Economics of U.S. Policy Uncertainty

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Uncertainty, always a potential impediment to growth, has been higher than normal during this business cycle. This has had economic costs, but heightened uncertainty cannot be blamed each time the economy hits a soft patch, particularly during an election year.

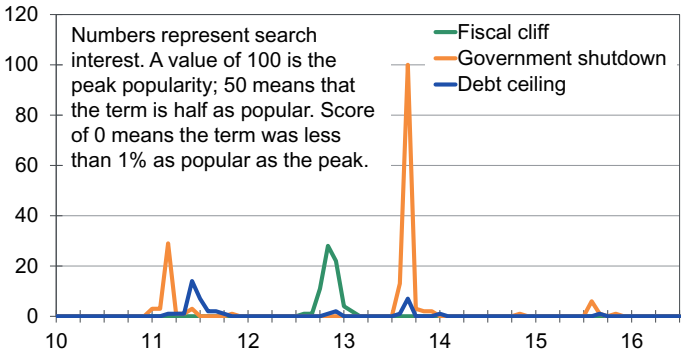
Uncertainty is garnering more attention today because this is a presidential election year, leading some to conclude that it is partially to blame for recent weakness in GDP growth and business investment, and a slowdown in trend job growth.

This is not misguided, but it is overdone. Political uncertainty can prompt businesses to delay hiring, firing and investment. Consumers could also turn more frugal during periods of heighted uncertainty. However, disentangling fluctuations in policy uncertainty from general economic uncertainty is challenging, let alone trying to isolate any impact of uncertainty related directly to a presidential election.

However, doing so would show how the variation in economic activity that can be attributed to fluctuations in economic policy uncertainty deviates from fluctuations in general economic uncertainty. The past several years have included a number of periods of unnecessarily heightened policy uncertainty that have caught the attention of investors, businesses and consumers. This is evident in the relative popularity of Google searches[1] for such events, including the so-called fiscal cliff[2], debt-ceiling battles, and government shutdown (see Chart 1).

Chart 1: Policy Events Are Attention Grabbers

Relative popularity of Google searches in the U.S. for…



Sources: Google Trends, Moody's Analytics

Though these events were clearly on the minds of investors, businesses and consumers, they do not help us gauge if economic policy uncertainty is higher than normal. Also, increased searches tells us little about whether the events altered the behavior of businesses, investors and consumers. To help answer these questions, economists have developed economic policy uncertainty indexes.

The purpose of this paper is to assess whether policy uncertainty has economic costs. It will also answer whether U.S. presidential elections can hurt the economy.

To answer these questions this paper presents various measures of economic policy uncertainty, highlighting their strengths and weaknesses. Given that measuring economic policy uncertainty is an inexact science, no attempt is made to determine if one measure is better than another. Rather, this paper will use economic policy indexes to assess the economic costs of heightened uncertainty using vector autoregression models.

Another goal of this paper is to discuss whether elections boost economic policy uncertainty and if elections slow the economy. First, the effect of U.S. presidential elections throughout history on the economy is examined. Then regression analysis is used, utilizing prediction market data, to show that any weakness in the economy this year cannot be blamed on the upcoming election.

Finally, this paper turns to state-level data for additional evidence that an election year does not have a negative effect on an economy. A model is introduced using state-level economic data and gubernatorial election outcomes to quantify the impact of elections.

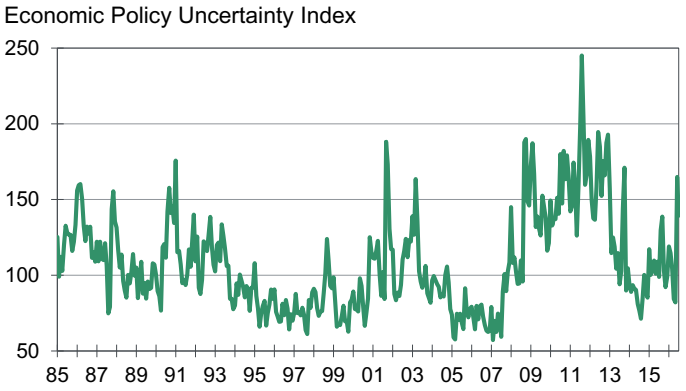
Economic policy uncertainty indexes

If one is to quantify the economic costs of policy uncertainty, one must make sure that policy uncertainty is appropriately measured. This is extremely difficult since policy uncertainty is not directly observable. There-

1 The benefit of Google Trends is that it provides the total number of searches for a term relative to the total number of searches done on Google over time. Google Trends adjusts search data to make comparisons between terms easier.

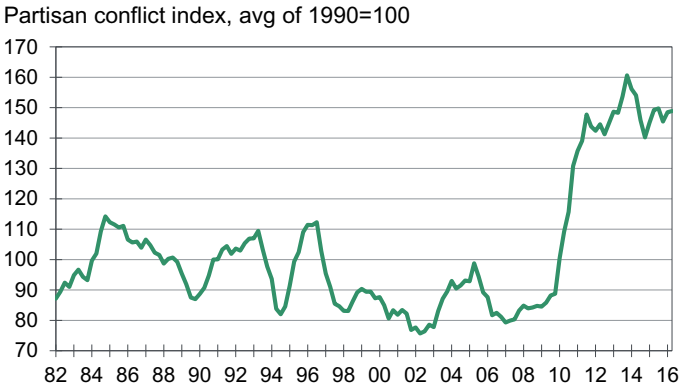
2 A situation that would have occurred in January 2013 whereby a series of previously enacted laws would come into effect simultaneously, increasing taxes while decreasing spending.

Chart 2: Policy Uncertainty Remains Elevated…



Sources: Baker, Bloom and Davis; Moody's Analytics

Chart 3: …As Is Partisan Conflict



Sources: Philly Fed, Moody's Analytics

fore, economists have created measures of policy uncertainty.

A widely cited measure of policy-related economic uncertainty was constructed by Baker, Bloom and Davis at Stanford University and the University of Chicago[3] (see Chart 2). Their initial index[4] comprised three components. The first component quantifies newspaper coverage of policy-related economic uncertainty. The second component reflects the number of federal tax code provisions[5] set to expire in future years. The third component uses disagreement among economic forecasters as a proxy for uncertainty.

Their index captures important periods of heighted policy uncertainty, including tight presidential elections, the Gulf Wars, the September 11 terrorist attacks, the failure of Lehman Brothers, the 2011 debt-ceiling dispute, and other recent major battles over fiscal policy.

This index has some important benefits. For example, the use of newspapers captures a broad range of uncertainty and is timely. However, there are methodological drawbacks to these types of measures. In particular, false positives are unavoidable. In other words, a newspaper piece may be about economic or policy uncertainty, therefore overstating[6] the degree of uncertainty. If the index picked up false positives attributable to economic uncertainty and not policy uncertainty, attempts to measure whether the index was related to economic conditions would be biased. There is also the potential risk of groupthink and inaccurate narratives in media coverage. Policy uncertainty could be incorrectly used to explain a sudden weakness in the economy, which can easily and quickly spread across media outlets. Also, uncertainty eventually turns into certainty, such as the outcome of a presidential election or fiscal policy. Still, discussion of uncertainty in the press could continue beyond the resolution of these events, inflating policy uncertainty.

Another potential issue is the difference between forecast dispersion and uncertainty. Forecast dispersion captures disagreement but not necessarily uncertainty. Each forecaster could be extremely certain, but there could still be a high degree of disagreement.

Also, the number of federal tax code provisions set to expire in future years could overstate policy uncertainty. The number of expiring provisions likely not as important as the value, which would capture the magnitude of the provisions. For example, a large number of small (in value terms) tax provisions could be scheduled to expire but they should create less uncertainty than if a small number of provisions that are large in value terms were due to expire. In addition, expiring provisions could be good or bad news depending on the effect of the policy on the economy.

Partisan conflict

Using a methodology similar to BB&D the Philadelphia Federal Reserve Bank[7] created a measure of political conflict (see Chart 3). The index captures the frequency of newspaper coverage of articles reporting political disagreement about government policy both within and between national parties, normalized by the total number of news articles within a given period.

By construction, the political conflict index captures some policy-related uncertainty. There are two types of economic policy uncertainty. The first relates to uncertainty about which policies will be chosen at each point in time. The second one relates to uncertainty about the consequences of policies that have already been chosen by the government. Partisan conflict causes only the first type of uncertainty.

For example, the Philadelphia Fed's policy conflict index is not overly responsive to either financial shocks or monetary policy, which can separately generate significant policy uncertainty. But not capturing these events is intuitive, as they are generally unrelated to government policy. Policy

3 See Baker, Bloom and Davis, "Measuring Economic Policy Uncertainty," *Chicago Booth Paper No. 13-02 Working Paper* (January 2013)

4 Data are available at http://www.policyuncertainty.com/

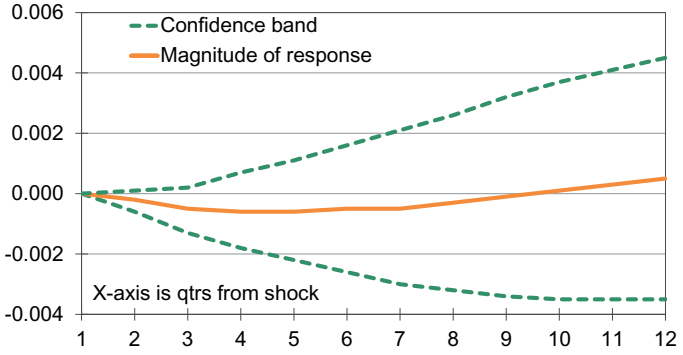
5 The methodology would later be adjusted to include the total dollar amount of expirations. They use weighting formula that corresponds to an annual discount rate of 100%. They use a high discount rate because many expiring tax code provisions are regularly renewed.

6 Creators of the Policy Uncertainty Index recognized this shortfall and audited their results by reading through a large number of articles to check whether the articles were in fact about economic uncertainty. Although there were some differences between the machine-created and the hand-created series, they found the two series were strongly correlated.

7 See Marina Azzimonti, "Partisan Conflict," *Working Paper NO. 14-19, Philadelphia Fed* (June 2014)

Chart 4: Not an Enormous Impact

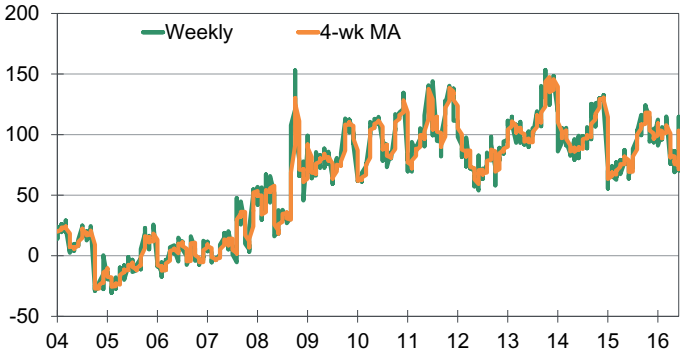
Log of private employment response to one std deviation in PCI



Source: Moody's Analytics

Chart 5: Little Recent Movement in MA Index

Moody's Analytics policy uncertainty index, 2004-2005=0



Source: Moody's Analytics

uncertainty and political conflict also can diverge during periods of military conflict. The former increases while the latter is shown to remain relatively low or even decrease.

The correlation coefficient between the Philadelphia Fed's partisan conflict index and the BB&D policy uncertainty index from January 1985 to July 2016 is only 0.38. There is almost no correlation between the two indexes from December 2007 to July 2016. Because this paper focuses on the economic implications of policy uncertainty or presidential election uncertainty, the low correlation coefficients suggest we should eliminate the partisan conflict index.

To double-check, the partisan conflict index is currently following a similar pattern to that of the past several presidential election years, even though this election feels particularly contentious. On the surface this would imply that the economic costs of policy uncertainty related to this election may not be significantly different from the past, which means they would be minimal.

Before deciding whether to drop the partisan conflict index from this analysis, it is important to determine if it has a greater and/or more persistent drag on the economy than policy uncertainty. To assess how long a sudden increase in partisan conflict would impact private employment and business investment, the relationship between these two variables and the partisan conflict index is examined using a vector autoregression model. The results show that a sudden increase in partisan conflict has a very small effect on private employment over the course of three years following the shock. The impact on real nonresidential fixed investment is more noticeable but not enormous (see Chart 4).

The results may seem a bit surprising. However, partisan conflict can, at times, be a positive factor for the economy. For example, conflict can cause brinkmanship, preventing fiscal policy, for example, from doing harm to the economy. In addition, bad economic policies often benefit groups with political influence, meaning that positive reforms can be politically contentious. These situations do not occur often but do highlight the difficulty in assessing the net costs of partisan conflict on the economy.

More important, partisan conflict has a smaller effect on the economy than policy uncertainty, justifying the use of other measures of uncertainty for this exercise.

Stock market volatility—a financial-based indicator as measured by the VIX—is a commonly used proxy for uncertainty. The drawback of stock volatility is that it is only indirectly connected to economic activity. Although company earnings are connected to economic activity, much of the short-run variation[8] in stock prices is driven by other factors.

Moody's Analytics Policy Uncertainty Index

While this paper builds on past work to quantify policy uncertainty, it is difficult to avoid all the criticism of the other indexes. Indeed, measuring uncertainty is an inexact science. Still, we create the Moody's Analytics Policy Uncertainty Index to measure uncertainty that stems from both fiscal and monetary policy (see Appendix 1). The index uses six variables; three each representing fiscal and monetary policy uncertainty (see Chart 5).

Event study

Though each measure takes either a different methodological or theoretical approach to measuring uncertainty, our a priori assumption is that there should be a high degree of correlation between them (see Appendix 2).

To test this a traditional event study methodology is used—selecting a number of events that would be expected to raise uncertainty—to compare how the various measures of policy uncertainty performed.[9] Though the magnitudes differed, generally the selected measures of policy uncertainty performed as expected (see Table 1).

Outlier events caused declines in the MA index in July 2011 (debt-ceiling standoff) and on June 23, 2016 (U.K. exit referendum). The inclusion of the expected default frequency of five-year Treasury bonds in the MA index explains why the MA index rose more quickly

8 See Robert Shiller, "Do Stock Prices Move Too Much to be Justified by Subsequent Changes in Dividends?", *The American Economic Review* (1981)

9 Though each measure of uncertainty is available at a lower frequency than monthly, we opted to use a one-month window because the lower frequency increases the volatility. These events are believed to have been significant enough to cause a large enough change in uncertainty to be visible on a monthly basis.

Table 1: Measures of Policy Uncertainty Generally Behaved Similarly

		Monthly % change in…		
Date	Event	Economic Policy Uncertainty Index	Moody's Analytics Policy Uncertainty Index	VIX
Mar 2008	Bear Sterns rescued	3.3	41.1	6.4
Sep 2008	Lehman Brothers files for bankruptcy and TARP	95.8	122.2	46.1
Jul 2011	Debt-ceiling standoff	25.2	-18.6	0.4
Dec 20012	Fiscal cliff	2.8	5.3	3.7
Oct 2013	U.S. government shutdown begins	18.4	21.6	4.9
Jun 2016	U.K. referendum vote	101.0	-3.2	19.7

Sources: Baker, Bloom and Davis; Moody's Analytics

than the others leading up to the debt-ceiling standoff in July 2011.

The U.K.'s decision to break from the European Union was a regional economic event. Therefore, it is a bit surprising that other measures of U.S. policy uncertainty increased because it is difficult to link Britain's decision to U.S. fiscal policy. There was some expectation of the Federal Reserve possibly having to ease monetary policy if financial market conditions tightened significantly in the wake of the vote, which did create some uncertainty. However, the U.K. referendum was not sufficient to significantly boost the MA index of U.S. policy uncertainty

Does policy uncertainty matter?

In theory, policy uncertainty should affect the economy by creating an incentive for businesses to delay hiring and investing. Uncertainty also can affect consumer behavior by postponing spending, particularly on large purchases including homes, cars, and other durable goods. Finally, uncertainty can also raise the cost of capital.

To quantify the impact of an increase in policy uncertainty, a vector autoregression model is used (See Appendix 3). This allows us to estimate the response of economic activity to an unexpected increase in policy uncertainty. Because the BB&D economic policy uncertainty index has a longer history than the MA index, we used it as our measure of uncertainty in the VAR. However, given the strong correlation between the two indexes, it is not unrealistic that the results would be similar.

The impulse responses were generally in line with our a priori assumptions. Employment, industrial production and stock prices respond negatively to a policy uncertainty shock. We will focus on employment, as it is easiest to gauge the implications of the shock. For perspective, the accumulated effect of employment from the policy shock we introduced, which is roughly equivalent to the difference between the averages of the index during the periods 2004 to 2006 and 2010 to 2015, reduces employment by 2.5 million after two years. For perspective, the economy created 2.9 million jobs in 2015.

Estimates of the employment effect vary depending on the time horizon over which the VAR is estimated and the severity of the policy shock. The simulation we ran could underestimate the impact by using the average of policy uncertainty index from 2010 to 2015. There were periods where uncertainty was significantly higher. However, the one benefit of this approach is that the accumulated impulse response shows the estimated boost to employment that would occur if uncertainty returned to its lower 2004 to 2006 average.

Similar exercises were done for other indicators of the economy, including business investment in R&D, but the results showed a minimal effect, counter to our a priori. There are a couple of possible explanations. First, a more granular approach is needed, including looking at firm-level data. The reasoning is that some firms face more irreversible investment decisions. Those with irreversible investment decisions should resort to a wait-and-see approach in the wake of a sudden increase in policy uncertainty.

Also, those firms that would find it costly to resell their physical capital and therefore have difficulties reversing their investment decisions should be hurt more by policy uncertainty. Both are difficult to quantify using aggregate investment data and using firm level is an avenue of future research.

Another possible explanation is that the impulse response to investment from a sudden increase in policy uncertainty is based on actual investment rather than planned expenditures. Therefore, uncertainty could have a greater impact on planned expenditures rather than actual. For example, the correlation coefficients between capital expenditure plans in regional Fed manufacturing surveys[10] and policy uncertainty were negative.

However, capital expenditure plans are not set in stone. Therefore, as policy uncertainty fades or uncertainty becomes certainty, businesses can adjust their plans. Therefore, the hit to actual investment is likely not as significant as it is to capital expenditure plans, particularly if the shock to uncertainty is temporary.

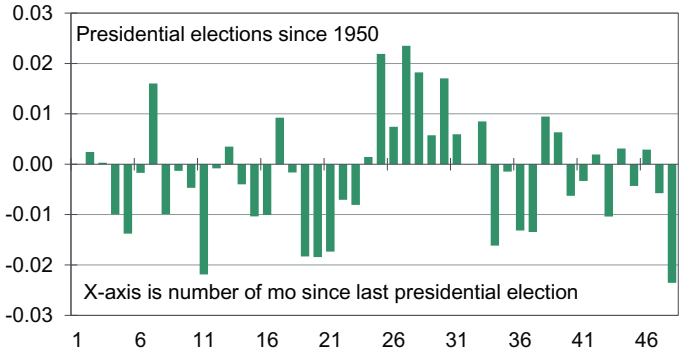
Presidential election uncertainty

Attention to policy uncertainty by investors, economists and the media is elevated given that it is a presidential election year. This raises two questions. First, do presidential elections increase policy uncertainty? Second, can we estimate the uncertainty created by the election itself, and is there any economic impact?

10 Regional Fed surveys used were Philadelphia, New York, Kansas City, Dallas and Richmond. The capital expenditure plans were used because of data availability and manufacturers likely experience more irreversible investment decisions than some other industries.

Chart 6: Little Evidence of Election's Impact

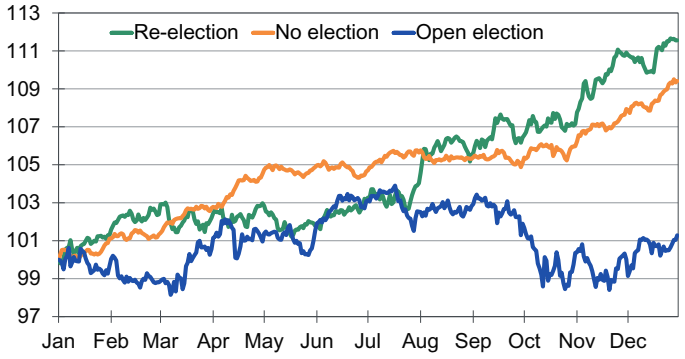
Coefficient on dummy variable for % change in S&P 500



Sources: Federal Reserve, Moody's Analytics

Chart 7: The Stock Market During Elections

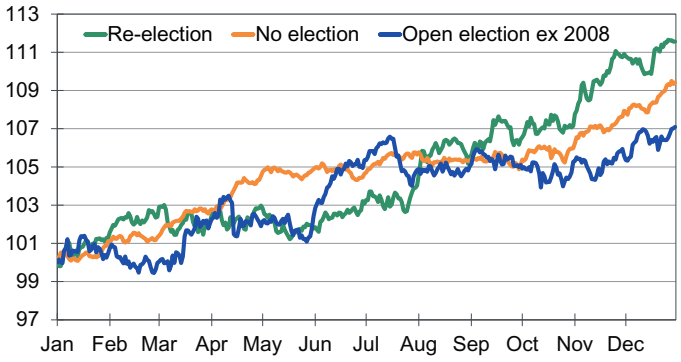
S&P 500, Jan 1=100, 1950-2016



Sources: S&P, Moody's Analytics

Chart 8: 2008 Blurs the Message

S&P 500, Jan 1=100, 1950-2016



Sources: S&P, Moody's Analytics

A simple regression is used to examine if presidential elections boost policy uncertainty. We used the BB&D economic policy uncertainty index, again because the measure has a longer history, which allows the inclusion of each presidential election since 1988. A dummy variable is created to equal 0 in nonelection years and 1 in election years. The results show that presidential election years explain little of the fluctuation in policy uncertainty and are not statistically significant, highlighted by the extremely low R-squared value and the statistical insignificance of the dummy variable.[11] This would appear to answer the first question, implying that presidential elections do not increase policy uncertainty.

There is the possibility that a presidential election campaign could affect the economy as the candidates create uncertainty when their differing policies are discussed publicly. To test this we regressed monthly changes in the Standard & Poor's 500—as a high-frequency proxy for economic expectations—on a dummy variable to capture months since the previous presidential election, going back to 1950. The results show no statistical pattern, implying presidential elections do not affect the stock market (see Chart 6).

This seems surprising. Therefore, we looked only at elections where no incumbent was running for president, with the assumption this would fuel greater uncertainty and would weigh on the S&P 500 (see Chart 7). Also, it is important to remove 2008, as the recession was the primary catalyst for the sharp decline in equity prices rather than the election. After removing 2008, open-election years look pretty much like no-election and re-election years (see Chart 8).

Thus, regarding the second question: Assuming history holds, the effect on the stock market and the broader economy should be small from this election. However, although history provides a useful guidepost, this election has been unusual and contentious, suggesting that uncertainty could be higher and persist longer than in past election years.

A contentious election

This presidential election presents an intuitive source of potential economic uncertainty and its economic costs. Therefore, this election should help to further understand the second question of whether elections can have economic costs.

Previous analysis that we have done has found that the economy would fair far differently under the two nominees for president. Under Hillary Clinton[12] the most likely scenario is that real GDP would grow 2.2% per year over the next decade, compared with 1.7% under Donald Trump.[13] This suggests that Trump may be viewed as a risk to the economy; his chances of winning the election may be creating uncertainty, and it may already be causing reduced investment. If electoral uncertainty can hurt the economy, the case of Trump's campaign represents a good test.

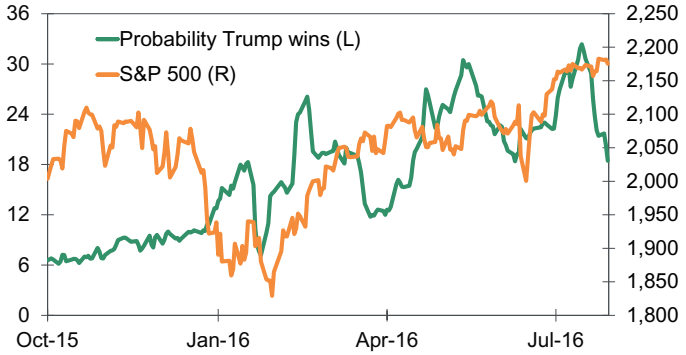
To assess the election's impact on the economy we will use stock prices. Current stock prices are based on expectations of future earnings. So, if the probability of Trump winning the election is reducing current in-

11 This seems counterintuitive. Presidential election years bring uncertainty about what policies will look like in the near term, so it is natural to wonder whether this uncertainty can hurt the economy now. Therefore, there may not have been a sufficient number of elections in our regression, making it too difficult of a test to pass.

12 See Zandi, Lafakis and Ozimek, "The Macroeconomic Consequences of Secretary Clinton's Economic Policies", *Regional Financial Review* (July 2016).

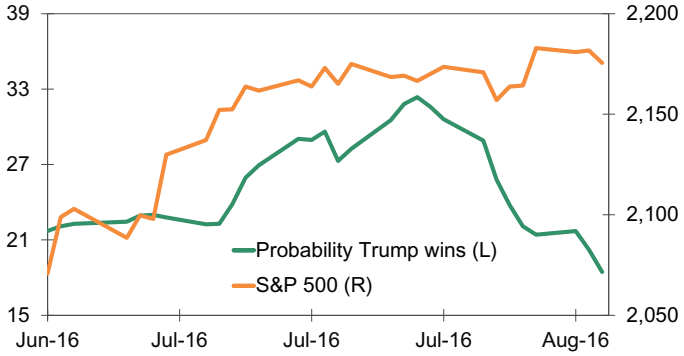
13 See Zandi, Lafakis, White and Ozimek, "The Macroeconomic Consequences of Mr. Trump's Economic Policies", *Regional Financial Review* (June 2016).

Chart 9: Trump Not Hurting Stock Market, Yet



Sources: ElectionBettingOdds.com, Betfair, S&P, Moody's Analytics

Chart 10: Steady Gains in U.S. Equities



Sources: ElectionBettingOdds.com, Betfair, S&P, Moody's Analytics

vestment and making businesses more pessimistic about the future, then it should result in lower equity prices ahead of the election.

We expand on our past work that used Betfair data, compiled at ElectionBettingOdds.com by Maxim Lott and John Stossel, to show that non-establishment candidates were not affecting the stock market.[14] If the election is causing uncertainty, than the stock market should rise and fall with Trump's odds of winning, according to Betfair data (see Chart 9).

At the end of 2015 and in early 2016, Trump's odds of winning rose as the S&P 500 fell in value, suggesting some relationship. However, after bottoming in February near 7%, the odds of a Trump win rose in fits and starts to a high of 32% in July while the stock market steadily climbed in value.

In addition, from June to early August, Trump's odds rose from 18% to 32% and then fell back down to 18%. Meanwhile, the S&P climbed steadily, seemingly unaffected by the rise and fall of election risk (see Chart 10). This would suggest no economic costs from the election.

More formal econometric analysis confirms the lack of a relationship between the S&P 500 and Trump's electoral odds. Regression analysis shows that day-to-day changes in Trump's odds of winning had a statistically insignificant effect on log differences of the S&P 500. This is true even when controlling for log differences in Canadian and British stock markets, which should isolate U.S.-specific changes in expectations about the future of corporate profitability.

There are several possible reasons for the lack of a relationship. First is that investors, and businesses more widely, are discounting the odds of a Trump election. However, forecasts based on polling data show odds of a similar magnitude. In addition, past research—at least prior to the Brexit referendum—showed that betting markets have performed well as predictors of electoral outcomes.

Another possibility is that businesses are discounting the negative effects that Trump would have on earnings and profitability. Though the stock market can affect the economy, the two do not move in tandem.[15] Trump's policies could be bad for job and GDP growth but still be healthy for corporate bottom lines. In addition, businesses may expect Trump's actions to be significantly constrained by the legislative and judicial branches, minimizing his impact on the actual economy.

Finally, Trump may represent a tail risk, which is the risk of a low-probability event with a large impact. The odds of his election may be a small-probability outcome, and the dangers he represents to the economy conditional on election may be small-probability events with large negative effects. For example, a default or even loss of confidence in the national debt would be a potential tail risk: highly unlikely but very damaging. There is some evidence that tail risks can be systematically underestimated,[16] which could explain the lack of stock market reaction so far.

Regardless of the explanation, the lack of effect of the election on the stock market to date suggests that it is not a likely explanation for the current weakness in investment or the downshift in trend job growth.

Turning to states

Some of the effect of presidential elections could be drowned out in the U.S. economic data. Therefore, we turned to gubernatorial elections to look for evidence of economic impact. States are an ideal test for the economic impact of elections. Governors have the chief authority over a state, with the ability to implement new policies and set budgets. What they do in office will directly affect local businesses, residents' disposable income, and the state economy. For this exercise, we did not use measures of policy uncertainty. For one, they are not available at the state level. Second, the assumption is that if an election were to affect the economy it would be at the state level.

Therefore, we tested how gubernatorial elections would impact the economy (see Appendix 4). Gubernatorial election data for the 50 U.S. states from 1938 to 2015, as well as monthly state employment data from

14 See Adam Ozimek, "Are Non-Establishment U.S. Candidates Affecting the Markets?", Economy.com (February 26, 2016)

15 See Ryan Sweet, "Does U.S. Growth Depend on the Stock Market?", Economy.com (April 16, 2014)

16 Taleb, Nassim Nicholas. *The Black Swan: The Impact of the Highly Improbable*. Random House, 2007.

January 1939 to December 2015, were used to measure the change in employment.

The assumption is that if the economy is hurt by the uncertainty surrounding gubernatorial elections, then employment growth would slow as the election nears, and start to pick up after. The reasoning is the election turns uncertainty into certainty, even if the policies of the elected candidate are not ideal.

We looked at the 12 months leading up to and following each gubernatorial election in each state, as these would be the months most likely affected by such an election. In the regression, we controlled for the overall health of the U.S. economy. Persistent differences in state job gains showed no pattern of weakening growth in the 12 months before the election, and no improvement in growth in the 12 months following it. Shortening the analysis to six months produced the same result.

As an additional test, separate effects were estimated for close elections with an incumbent candidate, and for close elections with no incumbent candidate. In elections that are not close, people have a better idea of the outcome of the election and therefore the possible policy implications, thereby decreasing uncertainty. Because of this, hiring decisions are less likely to be affected. In contrast, close elections generate more uncertainty because it is less predictable which candidate will take office.

To determine such effects we looked at the difference in the winning candidates' and losing candidates' share of votes. The closest 25% of elections were considered close, and the remainder fell under the not-close election category. As with the previous model, we tested both 12 and six months prior to and following each election month. The results followed suit, unable to prove a relationship.

Overall, the results show a lack of a relationship between elections and job growth at the state level. One reason could be because checks and balances limit the practical power of a single governor. If companies perceive a candidate's power to be limited, they will not give much weight to this when making hiring decisions.

In addition, many companies conduct business in more than just the state that they are located. Therefore, even if a policy change were to take affect because of a specific candidate's power, the implications may not be large enough to deter hiring. This would diminish the effect of electoral uncertainty on state employment.

Conclusion

Policy uncertainty is difficult to measure, making the task of accurately quantifying policy uncertainty's impact on the economy challenging. Using a number of measures of policy uncertainty showed that a sudden spike can have economic costs, but it can also be used as an excuse for weakness in the economy when there could be other clear causes, particularly during presidential elections.

This exercise showed that there is no discernable impact of a presidential election on the stock market and by extension the economy. Therefore, more fundamental issues, including weaker corporate profit growth, low labor force participation, and slower depreciation, are behind the recent struggles in business investment.

Also, blaming the downshift in trend job growth on the upcoming election is misguided. Again, job gains are slowing for other reasons, which should not be surprising. For one, the economy is approaching full employment, which leads to slower job growth.

Odds are policy uncertainty will remain elevated over the next several years because of the potential reforms to immigration and taxes. Also, environmental and financial regulations will continue to be debated. Still, a prolonged period of policy uncertainty does not justify lowering our forecast for U.S. GDP growth in coming years.

However, monitoring policy uncertainty will be important as the expansion continues to age because there is the potential that uncertainty could have a greater impact on the economy when it is vulnerable to falling into a recession. Therefore, we will continue to update our weekly policy uncertainty index while monitoring the other measures, including the BB&D economic policy uncertainty index, Partisan Conflict Index, and VIX.

Businesses can adapt, and policy uncertainty has been elevated for most of this business cycle. Therefore, if policy uncertainty remains elevated, the economic costs may not be overly significant. In other words, this is a new normal for businesses.

Appendix 1: The Moody's Analytics Policy Uncertainty Index

To measure U.S. economic policy uncertainty, an index is constructed using six equally weighted components. They capture both fiscal and monetary policy uncertainty. The components for the policy uncertainty index are:

1. Percent of respondents to the Moody's Analytics weekly business survey that say that regulation and legal issues are their biggest problem
2. Five-year U.S. CDS-implied EDF
3. The value of expiring tax provisions
4. 10-year CPI dispersion from the Philly Fed survey of professional forecasters
5. Unemployment rate (one year ahead) forecast dispersion from the Philly Fed survey of professional forecasters
6. LIBOR-OIS spread

The fiscal and monetary policy subcomponents are equally weighted.

The index begins in 2004.

Components:

Responses to the "biggest-problem question" from the Moody's Analytics weekly business confidence survey are used to gauge whether heightened uncertainty about government regulation is having an impact on business hiring/investment decisions.

Five-year U.S. CDS-implied EDF:

The Moody's CDS-implied EDF credit metric—probability of default—is used to capture uncertainty surrounding future U.S. fiscal policy.

Forecast dispersion:

The approach for measuring monetary policy uncertainty uses cross-sectional forecast dispersion from the Philadelphia Fed's Survey of Professional Forecasters. The dispersion for unemployment and CPI measures the degree of disagreement among the expectations of different forecasters. The measure of dispersion is the difference between the 75th percentile and the 25th percentile (the interquartile range) of the forecasts.

For most of the variables, the "level" is used to refer to the level of the variable, for example the unemployment rate. For CPI inflation, the Philly Fed defines the level as a quarter-over-quarter growth rate, in annualized percentage points, because forecasts are submitted as growth rates.

The unemployment dispersion is based on projections for the jobless rate one year ahead. As for inflation, the 10-year CPI dispersion forecast is used as an input into the uncertainty index.

The raw data for the dispersion indexes are pulled directly from the Philadelphia Fed and are updated quarterly.

Tax expiration:

Calculating an index value using the expiring tax provision data is done by taking the absolute value of the estimated net revenue impact from tax legislation set to expire and discounting it by the amount of time spanning the present to its planned expiration.

It is assumed that it does not matter whether the net impact of expiring tax provisions is positive or negative, since any change can potentially bring about uncertainty. The net financial impact of changes to tax policy is measured in absolute terms.

These values were discounted to reflect their growing importance as the expiration date nears. The same approach is used as by BB&D. The estimated revenue impacts from the tax changes were multiplied by $0.5^{((t+1)/12)}$, where t is the number of months between the present and the planned expiration of tax provisions. This represents a discount of 100% per year. The Joint Committee on Taxation typically estimates the revenue impacts of expiring tax provisions seven to 10 years ahead.

Libor-OIS: A measure of distress in money markets and can be used to gauge investor expectations of the target federal funds rate.

Construction of index:

The raw data are then normalized:

$$Z=(X\_i-X\_bar)/s\_{x}$$

Where X_bar is the sample mean and s_{x} is the sample standard deviation.

The raw data are normalized using the entire sample. Each component is then indexed to 2004 to 2005=0. These years were chosen based on data availability but also because this represented a "normal time."

$$Z^* = Z_i - \bar{Z}_{2004-2005}$$

where $Z^* = Z_i - \bar{Z}_{2004-2005}$ is the mean of the normalized values from January 2004 to December 2005.

The index was multiplied by 100 for easier interpretation. It is centered on zero and can be interpreted as: If greater than zero there is more political uncertainty than in the 2004-2005 time period; if less than zero there is less political uncertainty than 2004-2005.

Appendix 2: Comparing measures

Though each measure takes either a different methodological or theoretical approach to measuring uncertainty, our a priori assumption is that there should be a high degree of correlation between them (see Table 2). The summary statistics for each measure of policy uncertainty are provided in Table 3. The skewness in the BB&D economic policy uncertainty index and the Moody's Analytics Policy Uncertainty Index is not statically different than zero. The Economic Policy Index, however, appears to be more fat-tailed than ours. In other words, the probability of extreme policy uncertainty is much larger than predicted by the normal distribution.

Table 2: Summary Statistics

Statistics used for measures of policy uncertainty

Variable	Mean	Median	Minimum	Maximum	Standard deviation
Economic Policy Uncertainty Index	116.6	104.6	57.2	245.1	39.9
Moody's Analytics Policy Uncertainty Index	63.0	75.6	-27.3	145.8	46.3
VIX	19.3	16.3	10.8	62.6	8.9

Sample: Jan 2004 to Jul 2016
N=151

Source: Moody's Analytics

Table 3: Strong Correlations Between Measures of Uncertainty

Correlation coefficient between measures of policy uncertainty, Jan 2004 to Jul 2016

	Economic Policy Uncertainty Index	Moody's Analytics Policy Uncertainty Index	VIX
Economic Policy Uncertainty Index	1	0.60***	0.57***
Moody's Analytics Policy Uncertainty Index	0.60***	1	0.28**
VIX	0.57***	0.28**	1

N=151

0.5

Note: *** and ** denote statistical significance at p<.001 and p<.01, respectively
Source: Moody's Analytics

Appendix 3: Uncertainty VAR

A vector autoregression model is used to estimate the response of economic activity to an increase in the BB&D economic policy uncertainty index of nearly 60 points, which is equivalent to a difference change between the average of the index during 2004-2006 and during 2010-2015. The VAR includes the following variables:

1. Economic Policy Uncertainty Index
2. S&P 500
3. Three-month Treasury yield
4. Total nonfarm employment
5. Log of industrial production
6. Consumer price index

The VAR uses monthly data from January 1985 to July 2016 and includes two lags.

Appendix 4: Gubernatorial models

To calculate the effects gubernatorial elections have on a state economy, panel data were compiled from 1938 to 2015, which include both nominated candidates, the winning candidate, political party, each candidate's percent of popular vote, whether the candidate was an incumbent or not, and monthly employment for each state.

Variables were created for month-to-month change in employment, uncertainty, months since a gubernatorial election month, months until a gubernatorial election month, close elections, not-close elections, months since a close/not-close gubernatorial election month, and months until a close/not-close gubernatorial election month.

Next, five fixed-effects regressions were estimated.

Model 1: The dependent variable is the month-to-month percent change in employment. The independent variables are months until the next election and a dummy variable for each state.

Model 2: The dependent variable is the month-to-month percent change in employment. The independent variables are months until the election and employment growth in the 12 months leading up to it and the 12 months following, along with a dummy variable for each state.

Model 3: The dependent variable **is** the month-to-month percent change in employment. The independent variables are employment in the six months leading up to a gubernatorial election month, the six months following a gubernatorial election month, and a dummy variable for each state.

Model 4: This model includes a variable that indicates whether it was a close or not-close election. The variable is calculated by first observing the difference in the share of votes for the winning and losing candidate. The smallest 25% of differences in shares of votes across all states and elections were determined to be close, and the remainder fell under the not-close election category.

The regression is then a fixed-effects regression. The dependent variable is the month-to-month percent change in employment. The independent variables are percent change in employment in the 12 months leading up to and following a close gubernatorial election month, the 12 months leading up to and following a not-close gubernatorial election month, and a dummy variable for each state.

Model 5: The dependent variable is the month-to-month percent change in employment. The independent variables are employment growth for the six months leading up to and following a close gubernatorial election month, the six months leading up to and following a not-close gubernatorial election month, and a dummy variable for each state.

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Moody's Analytics added the economic forecasting firm Economy.com to its portfolio in 2005. This unit is based in West Chester PA, a suburb of Philadelphia, with offices in London, Prague and Sydney. More information is available at www.economy.com.

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