# Online Appendix to

# "The Political Economy of the U.S. Mortgage Default Crisis"

## 1 Robustness of Constituent Interest Result

Table OA1 shows that the effect of mortgage default rates on the likelihood of a representative voting in favor of the AHRFPA is not driven by the right tail of the default distribution. Columns 1 and 2 replicate specifications on a sample in which the right tail of the distribution is winsorized at the 5% level. Columns 3 and 4 split the sample by the median default rate and shows the sensitivity of the vote with respect to default rates is robust in both subsamples.

## 2 Special Interests and the EESA bill

To further our quantitative assessment of the effect of special interest influence on the EESA bill, we make use of an identification strategy similar in spirit to Besley and Case (1995) and Bronars and Lott (1997). Within the linear probability setting employed in the paper it is straightforward to set up a linear semi-structural system of voting and campaign contributions as:

$$v_i = a^1 + b^1 * Z_i + c^1 * SI_i + \varepsilon_i^1 \qquad \text{vote equation} \tag{1}$$

$$SI_i = a^2 + b^2 * Z_i + \varepsilon_i^2 + u_i \qquad \text{money equation} \tag{2}$$

where $cov(\varepsilon_i^1, \varepsilon_i^2) \neq 0$, $cov(\varepsilon_i^1, u_i) = 0$, and $Z_i = [ID_i \; CI_i \; X_i]$, where $X_i$ is the standard set of controls employed in Table 9 of the main text and $Z_i$ is assumed orthogonal to the error terms (see Stratmann, 2002). Let us emphasize that $SI_i = \frac{1}{T}\sum SI_{t,i}$, where $T$ indicates tenure in office, so it incorporates both current cycle contributions and the history of contributions from the financial industry. Notice also that the covariance $cov(\varepsilon_i^1, \varepsilon_i^2)$ is not easily signed. It may be positive, as congressmen who prefer supporting Wall Street may receive money from financial institutions to get reelected and congressmen who support financial institutions will also vote for the bailout. Alternatively, the covariance $cov(\varepsilon_i^1, \varepsilon_i^2)$ may, alternatively, be negative if financial institutions mostly attempt to befriend politicians less likely to support them. The

methodological issue is that it is difficult to break the perfect overlap between covariates affecting the "vote equation" and the "money equation" on theoretical grounds and we cannot identify the parameter $c^1$ without an instrumental variable.

The direct implication of this argument is that estimating the vote equation (1) by itself delivers a coefficient estimate asymptotically equal to $c^1 + cov(\varepsilon_i^1, \varepsilon_i^2)$. In the text our discussion of sensitivity analysis focused precisely on increasing the number of controls in $Z_i$, in as much to make the empirical counterpart of $\varepsilon_i^2$ almost pure noise and, hence, lower the correlation between residual unobservables $\varepsilon_i^2$ and $\varepsilon_i^1$ to zero.

We now describe a different take on the issue, based on estimation of the structural parameters. Particularly, under the following three identifying assumptions we can employ information on retiring congressmen to assess if campaign money affects votes directly (i.e. $c^1 > 0$). The first assumption is that for retiring congressmen campaign contributions should not affect the EESA vote directly, a theoretical constraint $c^1 = 0$. The argument is that retiring congressmen are unconcerned about reelection, so electoral contributions should not buy their decision on the EESA vote (and any remaining effect should be due to $cov(\varepsilon^1, \varepsilon^2)$). Indeed, retiring congressmen receive very low contributions in their last cycle and in our case financial contributions mostly reflect the pre-2007 historical averages. This implies that by running (1) on the subsample of retiring congressmen the coefficient on $SI_i$ should only capture $cov(\varepsilon_i^1, \varepsilon_i^2)$.

The second assumption is that the retirement decision of congressmen is not driven by the financial sector campaign contributions, which does not seem unreasonable for the majority of cases.

A third assumption is that $cov(\varepsilon_i^1, \varepsilon_i^2)$ is homogeneous across individual $i$'s.

Our identification strategy is equivalent to introducing nonlinear constraints on the structural parameters of the system (1)-(2). To see this, define $R$ as an indicator variable taking value 1 if the representative is running and 0 otherwise. The system becomes:

$$\begin{aligned} v_i &= a^1 + b^1 * Z_i + c^1 * R * (a^2 + b^2 * Z_i + \varepsilon_i^2 + u_i) + \varepsilon_i^1 \\ SI_i &= a^2 + b^2 * Z_i + \varepsilon_i^2 + u_i. \end{aligned}$$

We estimate this system through Feasible Generalized Nonlinear Least Squares (asymptotically equivalent to Full-Information Maximum Likelihood in this setting) in Table OA2. The intuition for identification comes directly by considering the reduced-form model (by replacement of the money equation into the vote equation):

$$\begin{aligned} v_i &= (a^1 + c^1 * a^2) + (b^1 + c^1 * b^2) * Z_i + (c^1 * u_i + c^1 * \varepsilon_i^2 + \varepsilon_i^1) \\ &= \widetilde{a} + \widetilde{b} * Z_i + \widetilde{\varepsilon}_i. \end{aligned}$$

and applying the following procedure:

1) Regress $v_i$ on $Z_i$ for $R = 0$ and obtain the structural parameters $b^1$

2) Regress $v_i$ on $Z_i$ for $R = 1$ and obtain the reduced-form parameters $\widetilde{b}$

3) Regress $SI_i$ on $Z_i$ for $R = 1$ and obtain the structural parameters $b^2$

4) Obtain the structural parameter $c^1 = (\widetilde{b} - b^1)/b^2$

As reported in this online appendix Table OA2, we again find strong and significant direct effects of $SI$ on EESA when the endogenous selection of campaign money targets is accounted for. We also obtain a quantitatively larger and 1 percent statistically significant estimate of $c^1 = 0.48$.

Overall, these different approaches tend to consistently support the view of influence of political contributions on the EESA, in line with the results described in Table 9 of the text.

# 3 Geography of Default Rates and Ideology

The congressional maps of default rate and ideology score for Republicans and Democrats for the 110th are reported separately in Figures OA1 and OA2. Both figures emphasize the high degree of spatial heterogeneity that is essential to the identification strategy of our paper. The maps were developed employing the 110th Congress shape file available from the US Bureau of the Census.[1] For presentation purposes, we omit Alaska and Hawaii from the graph.

# 4 Robustness to Senate Vote

In this section, we replicate our analysis of the AHRFPA and EESA votes for the United States Senate. Although the political science literature on congressional voting tends to focus on House votes both because of higher degrees of freedom and because of the non-staggered nature of the electoral process for representatives' reelection, an analysis of the response of the U.S. Senate to the mortgage crisis is also informative.

Of the 100 members of the U.S. Senate, only a third of the seats are up for election each Congress, for a total term of 6 years for each senator. In November 2008 35 Senate seats were up for election, with 5 retiring senators. Interestingly for our analysis, a good portion of the senators up for reelection were in fact held by republicans (23).[2]

We traced the relevant Senate votes in roll calls #170, 186 and 213. The first two roll calls are relevant for the AHRFPA and roll call #213 is the relevant Senate vote for the EESA. The EESA vote took place between the September 29 and October 3 House bills we examine in the paper. More precisely, on July 10, 2008 the Senate voted roll call #170 on the "Motion to invoke cloture on the motion to disagree to the amendments of the House, adding a new title and inserting a new section, to the amendment of the Senate to H.R. 3221 (the AHRFPA)". This vote de facto cleared the way for FHA insurance notwithstanding the

[1] http://www.census.gov/geo/www/cob/cd_metadata.html

[2] Republicans are the subsample for which there is variation in voting patterns for the AHRFPA bill.

presidency veto threat. The cloture motion was agreed with a $84-12$ majority and 4 not voting (3/5 required majority). On July 26, 2008 the Senate voted roll call #186 on the "Motion to concur in the House amendment to Senate amendment to the House amendments to the Senate amendment to H.R. 3221". The motion was agreed with a $72-13$ and 15 Senators not voting. This latter vote allowed the enactment of the AHRFPA. Since both votes are relevant as the starting and the final vote on the AHRFPA, we examine voting patterns for both.

On October 1, 2008 the Senate voted roll call #213 on the "Passage in the Senate of H. R. 1424 (the EESA) as amended". The bill passed $74-25$, with 1 Senator not voting (3/5 required). To quote GovTrack.us, a Congress watchdog organization, "This was the Senate's October 2008 vote to pass the Economic Stimulus Relief Bill, after co-opting H.R. 1424 as the vehicle to quickly pass the legislation."

For symmetry with the House analysis in the paper, we begin with the housing rescue bills and study the effect of constituent interests, ideology, and special interests on the Senate legislative response. As with the House vote, we concentrate on Republicans. In fact, all 47 voting Democrats (and 1 independent caucusing with them) supported rollcall #170 and all 44 voting Democrats (and 1 independent caucusing with them) supported #186. However, Republicans split 12 in favor versus 36 against rollcall #170 and 13 versus 27 on rollcall #186.

In the upper panel (A) of Table OA3 we report a baseline linear probability model for both AHRFPA roll calls in two different samples. The first sample includes all Republicans. For both rollcall #170 and #186 we find evidence of ideological opposition to the bill on the part of more conservative Senators with high statistical precision. Constituent interests (approximated by the State average mortgage default rates in the fourth quarter of 2007) do not show up in a statistically significant fashion (and depending on the specification with the wrong sign), nor do campaign contributions from the financial sector (our proxy for special interests). This sample, however, incorporates all classes of Senators, while only Class I Senators were in fact running for reelection in November 2008. Our next step is to reproduce these specifications only for Class I senators running for reelection, the cohort under short-term electoral pressure. Among Senators running for reelection, the responsiveness of Senators to constituent interests becomes both economically and statistically significant in predicting votes on the AHRFPA. A one standard deviation increase in average mortgage default rates in the state produces a 14.1 percent increase in the likelihood of voting for AHRFPA ($= 0.015 * 9.38$, column 3). Indeed, this is a finding that both provides a bridge to the House data results in this paper (i.e., facing the same electoral horizon both types of elected officials respond in the same fashion to electoral incentives) and an interesting insight on the short-term versus long-term electoral responsiveness of politicians. An election more than two years into the future does not provide enough of an incentive to outweigh ideological opposition.[3]

[3]See Kalt and Zupan (1984) for an early discussion of the differential responsiveness of different classes of Senators in the context of the vote on the Surface Mining Control and Reclamation Act.

The results on AHRFPA generalize to the EESA vote. In the lower panel of Table OA3 we report a baseline linear probability model for the EESA roll call #213 again in two different samples. The first sample includes all voting Senators.[4] We find evidence of ideological opposition to the bill on the part of more conservative Senators with high statistical precision and a 10 percent significant positive effect of special interest's campaign contributions. In column 2 of panel B, we show that this effect disappears for Senators of Classes not running for reelection. When we focus only on Class I senators running for reelection in November 2008 (the senatorial cohort under short-term electoral pressure), the results change. The responsiveness of Senators to the financial sector's campaign contributions becomes a strong, economically significant predictor of voting in favor of the EESA. A one standard deviation increase in per-cycle average campaign contributions from the financial sector produces a 14.4 percent increase in the likelihood of voting for EESA ($= 0.221 * 0.65$). If we focus on 2008 cycle campaign contributions only (column 3), we find an even stronger effect of a 19 percent increase ($= 0.648 * 0.294$).

Finally, we perform a similar exploration of the "vote buying" channel for political contributions as in Section 6 of the text. In column 4 we adding to the sample of Class I running senators the group of Class I retiring Senators. Were the effect of past average campaign contributions by the financial sector through a "selection" channel, retiring Senators should show the same coefficient as running Senators. If however, political contributions are based on vote-buying, the interaction term should be negative, as reelection incentives drop for retiring politicians who become insensitive to money. Similar to the House results, average past campaign contributions predict voting for the EESA only for those Senators running for reelection. Indeed, for retiring politicians the marginal effect of special interest money is negative (and statistically significant at the 10 percent level).

Our analysis of the Senate votes complements the House vote results in the text by showing that the time horizon of the re-election campaign for a Senator matters. Whenever the time horizon of Senators and Representatives coincide, we find consistent evidence across the chambers. However, the degree of responsiveness to voters and special interests is weaker when Senators are not up for re-election in 2008.

# 5 Theoretical justification for specification in Section 7

Our baseline empirical model in Section 3 of the paper produces a linear-in-covariates specification. In this simple model, there is no interaction between ideological and economic incentives of politicians. In other words, after controlling for ideology, all politicians respond equally to constituent and special interests. In reality, such an interaction is likely to be present in politician decision-making. The most simple example is one in which ideology enters the politician's utility function in such a way that ideologically extreme politicians are less sensitive to the desires of constituents and industry lobbyists. Indeed, one could argue

[4] The vote count split for #213 is 15 Republicans, 9 Democrats and 1 independent voting "Nay" and 34 Republicans and 40 Democrats voting "Yea".

that the very definition of being ideological is the characteristic of believing in certain policies regardless of the economic incentives that push against the beliefs. This "politician preference" hypothesis suggests that ideologically extreme politicians may be less responsive in their voting patterns to mortgage default rates and financial industry campaign contributions.

There is, however, a more subtle reason that ideologically extreme politicians may be less responsive to constituent and special interests, which we refer to as the "constituent ideology" hypothesis. Building on the model in Section 3, assume that higher $ID_i$ politicians represent districts with voters characterized by strong ideological opposition to the bill ($id_i$), where $id_i = \pi ID_i$, $\pi > 0$. A Republican from a district ideologically against the AHRFPA or the EESA bailout represents voters against the bailout. This has an important implication for the probability of reelection function $g$.

While a $v_i = 1$ vote induces the support of voters $CI_i$ and the accrual of $SI_i$ contributions, voters ideologically opposed to the bill will turn out against the incumbent (or withdraw their support). A "Yea" vote does not just attract supporters of the bill, but also opponents, and progressively more, the stronger is the intensity of opposition. Assume for simplicity that for every additional voter that $CI_i$ delivers and $SI_i$ sways there is a probability $id_i$ of an opposing voter showing up at the polling booth.[5] This implies that the (net) reelection probability is:

$$g(v_i) = (\beta_1 CI_i * v_i + \beta_2 SI_i * v_i) * (1 - id_i * v_i)$$

and $g(1) = (\beta_1 CI_i + \beta_2 SI_i) * (1 - \pi ID_i)$. This expression delivers two intuitive effects. First, fixing the number of voters in default, a higher number of voters ideologically opposing the bill lowers the electoral advantage of voting for the bill. The advantage of an extra $CI_i$ voter for a politician from a strongly conservative district (high $ID$) is lower than the advantage of an extra $CI_i$ voter for a politician from a more liberal (low $ID$) district. A portion $id_i$ of the additional ballots cast in favor of $i$ will be eroded by opposing ideological voters which would otherwise support the incumbent. Second, the impact of an additional dollar of campaign contributions is lower in districts with stronger ideological opposition. This implies that a "Yea" vote from a more ideologically extreme representative will be increasingly more expensive than the vote of a more moderate representative. The choice of a "Yea" vote becomes

$$\Pr\left(-\theta ID_i + (\beta_1 CI_i + \beta_2 SI_i) * (1 - \pi ID_i) > \varepsilon_i^0 - \varepsilon_i^1\right), \tag{3}$$

which again we can estimate, given distributional assumptions on $\left(\varepsilon_i^0 - \varepsilon_i^1\right)$.

This stylized model introduces interactions between ideology and constituent interests, and therefore motivate including in the regression specifications interaction terms of ideology with constituent interests and with special interests for both the AHRFPA and the EESA votes. Interactions follow the empirical

[5] The choice of $id$ as a probability of upset voters showing up on election day is not restrictive for our reduced-form model. However a structural estimation of the relection probability function would require further assumptions on the form of $g$.

model (3):

$$\frac{\partial \Pr(v_i = 1)}{\partial CI} = \beta_1 - \pi * \beta_1 ID_i$$

and

$$\frac{\partial \Pr(v_i = 1)}{\partial SI} = \beta_2 - \pi * \beta_2 ID_i,$$

implying that more ideological representatives are progressively more expensive to move to "Yea."

Both the politician preference and the constituent ideology hypotheses suggest that there may be an interaction effect where ideologically extreme politicians respond less to constituent and special interests. We examine these hypotheses in Section 7 of the paper.

# References


Besley, Tim and Anne Case (1995) "Incumbent Behavior: Vote Seeking, Tax Setting and Yardstick Competition" (with Anne Case), American Economic Review, 85, 1, 25-45.

Bronars, Stephen and John Lott (1997) "Do Campaign Donations Alter How Politicians Vote? Or, Do Donors Support Candidates Who Value the Same Things That They Do?" Journal of Law and Economics, 40(2), pp. 317-350

Kalt, Joseph P. and Mark A. Zupan, 1984. "Capture and ideology in the economic theory of politics", The American Economic Review 74, 279-300.

Stratmann, Thomas. 2002. "Can Special Interests Buy Congressional Votes? Evidence from Financial Services Legislation". The Journal of Law and Economics, 45, No. 2, 345-373.

**Table OA1**
**Robustness of Constituent Interest Result To Right Tail of Default Distribution**

All regressions include a constant.

| | Right Tail Winsorized At 5% | | Sample Below 07Q4 Median Default Rate | Sample Above 07Q4 Median Default Rate |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| | Dependent Variable: Voted in favor of AHRFPA '08 (July 26th, 2008) | | | |
| Mortgage default rate (07Q4) | 6.87** | | 11.41* | 8.28** |
| | (1.69) | | (4.42) | (2.01) |
| DW nominate ideology score | -0.88** | -0.85** | -0.77** | -1.01** |
| | (0.15) | (0.16) | (0.21) | (0.26) |
| Ln(Financial Industry Contributions per cycle) | 0.03 | 0.03 | -0.02 | 0.11* |
| | (0.03) | (0.03) | (0.04) | (0.04) |
| Mortgage default rate (05Q4) | | 2.03 | | |
| | | (2.32) | | |
| ΔMortgage default rate (05Q4-07Q4) | | 8.30** | | |
| | | (1.69) | | |
| N | 194 | 194 | 97 | 97 |
| $R^2$ | 0.21 | 0.24 | 0.18 | 0.29 |

**,*,+ Coefficient estimate statistically distinct from 0 at the 1%, 5%, and 10% levels, respectively.

**Table OA2**
**Special Interests, Constituency, and Voting Patterns on EESA**

This table presents FGNLS coefficient estimates of voting patterns on House EESA Vote (passage of the EESA of Oct 3, 2008). The sample includes voting Republicans and Democrats. Robust standard errors in parentheses. Both equations contain unconstrained constants (not reported).

| Feasibile Generalized Nonlinear Least Squares | Voted in favor of EESA '08 | Ln(Financial Industry Contributions per cycle) |
|---|---|---|
| Equation: | (1) | (2) |
| Ln(Financial Industry Contributions per cycle) | 0.466*** | -- |
| | (0.10) | |
| Mortgage Default Rate (07Q4) | 4.01*** | -6.5*** |
| | (1.43) | (2.38) |
| DW Nominate Ideology Score | -0.22*** | -0.12 |
| | (0.09) | (0.21) |
| Finance Committee | -0.44*** | 0.94*** |
| | (0.11) | (0.12) |
| Number of Terms Served | 0.039*** | -0.073*** |
| | (0.009) | (0.015) |
| Vote Margin '06 Elections | 0.003** | -0.005 |
| | (0.001) | (0.003) |
| Fraction Constituents Working In Financial Industry | 0.01 | 0.03 |
| | (0.01) | (0.03) |
| Fraction Constituents with >$200,000 Income | 0.72 | 5.07** |
| | (1.25) | (2.32) |
| Observations | 434 | 434 |
| R-squared | 18.66 | 16.7 |

***,**,* indicate coefficient estimate statistically distinct from 0 at the 1%, %5 and 10% levels, respectively.

**Table OA3**
**Senate Voting Results for AHRFPA and EESA**

This table presents the effect of special interests, constituent interests, and ideology on U.S. Senate voting patterns for the AHRFPA and the EESA bills.

**Panel A: Senate AHRFPA Votes**

| | All Republicans/ All Classes | | Republicans up for re-election | |
|---|---|---|---|---|
| | (1) July 10th, 2008 Vote | (2) July 26th, 2008 Vote | (3) July 10th, 2008 Vote | (4) July 26th, 2008 Vote |
| Mortgage default rate (07Q4) | -0.35 | 4.93 | 9.38+ | 9.75+ |
| | (3.37) | (3.97) | (4.48) | (5.13) |
| DW nominate ideology score | -1.50** | -1.45** | -1.67** | -1.49* |
| | (0.25) | (0.22) | (0.44) | (0.50) |
| Ln(Financial industry contributions per cycle) | 0.02 | -0.14+ | -0.02 | -0.06 |
| | (0.07) | (0.08) | (0.09) | (0.09) |
| N | 48 | 40 | 18 | 15 |
| Adjusted $R^2$ | 0.37 | 0.31 | 0.43 | 0.34 |

**Panel B: Senate EESA Vote**

| | All Classes | Classes Not up for re-election | Up for re-election, not retiring | Up for re-election, not retiring | Up for re-election |
|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) |
| Mortgage default rate (07Q4) | 1.70 | 1.06 | 2.13 | 1.89 | 0.97 |
| | (3.25) | (3.95) | (5.06) | (4.65) | (5.19) |
| DW nominate ideology score | -0.17+ | -0.04 | -0.46** | -0.38** | -0.50** |
| | (0.10) | (0.13) | (0.14) | (0.13) | (0.14) |
| Ln(Financial industry contributions per cycle) | 0.09+ | 0.07 | 0.22+ | | 0.23+ |
| | (0.05) | (0.05) | (0.12) | | (0.12) |
| Ln(Finance contributions, `08 cycle) | | | | 0.29** | |
| | | | | (0.10) | |
| Retiring representative | | | | | 7.28+ |
| | | | | | (3.68) |
| Retiring representative * Ln(Financial industry contributions per cycle) | | | | | -0.57+ |
| | | | | | (0.32) |
| N | 96 | 66 | 30 | 30 | 35 |
| Adjusted $R^2$ | 0.05 | -0.01 | 0.21 | 0.28 | 0.19 |

**, *, + Coefficient estimate statistically distinct from 0 at the 1%, 5%, and 10% levels, respectively. Robust standard errors in parentheses. The Senate EESA vote is dated Oct 1st, 2008. All equations contain constants (not reported).

Figure OA1:
Mortgage Defaul Rates by Congressional District
110th Congress, 2007 Q4

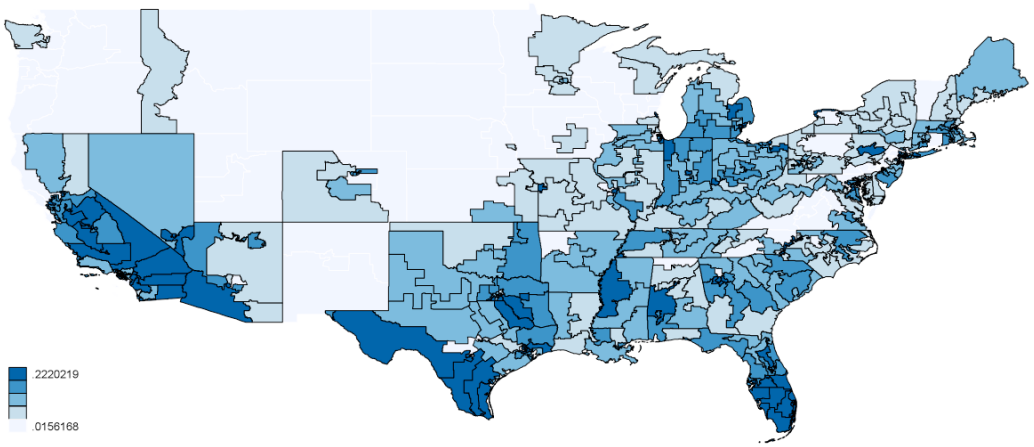


Figure OA2:
DW-Nominate Score by Congressional District
110th Congress