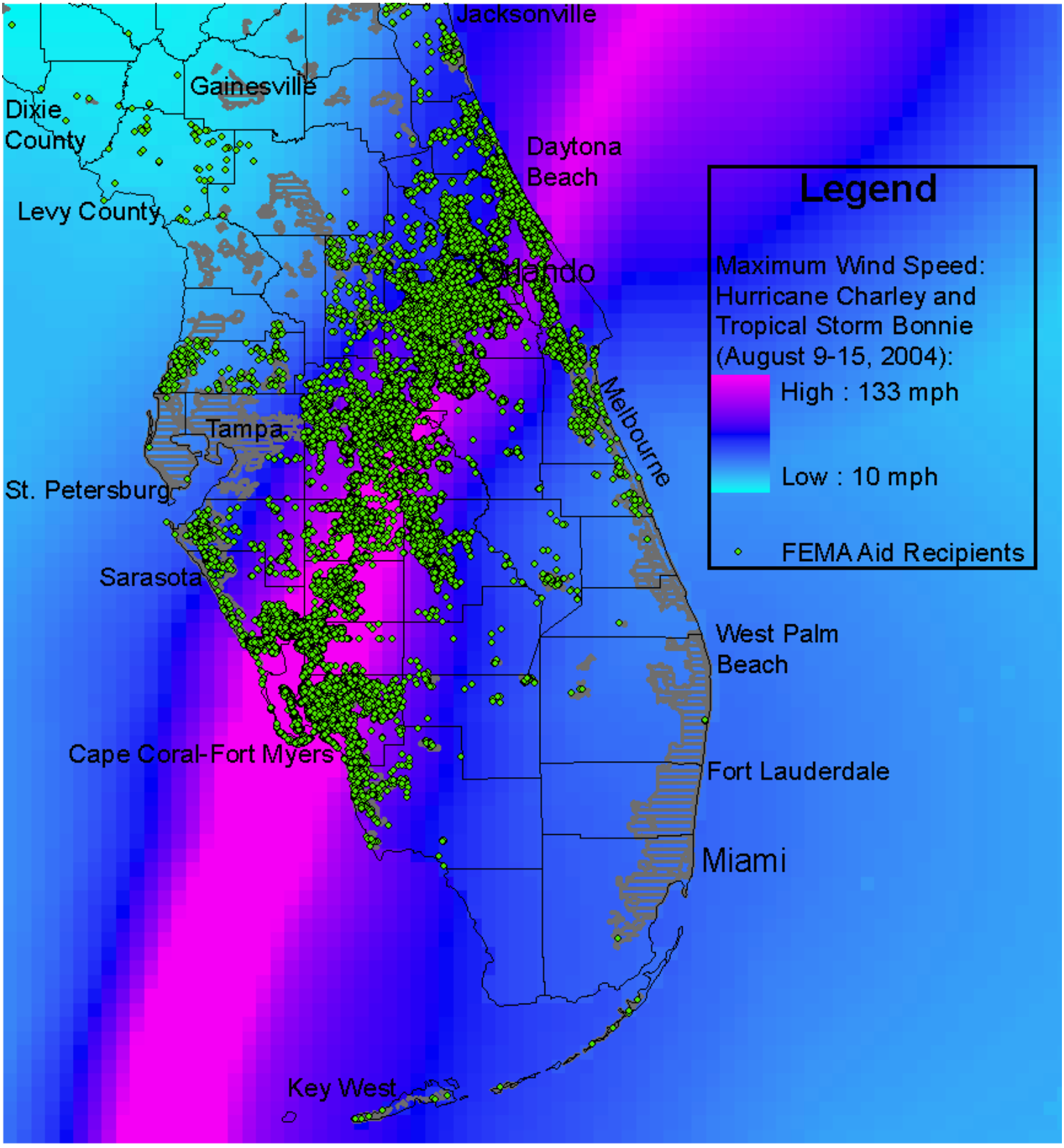
***p<.001; **p<.01; *p<.05 (two-tailed)

Note: Observations are weighted by precinct population. *Predicted Logged FEMA Aid Per Capita* is instrumented using predicted values from the first stage regression.

Table 4: Weather Reports From Dixie and Levy Counties During Hurricane Charley and Tropical Storm Bonnie (August 9-15, 2004)

County and Weather Station:		Aug. 9	Aug. 10	Aug. 11	Aug. 12	Aug. 13	Aug. 14	Aug. 15	Week Totals:
Dixie County (Cross City Airport):	Temperature:	73-87°*F*	79-87°*F*	72-88°*F*	73-84°*F*	72-79°*F*	72-84°*F*	73-84°*F*	72-8 °*F*
	Rainfall (Inches):	0	0	0	0	1.25	0.72	0.11	2.08
	Maximum Wind:	7 mph	13 mph	9 mph	16 mph	9 mph	7 mph	8 mph	16 mph
Levy County (Yankeetown, FL):	Temperature:	71-84°*F*	71-89°*F*	71-91°*F*	73-89°*F*	73-82°*F*	68-77°*F*	69-82°*F*	68-91°*F*
	Rainfall (Inches):	1.46	0.36	0	0.03	0.05	0.64	0	2.54
	Maximum Wind:	10 mph	8 mph	12 mph	29 mph	12 mph	10 mph	12 mph	29 mph

Map 1: FEMA Aid Recipients for Hurricane Charley and Tropical Storm Bonnie (FEMA Disaster #1539)



Map 2: Counties Eligible for Individual Disaster Aid Under Hurricane Charley and Tropical Storm Bonnie