Insuring Hedged Bets with Lobbying

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Online Appendix

This appendix consists of three components: First, it presents a more detailed description of our Bayesian linear model, including our specification of prior distributions. Second, it presents a regression table of our results to provide further detail beyond the marginal density plots presented in the article. Third, it describes our data sources in detail.

Bayesian Linear Model Specification

As described in the paper, we fit a linear time series model of spending on lobbying as a function of hedge fund assets under management, U.S. gross domestic product, the size of the federal budget, and an indicator for the year 2008. The full formal specification of our Bayesian linear model is as follows:

$$\begin{aligned}
\Delta Y_t &= \beta_0 + \beta_1 \Delta X_{1t} + \beta_2 \Delta X_{2t} + \beta_3 \Delta X_{3t} + \beta_4 D_t + \epsilon_t \\
\epsilon_t &\overset{iid}{\sim} \mathcal{N}(0, \sigma^2) \\
\beta_j &\sim \mathcal{N}(0, 1000) \\
1/\sigma &\sim \mathcal{G}(0.0005, 0.0005)
\end{aligned}$$

Here, ΔY_t is change in money spent on lobbying, ΔX_{1t} is change in hedge fund investments, ΔX_{2t} is change in GDP, ΔX_{3t} is change in the federal budget, D_t is an indicator for the year 2008, and ϵ_t is the disturbance term. We assume that our disturbance term is a white noise process with no autoregression or heteroscedasticity. (As is often the case, once our series were differenced, they behaved like white noise. Diagnostics are reported in Table 1.) Each of our regression coefficients ($\beta_j, j = \{0, 1, 2, 3, 4\}$) has a vague conjugate Normal prior. Our precision on the homoscedastic disturbance term ($1/\sigma$) is given a vague conjugate Gamma prior.

Regression Results

Table 1 presents the results from the full regression model. Each row presents a summary of the marginal posterior distribution for each term estimated. The first numerical column presents the mean of the marginal posterior distribution for each parameter. The second numerical column presents the standard deviation of the marginal posterior distribution. The last two columns present the credible interval constructed by finding the 5^{th} and 95^{th} percentiles of each marginal posterior distribution. As the results from a Bayesian model, we can say that there is a 95% probability that the coefficient is greater than the lower value, a 95% probability that the coefficient is less than the greater value, or a 90% probability that it is between the two values. This table complements Figure 2 from the main text, which presents the density plots for the marginal posterior distributions for change in hedge fund assets under management and change in federal budget outlays.

Table 1: Linear Model of Change in Spending on Lobbying, 1998-2015 (MCMC Estimates of Marginal Posteriors)

Predictor	Mean	Std. Dev.	[90% Cred. Int.]	
Intercept	-0.0869	0.0852	-0.2250	0.0520
Change in hedge fund investments	0.0004	0.0003	0.0000	0.0009
Change in GDP	0.0261	0.1748	-0.2608	0.3093
Change in federal outlays	0.5159	0.2814	0.0601	0.9749
Indicator for 2008	0.6602	0.2812	0.2042	1.1213
σ^2	0.0198	0.0099	0.0094	0.0380

Notes: N=18. MCMC sample of 100,000 (burn-in of 10,000 iterations). Geweke tests show no evidence of nonconvergence. Breusch-Godfrey test shows no evidence of autocorrelation, and Breusch-Pagan shows no evidence of heteroscedasticity. Estimates computed using MCMCpack 1.3-3 in R 3.2.4.

As was reported in the article, the posterior mean for change in hedge fund investments is 0.0004. This effect is robust, as we can see there over a 95% probability that the effect is positive. Substantively and with a bit more precision, the posterior mean implies that a billion dollar increase in hedge fund investments leads to another $445,000 in lobbying expenditures on average, all else being equal. The marginal posterior distribution for change in GDP is centered near zero and thereby does not offer evidence of a robust effect. The posterior mean for change in federal outlays is 0.5169, and there is over a 95% probability that the effect is positive. At the posterior mean, a $1 trillion increase in the federal budget would project a $516 million increase in lobbying, on average and all else being equal. Given that a billion dollar rise in the federal budget produces a $516,000 increase in lobbying expenditures, the $445,000 increase from a billion dollar investment in the hedge fund industry constitutes

a notable impact. The posterior mean for the error variance of regression (σ^2) is 0.0198, so the standard error of regression is 0.141 (or $141 million).

In terms of diagnostics, an initial version of the model showed that 2008, the year of a major financial collapse, was an influential data point. This led us to include the 2008 indicator as a correction. Because our input and output series all show trends, we model the differenced values of these variables. As the table mentions, a Breusch-Godfrey test shows no evidence of autocorrelation, so differencing sufficiently time-filtered the data.

Data Sources

Our data were gathered from the following sources:

- Annual hedge fund assets under management was provided by Sol Waksman of Barclay Hedge. Accessed from `http://www.barclayhedge.com/research/indices/ghs/mum/Hedge_Fund.html` on 30 March 2016.
- Total lobby expenditures by year was gathered from the Center for Responsive Politics. Accessed from `https://www.opensecrets.org/lobby/` on 30 March 2016.
- U.S. gross domestic product is the fourth quarter GDP in chained 2009 dollars, as reported by the Bureau of Economic Analysis in the U.S. Department of Commerce. Accessed from `http://www.bea.gov/national/#gdp` on 30 March 2016.
- U.S. federal budget is the annual value of outlays in trillions of chained 2009 dollars, as reported by the Office of Management and Budget in the White House. Accessed from `https://www.whitehouse.gov/omb/budget/Historicals` on 30 March 2016.
- Inflation conversion factors (used to convert hedge fund assets and lobby expenditures to chained 2009 dollars): Robert Sahr. 2014. "Inflation Conversion Factors for Years 1774 to Estimated 2024." Updated 8 April 2014. Accessed from `http://liberalarts.oregonstate.edu/spp/polisci/research/inflation-conversion-factors-convert-dollars-1774-estimated-2024-dollars-recent-year` on 31 March 2016.