Uncertainty and the Geography of the Great Recession*

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Abstract

The variation in a state-level measure of local economic-policy uncertainty during the 2007-2009 recession matches the cross-sectional distribution of unemployment outcomes in this period. This relationship is robust to numerous controls for other determinants of labor market outcomes. Using preexisting state institutions that amplified uncertainty, we find evidence that this type of local uncertainty played a causal role in increasing unemployment. Together, these results suggest that increased uncertainty contributed to the severity of the Great Recession.

Keywords: Great Recession, State Government, Uncertainty, Unemployment

JEL Codes: D8, E3, H7

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Mr. FITZPATRICK: What is the gentleman's plan to take care of the unemployment in this country?
Mr. KNUTSON: What is my plan?
Mr. FITZPATRICK: Yes.
Mr. KNUTSON: Reassure industry.
Mr. FITZPATRICK: How?
Mr. KNUTSON: By removing all the uncertainty that you folks have created. Let us assure industry and we will end unemployment in a short time.

United States House of Representatives, April 12, 1935

I Uncertainty and the Great Recession

Are increased levels of uncertainty an important factor in explaining the cross-sectional distribution of employment outcomes during the Great Recession? We assemble a state-level measure of policy uncertainty from 2006 through 2009 and find that increases in local uncertainty over this period are strongly correlated with local labor market outcomes. The uncertainty channel remains strongly correlated with unemployment increases in regressions that control for other mechanisms. While there is a feedback loop between economic outcomes and uncertainty, we also show that increases in local uncertainty are partially driven by pre-existing state institutions, and that these pre-determined uncertainty amplifications cause unemployment increases.

The key lesson from these findings taken together is that treating uncertainty as an important channel is consistent with the geographic pattern of the recession. Our baseline results suggest that if uncertainty levels in all states had been at those of the five states facing the lowest levels of uncertainty in 2009, the national unemployment rate would have been between 0.8 and 1.2 percentage points lower.

The findings contribute to our understanding of the interaction between the different channels that were responsible for the depth and length of the Great Recession. Macroeconomists have advanced a number of hypotheses to explain the severity of the 2007-2009 decline in employment, including insufficient demand due to household deleveraging, slow recalculation or adjustment to sector-specific shocks, credit constraints due to problems in the financial sector, and the increases in policy and general economic uncertainty that we focus on here. Unfortunately, as is often the case in macroeconomics, distinguishing the differential impact of these amplification channels has not been straightforward.

The aspect of the Great Recession that we use here to shed light on this question is the substantial geographic variation in employment losses. The five states most deeply affected by the recession experienced increases in their unemployment rates of 6 percentage points or more from 2006 to 2009 (with the largest increase, in Nevada, exceeding 7.5 percentage points). Conversely, the five states least affected by the downturn saw their unemployment rates increase by less than 2.1 percentage points. Given the importance of this geographic variation, it is desirable that theories of the recession be consistent with this cross-sectional pattern.

In line with an explanation centered around structural sectoral shifts, states with larger housing price run-ups and declines suffered the largest employment losses. Moreover, overall employment losses across states and counties are highly correlated with employment losses in the construction sector. A number of papers have demonstrated that geographic variation in household deleveraging and weaker demand are also correlated with employment losses. Mian and Sufi (2011), in a framework that is underpinned theoretically by Philippon and Midrigan (2011), show that employment losses are most severe in areas with initially high and subsequently falling household debt-to-income ratios. They analyze data from counties with large household balance sheet shocks and claim that lessened aggregate demand was responsible for the majority of the job losses between 2007 and 2009. Another theory, that credit constraints caused by financial sector problems lengthened the recovery (e.g. Guerrieri and Lorenzoni (2011) and Chodorow-Reich (2014)), does not necessarily predict such wide variety in regional outcomes. However, work by Gozzi and Goetz (2010) and Greenstone et al. (2015) find that local credit crunches for small businesses did indeed lead to employment and wage losses between 2007 and 2009.

A final popular explanation for the significant duration of the 2007-2009 recession's recovery is the increase in policy and economic uncertainty during the period. Widely discussed in the popular news amidst analyses of the impact of Federal Reserve policy, health care reform, the rise of the Tea Party movement (see Madestam et al., 2013), debt ceiling disputes and state and federal spending levels, policy and economic uncertainty have also received attention from researchers looking into their possible effects on the U.S. economy during the aftermath of the financial crisies (e.g. Bloom et al., 2012). Baker et al. (2016), for example, show that higher indicator uncertainty from 2008 on was associated with a deeper and longer recession. In their analysis of news and government

documents, Dominguez and Shapiro (2013) look to see how the slow recovery was anticipated, and find that the political "stalemate" in the US contributed to the length of the recession, as did shocks from Europe. Similarly, Bachmann and Sims (2012) establish that consumer and firm confidence is of the utmost importance during downturns. Schaal (2011) is able to reproduce many of the dynamics of the Great Recession by introducing uncertainty shocks into a dynamic search model of heterogeneous firms, while Stock and Watson (2012) use a dynamic factor model to establish that heightened uncertainty worsened the recession significantly.

In its simplest exposition, the uncertainty channel does not predict a wide spatial distribution of outcomes. This has led some to argue that the policy uncertainty channel is not consistent with a central feature of the recession. For example, Mian and Sufi (2012) claim that "an increase in business uncertainty at the aggregate level does not explain the stark cross-sectional patterns in employment losses we observe." This paper presents cross-sectional evidence in support of the uncertainty channel.

The remainder of this paper is structured as follows. In Section II, we develop a state-level measure of uncertainty and document its association with employment outcomes. The relationship between regional uncertainty and unemployment levels persists after controlling for competing explanations for the high post-2006 levels of unemployment. We then show, in Section III, that predetermined state government institutions affect regional uncertainty. By using these institutions to instrument for uncertainty, we show that higher levels of uncertainty cause higher levels of unemployment. In Section IV we discuss our results and conclude.

II A State-Level Measure of Uncertainty

In this section, we present a measure of uncertainty indicators at the state level. This measure was strongly associated with increases in unemployment during the 2007-2009 recession, and this remains the case after controlling for commonly offered other explanations for the severity of the Great Recession.

Conceptually, one could draw distinctions between the level at which uncertainty is perceived (state or national) and the level at which it originates (again, state or national). Although we would in principle like to separate the four resulting concepts of uncertainty, the different levels

of perception and origin of uncertainty are connected through a variety of feedback loops. It is difficult to conceive of them independently in practice, and in our cross-sectional setup it is impossible to measure the effects of uncertainty that is both perceived and produced nationally. We are ultimately interested in measuring uncertainty regarding business conditions as faced by firms locally (as in Bloom, 2009). We therefore construct a proxy for uncertainty concerning those conditions, and focus less on whose perception of those conditions our proxy embeds.

Of more direct relevance to our questions is whether increases in uncertainty about business conditions at the state level reflect different inherent economic sensitivity to national policy uncertainty or whether they reflect differential amplification by state and local governments. For example, states could be more or less sensitive to national congressional brinksmanship due to their industry mix, or state legislatures could be more or less likely to produce a budget on time in economic downturns. Table 1 shows that both routes matter independently. A proxy for state-level sensitivity to national uncertainty à la Bartik (1991) is constructed by regressing the log of national employment by 2-digit NAICS code on a trend and the Baker et al. (2016) national uncertainty index for 1990 to 2006, taking the coefficients on uncertainty from that regression and weighting them by 2006 state industry employment share. This sensitivity to nationally originated uncertainty contributes significantly to unemployment. At the same time, the remaining state-level uncertainty (measurement of which is described in more detail below) also affects labor market outcomes. Uncertainty originating at both levels thus appears to be relevant to explanations for the depth and length of the Great Recession. Our focus here is on the latter: state-level uncertainty.

LOCATE TABLE 1 ABOUT HERE

Following Baker et al. (2016), uncertainty is measured using media mentions of the word "uncertainty" in a policy context. An archive of local newspapers (NewsLibrary.com), which covers more than 4000 news sources and contains state identifiers, is used to count articles from 1/1/2006 through 12/31/2009 containing the word "uncertainty." These results were filtered to remove any papers that began after this period or with spotty on-line coverage (by restricting ourselves to papers with at least 25 articles a year from 2006 through 2010 with the word "uncertainty") and to remove television transcripts, non-English language papers, and national papers such as USA Today. In the end, this leaves 116,120 articles from 42 states from 226 newspapers.

From this group only those articles are selected that contain terms relating to state, not national, uncertainty surrounding policy, not the weather. To do this, 17,226 articles are selected that contain terms like "governor" or "state agency" (referred to as "state words," see Figure 2 for a full list). Articles are then eliminated that contain terms reflective of national or sub-state uncertainty, like "president," "Bush," or "Obama" (referred to as "national words," see Figure 2 again for a full list). This process generates, in total, 10,501 news articles reflective of state policy uncertainty. The article counts are then aggregated by state and year, and a measure of the increase of uncertainty during the recession is created that equals the ratio of the sum of the numbers of articles published in 2007, 2008 and 2009 to the number of articles published in 2006. The 2006 measure is a conservative baseline, since the downturn began at different times in different states. The results are not changed significantly by altering the starting date. The unit for the dependent measure is effectively the ratio of article counts in the next three years relative to 2006. The mean is at 5.47, indicating that there was a 80% increase in the number of articles describing policy-related "uncertainty" in this period. The measure ranges from highs of 18.0 for Delaware, 16.3 for Nevada, 13.8 for Illinois and 10.3 for Florida to lows of 1.3 for Alaska, 1.5 for Mississippi, and 1.8 for Virginia. This means that there was a 540% annual increase in the number of articles containing the word uncertainty in Nevada, as opposed to a 40% decrease in Virginia. This measure is obviously noisy, but this range of variation appears reasonable relative to the within-state year-to-year variation in this period. The mean of the index is 5.5, with a standard deviation of 3.5.

LOCATE FIGURE 1 ABOUT HERE

In the top panel of Figure 1, this measure is plotted against the change in unemployment rates across states from 2006 to 2009, using seasonally adjusted rates from the Bureau of Labor Statistics. As is evident in the graph, the relationship is quite strong. The R^2 is 0.26. The bottom panel shows that this relationship is not driven mostly by Delaware and Nevada, the two outliers ($R^2 = 0.22$). The relationship holds when including 2010 ($R^2 = 0.33$), and when using the change in unemployment rates from 2007 to 2009 ($R^2 = 0.20$). To contextualize these numbers, note that the R^2 between employment growth and debt-to-income across county reported in Mian and Sufi (2011) is 0.10, and the R^2 when regressing state unemployment rate changes on housing price changes from 2006-2009 is 0.48.

To shed some light on what this means in real-world terms, let us think of a counterfactual world in which all states arrived in 2009 with uncertainty levels that were the average of the five states in our sample with the lowest uncertainty indices (Alaska, Maryland, Mississippi, Nebraska, and Virginia). If unemployment levels comoved correspondingly, the national unemployment rate (as a population-weighted average of state-level rates of unemployment) would have been 0.8 percentage points lower than it was.

LOCATE TABLE 2 ABOUT HERE

The top panel of Table 2 demonstrates the strong positive correlation between our uncertainty measure and unemployment growth and its robustness to dropping states that were heavily affected by the foreclosure crisis or, in 2005, by hurricane Katrina. Now, any choice of terms to reflect policy uncertainty will induce a slightly different set of relative values for the measure across states. Versions of our baseline test using first, all of the subsets of at least five of the state words used above, as well as, second, all of the subsets of at least five of the national words used above, address this. Figure 2 illustrates that for the overwhelming majority of combinations of state words (top panel) and national words (bottom panel), the estimated coefficient on uncertainty in column 1 of Table 2 is similar to our baseline, in sign, size, and significance.

LOCATE FIGURE 2 ABOUT HERE

A different concern in using the uncertainty measure is that it might also reflect variation in initial conditions that affect economic performance. The bottom panel of Table 2 shows the lack of a strong positive relationship between the measure and initial unemployment or predicted unemployment, and the absence of any strong relationship with a Bartik-style industry share instrument.

II.a Alternative Mechanisms

Another way to assess whether the uncertainty hypothesis helps rationalize the distribution of unemployment changes is to attempt to control for other, concurrent, amplification channels. This type of test requires strong assumptions to isolate causality, and these assumptions clearly do not hold in this situation. Nevertheless, and recognizing these limitations, it is informative to see whether the variation in employment outcomes correlates with our uncertainty index above and beyond the variation explained by other channels. In order to do so, Table 3 replicates the main specification regressing unemployment rate changes from 2006 to 2009 on the uncertainty

measure while including controls for structural shocks, changes in aggregate demand, and local credit conditions.

Panel A includes controls for structural shocks. Column 1 replicates our main specification adding the share of state employment in the construction industry in 2006 as a control (from the BLS' Quarterly Census of Wages (QCEW)). In Column 2, the construction share is replaced with a Bartik-style industry share shift instrument, constructed from the QCEW at the 5-digit level, to identify the impact of local labor demand changes. In both columns, the estimated effect of uncertainty is roughly unchanged. Column 3 includes a variable for the percentage change in the FHFA Housing Price Index. This control diminishes the magnitude of the impact of uncertainty by over 40%, though it remains highly economically and statistically significant, and the hypothesis that it has remained unchanged at the 95% confidence level cannot be rejected. Column 4 includes Census region fixed effects to account for overall regional patterns, which again leaves the coefficient on uncertainty nearly unchanged. The last column shows that controlling for the various sectoral shocks at the same time still results in a statistically significant ($p < 0.05$) and sizable coefficient on uncertainty: a increase in the uncertainty of 1 standard deviation corresponds to an increase in the unemployment rate of a quarter of a percentage point. The results in this panel suggest that the relationship between uncertainty and regional unemployment increases is not fully accounted for by its correlation with measures of structural shifts.

LOCATE TABLE 3 ABOUT HERE

Panel B explores the effect of adding controls for consumer demand. Column 1 includes state-level housing supply elasticities (as in Saiz (2010), weighted by population to the state level as in Ganong and Shoag (forthcoming)), to proxy for debt-to-income (DTI) levels as in Mian and Sufi (2012). This control has little effect on the estimated impact of the uncertainty index. Column 2 regresses unemployment changes on uncertainty and the percentage change in car sales, a common measure measure of durable consumption (see e.g. Mian and Sufi (2012), based on data from the National Automobile Dealers Association. The effect of uncertainty falls by 25%, but again remains significant. Column 3 regresses the unemployment change on our uncertainty index and a measure of the percentage change in employment in arts, entertainment, recreation, and food service (NAICS sectors 71 and 72). These industries are used by Mian and Sufi (2012) as a measure

of local demand for non-tradable goods. This variable barely decreases the magnitude of the effect of uncertainty. Finally, Column 4 includes all of these demand variables and the uncertainty index, and shows a significant coefficient on uncertainty that is only a third smaller than our baseline. The ability of uncertainty to explain the geography of unemployment changes is thus robust to controls for the aggregate demand channel.

Panel C examines the competing explanation of credit availability. Column 1 controls for the share of employees who work for small businesses (from the Quarterly Census of Employment and Wages), which supposedly have more problems gaining access to credit. Columns 2 and 3 include indicators for credit limits and unused credit from Experian (2010). Column 4 includes bank failures (from FFIEC call reports). The effect of uncertainty remains highly significant and comparable in magnitude across all of these specifications. Finally, Column 5 includes all of our credit variables and the uncertainty index: the coefficient on uncertainty is again reduced by about a third, but remains significant and within the bounds of the original 95% confidence interval.

What if the structural, demand, and credit variables described above are combined into aggregated indexes (by normalizing them to have a zero mean and unit variance, and then taking the first principal component) and included all at once? In Panel D, we regress unemployment changes on the uncertainty, credit, demand, and structural indices to see whether the combined effect of alternate channels breaks the association between uncertainty and unemployment. Despite this battery of controls, the relationship between uncertainty and unemployment persists: the coefficient on the uncertainty measure is highly significant, only about 30% smaller than our baseline estimate, and well within our original 95% confidence interval. These results demonstrate the robustness of our finding and suggest that accounting for uncertainty adds to our full understanding of the aftermath of the financial crisis: a back-of-the-envelope calculation similar to the one in section 2 suggests that the increase in the unemployment rate associated with the rise of levels of uncertainty above the average of the five lowest-uncertainty states, even after removing variation in unemployment rates correlated with demand shortfalls, structural shifts, and dried-up credit is just below one percentage point.

Table 3 shows that the coefficient on our uncertainty index remains stable despite various controls for structural, demand, and credit based shocks. It is still possible, of course, that our esti-

mates are biased due to differences along other, unobservable dimensions. Recent work by Oster (forthcoming), building off work by Altonji et al. (2008), has developed a method of benchmarking this bias using information about the change in the coefficient of interest when controls are added. Given the assumption that the observed set of controls vary proportionately to the potentially biasing unobserved controls, the Oster methodology computes an identified bounding set. It is possible to assess whether this set precludes a zero uncertainty effect. For the final regression in panel D, Oster's approach bounds the effect within a range of (0.093-0.148), under the conservative equal-selection assumption.[1]

While this interval is fairly broad, it suggests that the relationship between uncertainty and poor employment outcomes is not driven purely by omitted variable bias. Now, although the results presented so far demonstrate a tight correlation between uncertainty and unemployment in the data, they do not imply a *causal* role for uncertainty shocks. A natural experiment in this context is unlikely, but that should not prevent econometric work on such an important topic. In the next section we show that both relative uncertainty levels and unemployment increases are correlated with certain predetermined features of state government, suggesting that institutions that mediate levels of uncertainty also lead to lower levels of unemployment.

III State Institutions Affect Both Uncertainty and Unemployment

The changes in state-level uncertainty studied in the previous section, which mirror the national increase measured by Baker et al. (2016), may have been moderated or exacerbated by predetermined state-level institutions. Previous research has identified a variety of institutions that contribute to or mitigate policy-related uncertainty. Ozler and Rodrik (1993) found that some political systems were able to absorb external shocks more effectively. Poterba (1995) and Clemens and Miran (2012) found that states' budgetary rules have a large impact on the cyclicality of state spending. Andersen, Lassen, and Nielsen (2012) found that economic and political uncertainty were correlated with late budgets at the state level, and Besley and Case (1995) note the large impact that gubernatorial term limits have on state policy. In this section we investigate whether the impact of the aggregate, nationwide increase in uncertainty, once filtered through features of

[1]This calculation assumes $R^2_{max} = 0.85$. Under an assumption of $R^2_{max} = 1$, the range extends from .045-.148.

state-level institutions as they existed at the onset of the recession, caused some of the variation in the cross-section of unemployment outcomes. In other words, we seek institutions that, while not affecting level outcomes, amplify second-moment shocks.

We focus on state-level institutional features that both intuitively and based on the previous work discussed above drive uncertainty about policymaking at the state level, and where the effects can be measured relatively precisely. These features are whether states were governed by a lame-duck governor upon entering the recession, have recently failed to pass a budget on time, or have a formal budget deadline. Data on whether a state had a budget deadline in 2006, whether or not a state failed to pass a budget between 1988 and 2006 on time, and whether a state's governor was a lame duck in 2006 all come from from Andersen et al. (2012). Davig and Foerster (2015) demonstrate how such pre-determined features of the political environment can generate uncertainty and, as a consequence, affect economic performance.

The relevance of the set of institutions is confirmed by the fact that they have historically moderated the relationship between a measure of national uncertainty and state level labor market outcomes. This can be shown by regressing the log of employment at the state level on state and year fixed effects, an institution indicator, and the interaction of the log of the Baker et al. (2016) national uncertainty measure with the institution indicator. In other words, national-uncertainty movements had a bigger impact on states with late budgets, formal budget deadlines, and lame-duck governors.[2]

Table 4 shows that the level of our uncertainty measure is correlated with these predetermined features of state government. Columns 1 through 3 display the results of having a lame-duck governor, of producing budgets late in the past, and of not having a budget deadline. Late budgets and not having a deadline are similarly correlated with higher uncertainty, raising the level by 0.83 and 0.64 standard deviations. A lame-duck governor increased it by 1.24 standard deviations. Aggregating our institutional measures by either normalizing them or averaging states' ranks in different

[2]We do this from 1979 until the Great Recession, as Andersen et al. (2012) collected data for the existence of a budget deadline and the presence of a lame-duck governor from 1978 on. Late-budget data do not become available until 1988. Having produced a late budget reduces the elasticitiy of employment with respect to national uncertainty by 6.7, a lame-duck governor does so by 5.5, both statistically significant, whereas having a budget deadline raises the elasticity by by 3.8. As Baker et al. (2016) note, their index exhibits more limited variation in earlier years. In addition, all three of our institutional measures are binary. This makes precisely estimating these effects difficult, and our estimates should be seen as a confirmation of previously established relationships more than stand-alone findings.

orderings, which produces a stronger first stage produces quite similar relationships (an increase of one standard deviation raises the measure by 0.50 and 0.54 standard deviations). In sum, this panel paints a consistent picture of correlations between these features of state government and uncertainty levels, with more predictable state governments showing lower levels of uncertainty.

LOCATE TABLE 4 ABOUT HERE

Importantly, these predetermined institutions do not just mediate state-level uncertainty. The impact they have on uncertainty levels also drives employment outcomes at the state level in the recession. In the first two rows of Panel B, the government features from Panel A are used as instruments for our uncertainty measure, producing instrumental-variable estimates of the impact of uncertainty on the change in unemployment between 2006 and 2009. Some of the first-stage F-tests suggest that the instruments used are weak, but even so the estimates will be median-unbiased (Angrist and Pischke, 2009). These estimates show that higher levels of uncertainty caused higher levels of state-wide unemployment. In particular, the sign of the coefficient is always positive, as one would expect. For two of the three pre-determined institutions used as instruments for uncertainty, the coefficient is statistically significant, at the 5% level for a lame-duck governor and at the 1% level for the absence of a budget deadline. In the last two columns of Table 4, the instruments are averaged in two different ways to increase first-stage power without introducing median bias. These combined measures pass conventional weak-instrument tests, and bring confirmation that higher levels of uncertainty do indeed lead to worse outcomes. The third and fourth row of Panel B show these same estimates with a direct control for first-order shocks that may have affected unemployment rates, the percentage change in Gross State Product. Aghion et al. (2015) use this approach in a similar setup. Our estimates are barely affected. They, like theirs, will now be consistent if the unobservables in the model are mean-independent of the instruments conditional on the included controls, which seems plausible.

Simple cross-sectional exogeneity tests similar to those presented in the bottom panel of Table 2 show that the two composite institutional measures are not correlated with unemployment rates in 2006, Bartik-style employment shocks, or a simple AR model forecast of the change in the unemployment rate. The same holds for the three institutional measures independently. While these exogeneity tests do not prove that the exclusion restriction holds, they are reassuring.

The results in this section demonstrate that increased uncertainty driven by predetermined features of state government increased the levels of unemployment the states suffered through during the Great Recession. Uncertainty is thus likely to be not merely a by-product of economic conditions, but an independent driver of outcomes.

IV Discussion and Conclusion

The high levels of persistent unemployment caused by the 2008 financial crisis have been explained in a variety of ways. What we have shown here is that an explanation grounded in increased levels of policy and general economic uncertainty channel is plausibly of significant importance. We have built on the work of Baker et al. (forthcoming) to demonstrate that it is not just the time series, but also the cross-section of uncertainty levels that is consistent with the observed unemployment increases. We also provide evidence that all of this is not a mere statistical fluke: when compared to competing hypotheses, the uncertainty explanation for the length and depth of the Great Recession shows the potential to add to our understanding in and of itself. As further support for the uncertainty mechanism's role in driving jumps in unemployment we show that high levels of uncertainty driven by predetermined state-level institutions cause high levels of unemployment.

At the same time, we recognize that this is a prefatory result. The notion of uncertainty employed ("uncertainty regarding business conditions as faced by firms locally") could be more precise, and so could our measurement of uncertainty. To some extent this reflects weaknesses in the broader literature on economic and policy uncertainty. These weaknesses are driven by tension between a desire to understand the consequences of an intuitive notion of uncertainty, an unwillingness to commit to specific mathematical moments, and a limited ability to measure exogenous shocks to either intuitive notions or specific moments. Future research will hopefully find ways to continue increasing our understanding of both concepts and measurements.

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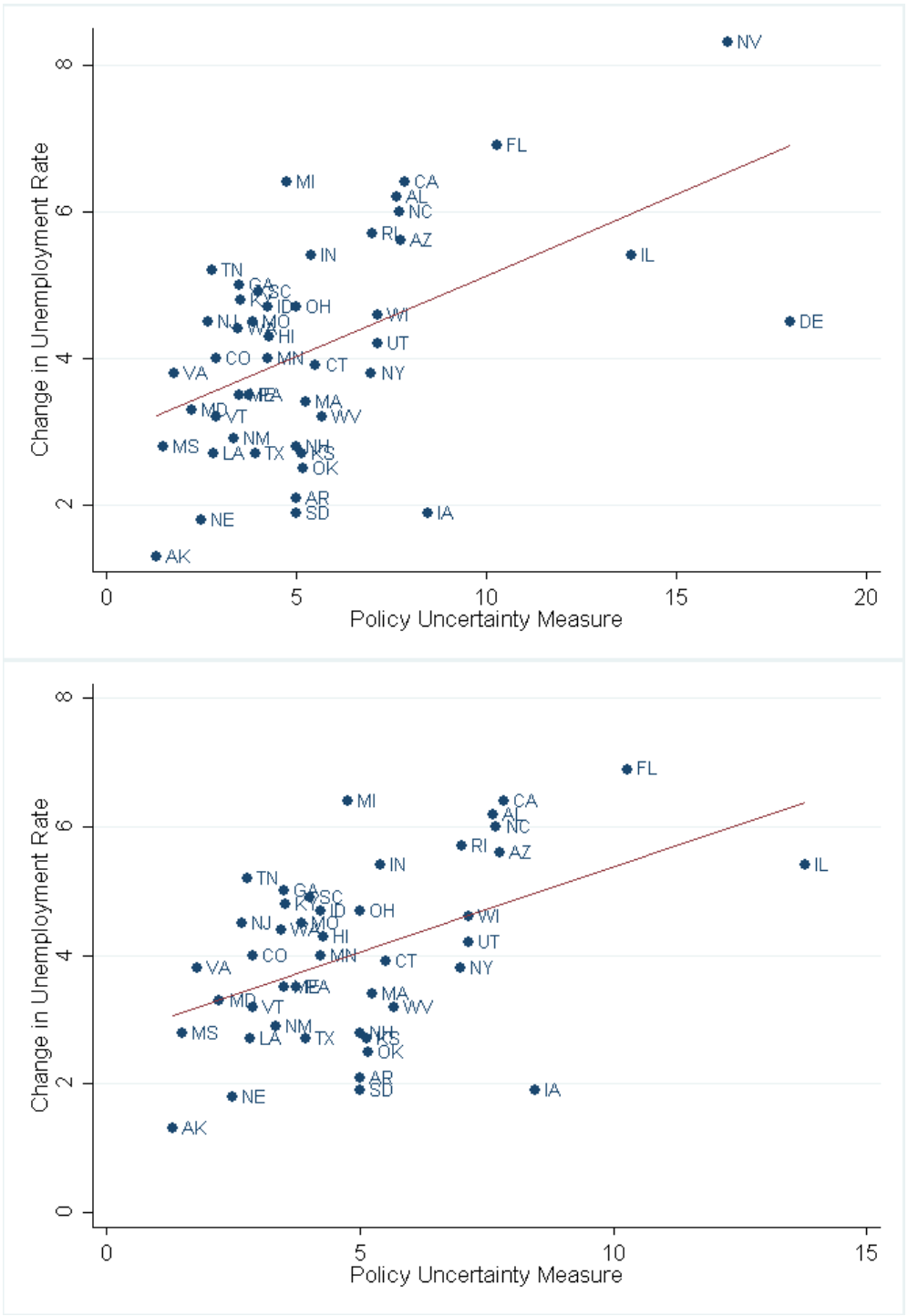

Figure 1. Uncertainty in the News and Unemployment: The top panel plots state-level uncertainty against the change in unemployment rates across states from 2009 to 2006, using seasonally adjusted rates from the Bureau of Labor Statistics. The bottom panel shows this same relationship without the two outliers.

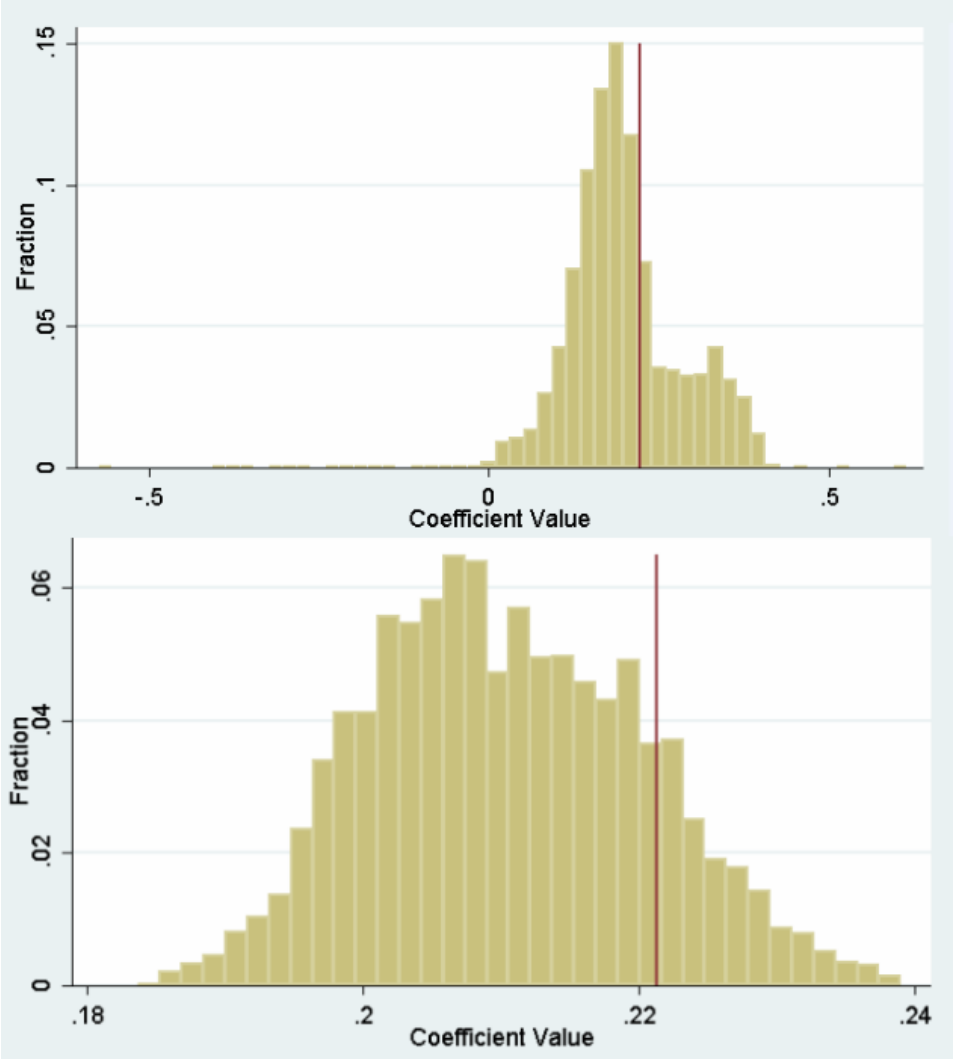

Figure 2. Uncertainty Index Coefficients: From our database of newspaper articles about uncertainty, described in the text, we select articles that contain terms related to state, and not national, uncertainty, and to policy, not sports or weather-related uncertainty. To do this we first select articles containing "state leaders," "state law," "state government," "state regulation," "state regulators," "state agency," "state grant," "state assistance," "auditor," "secretary," "treasurer," "gubernatorial," "tax," "budget," "governor," "legislature," "lawmaker," "state capital," and "representative." This leaves us with 17,226 articles. We then eliminate articles containing terms reflective of national or sub-state uncertainty: "washington," "dc," "katrina," "congress," "president," "editorial," "municipal," "obama," "bush," "federal," "county," and "district," for a total of 10,501 news articles reflective of state policy uncertainty. We use the relative frequency of these article before and during the recession to produce our measure of uncertainty as described in the text, and calculate its correlation with unemployment growth, as in the first column of the top panel of Table 1. To construct the figure in the top panel, we repeat this calculation using all of the subsets of at least five of the state words used above. To construct the figure in the bottom panel, we do so for all of the subsets of at least five of the national words used above.

Table 1. Industry Performance and State-Level Uncertainty

	Δ Unemployment (2006-2009)			
	(1)	(2)	(3)	(4)
National Uncertainty Sensitivity	0.144***	0.126***	0.139***	0.128***
	(0.022)	(0.027)	(0.023)	(0.024)
State Uncertainty Measure	0.144***	0.106**	0.159***	0.151***
	(0.0326)	(0.0361)	(0.0307)	(0.0259)
Controls				
Initial Unemployment			X	X
AR Model Forecast				X
Sample	Full	Drop Foreclosure Katrina States	Full	Full
R^2	0.538	0.342	0.558	0.594
N	46	41	46	46
Dependent Variable	4.4	4.4	4.4	4.4

Notes: This table reports regressions of the form $\Delta Unemployment\ 2006\text{-}2009_s = \alpha + NationalUncertainty_s\theta' + StateUncertainty_s\beta' + Controls_s\gamma' + \varepsilon_s$. National uncertainty is calculated by regressing the log of national employment by NAICS code on a trend and the Baker et al. (forthcoming) national-uncertainty index for 1990 to 2006. We take the coefficients on uncertainty from that regression and weight them by 2006 state industry employment share. State Uncertainty is the uncertainty measure described in the paper. Controls include the initial unemployment and the the predicted results of regressing unemployment on lags U_{t-3} to U_{t-7} for 1976-2006. The Katrina and foreclosure states are Arizona, California, Florida, Louisiana and Nevada. Robust standard errors in parentheses. $***\ p<0.01$, $**\ p<0.05$, $*\ p<0.1$

Table 2. Correlation of Uncertainty and Changes in Unemployment Rates

Baseline

	Δ Unemployment (2006-2009)			
	(1)	(2)	(3)	(4)
Uncertainty Measure	0.221***	0.121**	0.240***	0.217***
	(0.0762)	(0.0560)	(0.0751)	(0.0637)
Controls				
Initial Unemployment			X	X
AR Model Forecast				X
Sample	Full	Drop Foreclosure Katrina States	Full	Full
R^2	0.265	0.085	0.307	0.391
N	46	41	46	46
Dependent Variable Mean	4.4	4.4	4.4	4.4

Placebo Tests

	Unemployment 2006		Industry Share (Bartik) Shock		AR Unemployment Forecast	
	(1)	(2)	(3)	(4)	(5)	(6)
Uncertainty Measure	-0.0605*	-0.0679	0.137	0.0999	-0.000703	-0.00120
	(0.0339)	(0.0414)	(0.0865)	(0.0917)	(0.000787)	(0.000908)
Sample	Full	Drop Foreclosure Katrina States	Full	Drop Foreclosure Katrina States	Full	Drop Foreclosure Katrina States
R^2	0.043	0.039	0.032	0.021	0.020	0.042
N	46	41	46	41	46	41
Dependent Variable Mean	4.4	4.4	0.96	0.96	4.5	4.5

Notes: Details on the construction of the state uncertainty measure are in the text. Initial Unemployment is unemployment in 2006. AR Unemploymentl Forecast is the prediction from regressing unemployment on lags U_{t-3} to U_{t-7} for 1976-2006. Industry Share Shock is a Bartik-style industry share instrument, constructed as the predicted change in employment growth from weighted (by state industry employment) national industry-level employment growth. The Katrina and foreclosure states are Arizona, California, Florida, Louisiana and Nevada. Robust standard errors in parentheses. $***$ $p<0.01$, $**$ $p<0.05$, $*$ $p<0.1$

Table 3. Alternative Hypotheses Compared

Panel A. Structural Shift Controls			Δ Unemployment 2006-2009		
Uncertainty Measure	0.207***	0.200**	0.115**	0.220***	0.0822*
	(0.0573)	(0.0520)	(0.0519)	(0.0570)	(0.0452)
	Construction	Industry Share	FHFA	Census	All
Controls	Employment	Instrument	Housing Price	Regions	Structural
Panel B. Aggregate Demand Controls			Δ Unemployment 2006-2009		
Uncertainty Measure	0.188**	0.159**	0.204**		0.131*
	(0.0704)	(0.0666)	(0.0765)		(0.0699)
			Change in		
	DTI	Percentage	Food and		All
	Instrument	Change in	Entertainment		Demand
Controls		Car Sales	Employment		Controls
Panel C. Credit Supply Controls			Δ Unemployment 2006-2009		
Uncertainty Measure	0.177**	0.198**	0.202**	0.196**	0.138*
	(0.0816)	(0.0775)	(0.0774)	(0.0789)	(0.0773)
	Small	Average	Average		
	Business	Credit	Unused	Bank	All Credit
Controls	Share	Limit	Credit	Failures	Controls
Panel D: Multiple Channels			Δ Unemployment 2006-2009		
Uncertainty Measure			0.148***		
			(0.0486)		
Structural Shift Index			X		
Aggregate Demand Index			X		
Credit Supply Index			X		

Notes: This table tests the robustness of uncertainty to the inclusion of other amplification channels. All regressions have the following form: $\Delta Unemployment\ 2006\text{-}2009_s = Uncertainty_s\theta' + Controls_s\gamma' + \varepsilon_s$. Panel A, B, and C add control variables related to the structural shift, aggregate demand, and credit supply hypotheses respectively. Specifically, in Panel A we include the number of construction employees in the state, a Bartik-style industry-share-shift instrument, the percent change in housing price and census region fixed effects. In Panel B we control for state level housing supply elasticities (Debt-to-Income Instrument), the percent change in food and entertainment employment and the percent change in automotive sales. In Panel C the credit supply controls are the percent of employees working for a small business, the average credit limit, the average unused credit limit and the number of bank failures. In panel D, we first construct an index for each alternate hypotheses by standardizing the individual controls and taking the principal component factor. Then we regress the change in the unemployment rate on all three indices and our uncertainty measure. Robust standard errors in parentheses. $***$ $p<0.01$, $**$ $p<0.05$, $*$ $p<0.1$

Table 4. The Impact of Institutions on Uncertainty and Unemployment

Panel A. Effect of Institutions on Uncertainty

	State Uncertainty Measure				
Institution	1.365*	1.495***	-0.769*	0.029***	0.325***
	(0.673)	(0.394)	(0.418)	(0.007)	(0.0832)
Measure	Lame Duck	Late Budget	No Budget Deadline	Average Instrument: Rank	Average Instrument: Normalized
R^2	0.117	0.237	0.063	0.263	0.193

Panel B. IV Results

	Δ Unemployment 2006-2009				
Uncertainty Measure	0.303**	0.249	0.461***	0.342***	0.337***
	(0.141)	(0.187)	(0.159)	(0.128)	(0.126)
First Stage F-Statistic	5.17	4.03	8.28	10.53	10.56
With Δ GSP Control	0.308**	0.242	0.431***	0.330***	0.327***
	(0.140)	(0.176)	(0.141)	(0.122)	(0.120)
First Stage F-Statistic	5.28	4.55	9.91	11.98	11.97
Instrument	Lame Duck	Late Budget	No Budget Deadline	Average Instrument: Rank	Average Instrument: Normalized

Notes: This table tests the impact of three institutions on uncertainty and uses them as instruments for unemployment. The three institutional variables are the the presence of lame-duck governor at the beginning of the recession (Lame Duck), failure to recently pass a budget on time (Late Budget) and an indicator variable for a presence of a budget dead-line (Budget Deadline). Furthermore, in the last two columns these variables are combined. We rank each institutional variable and calculate the average by summing up the ranked variables that should increase uncertainty and subtract the ranked variables that would decrease it. A similar procedure is done with normalized variables. $***$ $p<0.01$, $**$ $p<0.05$, $*$ $p<0.1$