Loss Aversion, Policy Stickiness, and its Effect on Public Policy

by

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ABSTRACT

This paper looks at how loss aversion affects the Affordable Care Act in the United States. First, by extending a model of loss aversion on politics to include policy stickiness, I show that the change in marginal benefits and costs matters. Second, I look at how a change in the future amount of policy affects your decision today. Finally, through polling and google trends data, I show that the change in the expected future policy is a likely mechanism to explain the behavioral change seen in the Affordable Care Act. This helps give an example of loss aversion's affect outside of lab and field experiments.

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Chapter 1

Motivation

The Affordable Care Act (ACA), since it was implemented in 2010, has always been a controversial law. One question that has arisen in 2017 is why has it has suddenly become popular? Since the election of Republican President Donald Trump, which occurred in November 2016, the ACA's popularity has risen. The timing of the change is very important due to the campaign promises, to repeal and replace the ACA, was a central talking point of the Republican Party. There have been numerous articles talking about loss aversion and the Affordable Care Act from both the New York Times (Frank, 2017) and the BBC (Subramanian, 2017), but nothing within the economic and psychology literature. The goal of this paper is to see, with public opinion and google trends data, if loss aversion is a possible mechanism to understand the changing opinions of the American population.

Loss aversion, which was first put forward as part of prospect theory, is one of the cornerstone results of behavioral economics. Since it was proposed by Kahneman and Tversky (1979), it has helped lead a new study of economics by examining those without perfectly rational preferences. By suggesting a utility function which is concave in gains and convex in losses, it has allowed individuals to look at loss aversion in theoretical models. There is also an extensive literature showing loss aversion in field

experiments; however its effect on society as whole has been hard to prove. While there is research on loss aversions effect on trade policy and monetary policy, it is has had much less work done on its effect on public policy. By looking at the literature on loss aversion and comparing their results to public opinion and Google trends data, I hope to gain a better understanding of this relationship and to examine this behavioral economics effect.

The Affordable Care Act was first introduced and signed on March 23^{rd}, 2010 and is one of Barack Obama's most recognizable and polarizing policies. During the 2016 election, the Republican Party used repealing Obamacare, a common name used for the ACA, as one of its main goals if elected. In March 2017, the ruling Trump administration tried to repeal and replace the ACA, which was met with a large amount of criticism. At the time of this paper all attempts to repeal and replace the law have been unsuccessful. Though this issue is still far from being solved, and health care in America continues to be a polarizing issue, even with a general shift in the opinions surrounding the ACA.

There are many who doubt if loss aversion is felt in the market. Levitt and List (2008) state:

"Perhaps the greatest challenge facing behavioral economics is demonstrating its applicability in the real world. In nearly every instance, the strongest empirical evidence in favor of behavioral anomalies emerges from the lab. Yet, there are many reasons to suspect that these laboratory findings might fail to generalize to real markets."

One of the most persistent findings for loss aversion is that with experience and knowledge on a subject, its effect diminishes. It is easy to see why you would not feel a large amount loss aversion within real markets. If you are a business, loss aversion means you leave money on the table. There is a large incentive to maximize wealth which mediates the effect of negative behavioral anomalies. However, with

public policy, the number of people affected by changes is larger. This means that the percentage of people who are experts on a subject is usually much lower for any specific public policy issue. This allows loss aversions effect to play a larger role for public policy when compared to other markets and scenarios.

Though loss aversion might be a very reasonable explanation for the shift in opinion it is a different beast to be able to quantify and prove its effect. This makes this topic not only important in understanding the shift in the perception of the ACA, but also understanding how behavioral anomalies can have very large impacts. The use of google trends provides a new way to examine policy that was previously not available. You can examine not only how many times a policy was searched but the specific types of searches at different times. This helps give context to what mechanisms are underlying changes in public policy perception throughout time.

This paper will be organized as follows; it will start with background information on the Affordable Care Act, followed by a literature review, an extension of the model used in Alesina and Passarelli (2017), a look at polling and google trends data, and lastly a look at future work on this topic.

Chapter 2

Background Information

The Affordable Care Act (ACA) remains one of the most controversial bills associated with Barack Obama's presidency. It was given the name Obamacare by Republicans who opposed the bill and have moved to repeal it ever since. As of July 2017, the push to repeal and replace the ACA has stalled in the Senate with any future vote on the bill being at least temporarily delayed (Kane, 2017). The law put forward by the Republican senators has had an approval rating hit as low as 12% (Lopez, 2017) while the approval rating of the ACA has only increased. Repeal and replace was one of the main policies that the Republican Party ran during the 2016 presidential election and has been a main talking point ever since the law was signed in 2010 (Bump, 2017). With Republican control of the House, Senate and Presidency, you would expect to see favorable opinions of the main policies of the party, mirroring how the general public voted. This is however, not the case and I propose loss aversion is a viable mechanism to explain this.

The ACA required most U.S citizens to have health insurance all while expanding Medicaid, a government health care option for low income individuals, to also include those who made less than 133% of the Federal Poverty Line. (Summary of the Affordable Health Care Act, 2017). It also stopped insurance companies from turning

down applications of individuals who had pre-existing conditions and expanded the reach of the Medicare program, which was mostly geared towards older Americans. Though this is only a small summary of a large complicated policy, it does touch at the major talking points. One of the main criticisms has been the high insurance premiums that have plagued the ACA insurance plans (Luhby, 2017). This makes it difficult for some Americans to fully utilize the healthcare coverage, though the rate of uninsured Americans has decreased since the implementation of the law.

The controversy of the ACA was at its height in 2013 when Politico named then President Obama's quote "If you like your health care coverage, you can keep it" the 2013 lie of the year (Holan, 2013). During that time, the healthcare law was attacked more often than any other legislation that PolitiFact had previously looked at. In 2017 Gallup showed cost of healthcare is Americans' top financial concern (Dugan, 2017) and that many believe that healthcare is the top problem in the United States (McCarthy, 2017). Healthcare in America has been a major issue for quite some time, and the current situation has put it on the forefront of voters' minds.

The policy of the Democratic Party nominee for the 2016 presidential election, Hilary Clinton, was to "expand and defend" the ACA (Hilary on Healthcare, 2017). She also stated that the goal was to bring down out-of-pocket costs through spending, reduce prescription drug costs, provide incentives to states in order to expand Medicaid, expand rural healthcare, and double the funding for community health centers to name a few. This shows that the Democratic party's plan was to increase the amount of healthcare policy in America. This is a stark contrast when compared to the Republican plan to repeal and replace the law and have dramatic cuts to the amount of healthcare spending.

The replacement policies, the American Health Care Act (AHCA) and Better Care Reconciliation Act (BCRA), put forward by the Republican House and Senate respectively, both have come under heavy criticism. The Congressional Budget Office

(CBO) has scored both bills and the possibility of complete repeal of the ACA with no replacement. Under the AHCA, 23 million people would lose health insurance by 2026 but cut deficits by $119 billion (U.S. Congressional Budget Office, 2017). As of July 20^{th} the current version of the BCRA would cause 22 million individuals to lose coverage by 2026 and reduce deficits by $420 billion (U.S. Congressional Budget Office, 2017). Completely repealing the ACA without a replacement would cause 32 million people to lose coverage by 2026 but would reduce the deficit by $473 billion (U.S. Congressional Budget Office, 2017).

Policy	Coverage Loss	Reduction in Federal Deficit
American Health Care Act (AHCA)	23 Million	$119 Billion
Better Care Reconciliation Act (BCRA)	22 Million	$420 Billion
Repeal ACA, No Replacement	32 Million	$473 Billion

Table 2.1: Alternatives to the Affordable Care Act

As of july 5^{th}, 2017 the majority of Americans, 71%, want the Republican administration to work at improving the ACA instead of repealing and replacing the law (Altman, 2017). The unpopularity of potential changes from the current status quo in healthcare supports the idea that loss aversion has an effect. All of the policies put forward by the Republican Party show that they plan to decrease healthcare coverage in America.

Chapter 3

Literature Review

The literature review will focus on trying to gain as much insight from field experiments and their implications on Loss Aversion so that I can better relate it to the macroeconomic level. This will examine how previous papers quantified loss aversions affect in different areas ranging from trade policy, monetary policy to even PGA golfers. Finally, it will focus on the belief updating literature.

3.1 Loss Aversion

Loss aversion is the theory where an individual's losses weigh more than their equivalent gains. Pioneering work was done by Kahneman and Tversky (1979) with their model being extended in their 1992 paper. The basic idea is that the utility function of an individual is concave for gains, convex for losses, and steeper for losses than for gains. These gains and losses are all relative to a reference point. In their 1992 paper they estimate that the loss aversion coefficient was 2.25, which is still the bench mark value from which current analysis is compared to.

It is also important to talk about myopic loss aversion (MLA), which is a combination of loss aversion and mental accounting. Mental accounting is the idea that different individuals will aggregate their choices in different ways (Thaler, 2008).

MLA theory, when looked at experimentally by Haigh and List (2005), showed that traders who constantly looked at prices showed more MLA. This is due to the fact that traders, who constantly look at the market, might see periods when low risk assets (bonds) provide a higher payoff than riskier assets (stocks). This desecration means that those who are constantly looking at prices evaluated benefits and losses separately and over a shorter time period instead of weighing the returns on all assets over a lifetime. When this effect was tested in an experiment, MLA was observed to affect both the traders and undergraduate students, who were used as a control group, but affected the traders to a greater extent. This result is important since it shows MLA affects individuals in the work force and not just undergraduate students in a lab rat type setting. This paper also shows the importance of a reference point, the value that people compare a loss or gain to, and helps show how gains and losses are computed.

Field experiment work by Johnson et al. (2006) looked at the nature of loss aversion to see if this effect was constant, dependent on the individual, a characteristic of an attribute, or the result of a process. They achieved this by looking at individuals who recently bought sedans with different attributes. Their results show that those who are older and less educated are more likely to be loss averse. They also showed the importance of an individuals knowledge of the attribute and how important the attribute is to the decision-maker when talking about loss aversion. The attributes looked at here were car safety, fuel consumption, comfort, and information systems. Experience, age, and education are some of the most important factors to consider when studying loss aversion.

When looking at monetary policy, it has been found that there are asymmetries in responses to different actions. Work by Lo and Piger (2003) find that policy action has a much greater effect if done during a recession than during expansions. Gaffeo et al. (2014) looked at these asymmetries through adding prospect theory to

an otherwise standard dynamic general equilibrium model. Their results show that output reacted to monetary policy during a recession to a greater extent than during an expansion, which coincided with the empirical evidence. This has helped show the utility function from Kahneman and Tversky (1979) is useful in helping model monetary policy.

Rosenblatt-Wisch (2008) also added a piece-wise utility function described by Kahneman and Tversky (1979) into a stochastic optimal growth model with a dynamically updating reference point. The dynamically updating reference point states that whatever their consumption is in that period, it is their new norm. The resulting Euler equation coefficients, which included the discount factor and the loss aversion term, was estimated through using generalized method of moments (GMM). They used data on U.S consumption expenditure, gross domestic product and gross capital formation. The loss aversion factor was similar to the value found in Kahneman and Tversky (1992). This is important for macroeconomic modeling with implications on how to set up the representative agent. It also shows that the effect of loss aversion can be quantified and measured in macroeconomic data.

Trade policy is another area at that been both modeled and empirically estimated through the lens of loss aversion. One question that has arisen empirically from international trade is why so much protection is given to declining industries. Work by Tovar (2009) examined this problem through adding a piece-wise utility function, consistent with prospect theory, to help model the anti-trade bias puzzle within a small competitive economy. The results from the model show that with the prospect theory preferences and a large enough coefficient of loss aversion, the anti-trade bias can be explained. It also showed that those industries where the greatest loss in profits is felt, will receive the greatest protection. When the model endogenized the lobby function, the sectors that received a loss were more likely to form a lobby and fight for protection. Through GMM and nonlinear two-stage least squares estimation

it looked at 241 different US industries. The results coincide with the work done by Kahmeman and Tversky (1992) when looking at the value of the loss aversion coefficient.

When trying to quantify prospect theory for experienced agents in the field, Pope and Schweitzer (2011) looked at PGA golfers. More specifically, 2.5 million putts were examined and tested for loss aversion. They found that golfers were more likely to hit birdie putts less hard when compared to par putts. This result is consistent with loss aversion since the individuals equate the gain from getting a birdie less than the weight of giving them a hard putt for par which could lead to potential losses. This shows that experienced agents, those who are most likely to avoid loss aversion, still display this psychological affect.

Loss aversion on policy implementation has been looked at in the context of bundling. Milkman et al. (2012) showed that unpopular policies, due to their potential losses weighing more than the gains, could be bundled together to create a popular piece of legislature. Policies that have unpopular losses can be bundled to show only the net social welfare gain. This technique allows policy makers to overcome the psychological barrier faced by important but potentially costly policy. This does not quantify the effect of loss aversion but does show that this is a problem that policy makers face and demonstrates the importance of understanding the perception of a removal of a policy.

In policy and politics, loss aversion has been looked at by Aleisna and Passarelli (2017). Specially, they created a framework where loss aversion was incorporated incorporated into a value function's cost variables when the amount of policy increased. The same was done for benefits when the amount of policy decreased. They then show that loss aversion has a moderation effect and a status quo bias when compared to its rational actor counterpart. There is also a political endowment effect which stops the strict majority of individuals wanting to return to an old status quo once a new

policy has been approved. Then by extension they examine the differences between old and young voters. The older the voters are, the more susceptible to loss aversion, when compared to their younger counterparts. The younger individuals are also more likely to want an increase in the amount of policy where older individuals will prefer the status quo. The birthrate plays a role, where the lower the birthrate the more likely the status quo will be preferred.

3.2 Belief Updating

The work by Hogarthand and Einhorn (1992) is the main piece of work that examines how people update their beliefs across time. They put forward a belief-adjustment model about how people show a degree of belief in some hypothesis based on new information. This model is all relative to a reference point and how people weight new evidence. They then extend the model and give different possibilities depending on how people encode evidence, the mode of processing information and difference in the adjustment weight. It does provide a good starting point for trying to incorporate stickiness of beliefs.

Bamber, Ramsay and Tubbs (1997) take the belief adjustment model and then extend it to look at auditors' attitudes to evidence. They extend the model to look at whether evidence is confirming or disproving their previous information. It then looks at the sensitivity of the belief revisions. Their work suggests that less experienced individuals may be more likely to confirm their preconceived notion.

Chapter 4

Model

This section will look first look at the belief-adjustment model put forward by Hogarth and Einhorn (1992) and change it to examine policy stickiness. Then I will incorporate this stickiness to the Loss Aversion model by Alesina and Passarelli (2017). Lastly, I will use the loss aversion model to look at the sequence of events that unfolded around the Affordable Care Act with and without policy stickiness.

4.1 Stickiness of Beliefs

First I establish a stickiness of beliefs equation based of the frame work from Hogarth and Einhorn (1992). The model will be backwards looking and have a dynamically updating reference point.

$$S_k = S_{k-1} + w_k[s(x_k) - R]$$

Where:

S_k is the degree of belief in some attitude after evaluating the k^{th} piece of evidence

S_{k-1} is the prior opinion

w_k is the weight on the k^{th} piece of evidence

s_{x_k} is the subjective evaluation on the same evidence (x_k)

R is the reference point (which can also be S_{k-1})

k is the time period

To change this to look at how belief updating changes with loss aversion on policy I first define the belief model's reference point as S_{k-1}. This gives us the backwards looking, dynamically updating reference point. p_k is S_k, the desired amount of policy in ever time period, $\forall\ k$.

$$p_k = (1 - w_k)p_{k-1} + w_k s(x_k)$$

The term $w_k s(x_k)$ is how an individual perceives the policy change. In Alesina and Passarelli (2017) they describe this as type, t_i so I will set $x_k = t_i$. As in Alesina and Passarelli (2017) I also define the three groups of people, high types who want more policy ($t_i > \hat{t}_i$), low types who want less policy ($t_i < \check{t}_i$), and the median voter who prefers the status quo ($\check{t}_i < t_i < \hat{t}_i$). $F(t)$, the distribution of types, is assumed to be symmetrical so the median voters behave like a social planner.

This leaves us with

$$G(p^{k-1}) = p_k = (1 - w_k)p_{k-1} + w_k s(t_i)$$

This is how the desired amount of policy changes over time. $G(p^{k-1})$ is the function of your future beliefs with respect to your previous beliefs.

For simplicity I define

$$s(t_i) = \begin{cases} 1 & \text{if } t_i > \hat{t}_i \\ 0 & \text{if } \check{t}_i < t_i < \hat{t}_i \\ -1 & \text{if } t_i < \check{t}_i \end{cases}$$

This way the equation of motion of beliefs becomes

$$G(p^{k-1}) = p_k = \begin{cases} (1-w_k)p_{k-1} + w_k & \text{if } t_i > \hat{t}_i \\ (1-w_k)p_{k-1} & \text{if } \check{t}_i < t_i < \hat{t}_i \\ (1-w_k)p_{k-1} - w_k & \text{if } t_i < \check{t}_i \end{cases}$$

Iff $w_k \gtrless 0$, depending on if the amount of policy is increasing or decreasing. This will also give you a degree of polarization between the different types when updating beliefs; however this will not be looked at in the paper. The weighting function is then the "stickiness" of prior beliefs and could follow a different forms in future work.

4.2 Loss Aversion Model

Using the value function from Alesina and Passarelli (2017) and defining p^s, the status quo policy, as the previous periods policy, p_{k-1}, you get

$$V(t_i, p_t|p_{k-1}) = \begin{cases} B(t_i, p_k) - C(t_i, p_k) - \lambda[C(t_i, p_k) - C(t_i, p_{k-1})] & \text{if } p_k \geq p_{k-1} \\ B(t_i, p_k) - C(t_i, p_k) - \lambda[B(t_i, p_{k-1}) - B(t_i, p_k)] & \text{if } p_k < p_{k-1} \end{cases}$$

We also assume that, like in Alesina and Passarelli (2017), that

- Benefits are increasing and concave in the policy: $\frac{\partial B(t_i,p)}{\partial p} > 0$, $\frac{\partial^2 B(t_i,p)}{\partial p^2} < 0$
- Costs are increasing and convex in the policy: $\frac{\partial C(t_i,p)}{\partial p} > 0$, $\frac{\partial^2 C(t_i,p)}{\partial p^2} \geq 0$
- Types are indexed such that higher types bear lower marginal costs and/or enjoy higher marginal benefits from the policy: $\frac{\partial C_p(t_i,p)}{\partial t_i} \leq 0$, $\frac{\partial B_p(t_i,p)}{\partial t_i} \geq 0$ with at least one of these inequalities being strict.

This means that for all types $V(t_i, p)$ is concave in p and, for any t_i, there is a unique policy maximizing indirect utility.

From Alesina and Passarelli (2017) they state that for a 2 period model, consider a voter i in period 1. You proceed backwards, in period 2 the bliss point maximizes residual lifetime utility $V(t_i, p^2|p^1)$

$$p_i^2 \in \arg\max_{p^2} \begin{cases} B(t_i,p^2) - C(t_i,p^2) - \lambda[C(t_i,p^2) - C(t_i,p^1)] & \text{if } p^2 \geq p^1 \\ B(t_i,p^2) - C(t_i,p^2) - \lambda[B(t_i,p^1) - B(t_i,p^2)] & \text{if } p^2 < p^1 \end{cases}$$

Thus,

$$p_i^2 \in \arg\max_{p^2} \begin{cases} B_p(t_i,p^2) - (1+\lambda)C_p(t_i,p^2) = 0 & \text{if } p^2 > p^1 \\ p^2 = p^1 & \text{otherwise} \\ (1+\lambda)B_p(t_i,p^2) - C_p(t_i,p^2) = 0 & \text{if } p^2 < p^1 \end{cases}$$

This is due to the fact that in their analysis when you solve for p^2 you do not include the previous period at all. Or

$$p_i^2 \in \arg\max_{p^2} \begin{cases} \frac{\partial B(t_i,p^2)}{\partial p^2} - (1+\lambda)\frac{\partial C(t_i,p^2)}{\partial p^2} + \lambda\frac{\partial C(t_i,p^1)}{\partial p^1}\frac{\partial p^1}{\partial p^2} = 0 & \text{if } p^2 > p^1 \\ p^2 = p^1 & \text{otherwise} \\ (1+\lambda)\frac{\partial B(t_i,p^2)}{\partial p^2} - \frac{\partial C(t_i,p^2)}{\partial p^2} - \lambda\frac{\partial B(t_i,p^1)}{\partial p^1}\frac{\partial p^1}{\partial p^2} = 0 & \text{if } p^2 < p^1 \end{cases}$$

With $\frac{\partial p^1}{\partial p^2} = 0$ to get the same result as before. With policy stickiness added to the model $\frac{\partial p^1}{\partial p^2} \neq 0$

In period 1,

$p^1 \in \arg\max_{p^1} V(t_i, p^1|p^0) + V(t_i, p^2|p^1) =$

$$\begin{cases} B(t_i,p^1) - C(t_i,p^1) + B(t_i,p^2) - C(t_i,p^2) - \lambda[C(t_i,p^2) - C(t_i,p^0)] & \text{if } p^1 \geq p^0 \\ B(t_i,p^1) - C(t_i,p^1) + B(t_i,p^2) - C(t_i,p^2) - \lambda[B(t_i,p^0) - B(t_i,p^2)] & \text{if } p^1 < p^0 \end{cases}$$

And Alesina and Passarelli (2017) get

$$\begin{cases} \frac{\partial B(t_i,p^1)}{\partial p^1} - \frac{\partial C(t_i,p^1)}{\partial p^1} + [\frac{\partial B(t_i,p^2)}{\partial p^2} - (1+\lambda)\frac{\partial C(t_i,p^2)}{\partial p^2}]\frac{\partial p^2}{\partial p^1} + \lambda\frac{\partial C(t_i,p^0)}{\partial p^0}\frac{\partial p^0}{\partial p^1} = 0 & \text{if } p^1 > p^0 \\ p^1 = p^0 & \text{otherwise} \\ \frac{\partial B(t_i,p^1)}{\partial p^1} - \frac{\partial C(t_i,p^1)}{\partial p^1} + [(1+\lambda)\frac{\partial B(t_i,p^2)}{\partial p^2} - \frac{\partial C(t_i,p^2)}{\partial p^2}]\frac{\partial p^2}{\partial p^1} - \lambda\frac{\partial B(t_i,p^0)}{\partial p^0}\frac{\partial p^0}{\partial p^1} = 0 & \text{if } p^1 < p^0 \end{cases}$$

In their analysis $\frac{\partial p^1}{\partial p^0} = \frac{\partial p^0}{\partial p^1} = 0$ Which then leaves only

$$B_p(t_i, p^1) = C_p(t_i, p^1)$$

Which then proves that $p^1 = p^2$ in this case, through a proof by contradiction.

However assuming that $\frac{\partial p^1}{\partial p^0} \neq \frac{\partial p^0}{\partial p^1} \neq 0$, then you have four different cases for policy. In all of these cases p^0 is assumed to be known.

4.2.1 Cases of Loss Aversion with Sticky Beliefs

Case 1: $p^2 > p^1 > p^0$

$p^2 : \frac{\partial B(t_i,p^2)}{\partial p^2} - (1+\lambda)\frac{\partial C(t_i,p^2)}{\partial p^2} + \lambda\frac{\partial C(t_i,p^1)}{\partial p^1}\frac{\partial p^1}{\partial p^2} = 0$

$p^1 : \frac{\partial B(t_i,p^1)}{\partial p^1} - \frac{\partial C(t_i,p^1)}{\partial p^1} + [\frac{\partial B(t_i,p^2)}{\partial p^2} - (1+\lambda)\frac{\partial C(t_i,p^2)}{\partial p^2}]\frac{\partial p^2}{\partial p^1} + \lambda\frac{\partial C(t_i,p^0)}{\partial p^0}\frac{\partial p^0}{\partial p^1} = 0$

This simplifies when substituting in the p^2 solution to become

$p^1 : \frac{\partial B(t_i,p^1)}{\partial p^1} - \frac{\partial C(t_i,p^1)}{\partial p^1} - \lambda[\frac{\partial C(t_i,p^1)}{\partial p^1} - \frac{\partial C(t_i,p^0)}{\partial p^0}\frac{\partial p^0}{\partial p^1}] = 0$

Case 2: $p^2 < p^1 < p^0$

$p^2 : (1+\lambda)\frac{\partial B(t_i,p^2)}{\partial p^2} - \frac{\partial C(t_i,p^2)}{\partial p^2} - \lambda\frac{\partial B(t_i,p^1)}{\partial p^1}\frac{\partial p^1}{\partial p^2} = 0$

$p^1 : \frac{\partial B(t_i,p^1)}{\partial p^1} - \frac{\partial C(t_i,p^1)}{\partial p^1} + [(1+\lambda)\frac{\partial B(t_i,p^2)}{\partial p^2} - \frac{\partial C(t_i,p^2)}{\partial p^2}]\frac{\partial p^2}{\partial p^1} - \lambda\frac{\partial B(t_i,p^0)}{\partial p^0}\frac{\partial p^0}{\partial p^1} = 0$

This simplifies when substituting in the p^2 solution to become

$p^1 : \frac{\partial B(t_i,p^1)}{\partial p^1} - \frac{\partial C(t_i,p^1)}{\partial p^1} + \lambda[\frac{\partial B(t_i,p^1)}{\partial p^1} - \frac{\partial B(t_i,p^0)}{\partial p^0}\frac{\partial p^0}{\partial p^1}] = 0$

Case 3: $p^2 > p^1 < p^0$

$$p^2 : \frac{\partial B(t_i,p^2)}{\partial p^2} - (1+\lambda)\frac{\partial C(t_i,p^2)}{\partial p^2} + \lambda\frac{\partial C(t_i,p^1)}{\partial p^1}\frac{\partial p^1}{\partial p^2} = 0$$

$$p^1 : \frac{\partial B(t_i,p^1)}{\partial p^1} - \frac{\partial C(t_i,p^1)}{\partial p^1} + [(1+\lambda)\frac{\partial B(t_i,p^2)}{\partial p^2} - \frac{\partial C(t_i,p^2)}{\partial p^2}]\frac{\partial p^2}{\partial p^1} - \lambda\frac{\partial B(t_i,p^0)}{\partial p^0}\frac{\partial p^0}{\partial p^1} = 0$$

This simplifies when substituting in the p^2 solution to become

$$p^1 : \frac{\partial B(t_i,p^1)}{\partial p^1} - \frac{\partial C(t_i,p^1)}{\partial p^1} + \lambda[\frac{\partial B(t_i,p^2)}{\partial p^2}\frac{\partial p^2}{\partial p^1} - \frac{\partial B(t_i,p^0)}{\partial p^0}\frac{\partial p^0}{\partial p^1}] - \lambda[\frac{\partial C(t_i,p^1)}{\partial p^1} - \frac{\partial C(t_i,p^2)}{\partial p^2}\frac{\partial p^2}{\partial p^1}] = 0$$

Case 4: $p^2 < p^1 > p^0$

$$p^2 : (1+\lambda)\frac{\partial B(t_i,p^2)}{\partial p^2} - \frac{\partial C(t_i,p^2)}{\partial p^2} - \lambda\frac{\partial B(t_i,p^1)}{\partial p^1}\frac{\partial p^1}{\partial p^2} = 0$$

$$p^1 : \frac{\partial B(t_i,p^1)}{\partial p^1} - \frac{\partial C(t_i,p^1)}{\partial p^1} + [\frac{\partial B(t_i,p^2)}{\partial p^2} - (1+\lambda)\frac{\partial C(t_i,p^2)}{\partial p^2}]\frac{\partial p^2}{\partial p^1} + \lambda\frac{\partial C(t_i,p^0)}{\partial p^0}\frac{\partial p^0}{\partial p^1} = 0$$

This simplifies when substituting in the p^2 solution to become

$$p^1 : \frac{\partial B(t_i,p^1)}{\partial p^1} - \frac{\partial C(t_i,p^1)}{\partial p^1} + \lambda[\frac{\partial B(t_i,p^1)}{\partial p^1} - \frac{\partial B(t_i,p^2)}{\partial p^2}\frac{\partial p^2}{\partial p^1}] - \lambda[\frac{\partial C(t_i,p^2)}{\partial p^2}\frac{\partial p^2}{\partial p^1} - \frac{\partial C(t_i,p^0)}{\partial p^0}\frac{\partial p^0}{\partial p^1}] = 0$$

These are the cases for when the individual knows what the sequence of policy changes are going to be. Cases 3 & 4 exhibit an internal policy bundling effect. This internal policy bundling is consistent with Milkman et al. (2012) as it mediates the effect of loss aversion and makes the desired amount of policy closer to the socially optimal amount. That is, when it is known that a policy will reach a peak or valley, your loss aversion will be reduced due to the fact that it incorporates both benefits and costs. For cases 1 & 2 loss aversion will only affect cost and benefits respectively. This differs from the original model, where some degree of loss aversion is now felt in every period, meaning it is no longer just a one period switching cost.

4.3 Looking at the Affordable Care Act

In the case of the ACA my hypothesis is as follows. During the election the expectation was that Trump would not win. Republican Senators Mitch McConnell (Hensch, 2016) and Pat Toomey (Abramson, 2017) both stated that they themselves did not

expect to win the election. The assumption was that healthcare was going to expand following Case 1 under a Democrat President, Hillary Clinton. That means that the loss aversion coefficient was solely on the cost variables which explains why there was so much attack on rising Obamacare premiums and relatively low coverage on the benefits of the law. Then post November 2016, after Trump was elected, the policy path changed from case 1 to Case 4.

What the voters thought pre-2016 election was

$p_0 < p_1 < E[p_2]$

The actual sequence was that was unfolding with the Republican repeal efforts is

$p_0 < p_1 > E[p_2]$

4.3.1 Without Policy Stickiness

Bellow is the policy decision from Alesina and Passarelli (2017), this comes from their proof of proposition 2. The amount of policy selected for period 1 when an individual lives for 2 periods is

$$p_i^1 \quad \text{solves} \begin{cases} B_p(t_i, p^1) - (1 + \frac{\lambda}{2})C_p(t_i, p^1) \quad s.t. \quad \text{if } p^1 > p^0 \\ p^1 = p^0 \qquad\qquad\qquad\qquad\qquad\quad \text{otherwise} \\ (1 + \frac{\lambda}{2})B_p(t_i, p^1) - C_p(t_i, p^1) \quad s.t. \quad \text{if } p^0 > p^1 \end{cases}$$

and $p_i^2 = p_i^1$

They show that there is no incentive to change the amount of policy from period 1 to period 2 for an individual who lives for two periods. This means an individual selects their amount of policy such that $p_1 = p_2$ no matter what p_2 is. That is before the election, the current period amount of policy, p_1, was based on the expectation that the amount of policy in the future would increase with the ACA remaining and expanding. Post-election with repeal being increasingly more likely, individuals found

out that the policy was going to decrease, meaning that $p_1^{pre-election} \neq p_1^{post-election}$. This shift means that a large change in the policy's popularity is expected, thanks in part to the change in the expected amount of the future policy.

With the assumption that the reference point, p^0, is now the healthcare system under the ACA the assumption is that $p^1 = p^2 \leq p^0$ when previously it was $p^1 = p^2 \geq p^0$. This not only changes the amount of policy, but where loss aversion is felt. Benefits are now in the forefront of individual's minds when previously it was solely the costs. This leads to not only a shift in policy but also a shift of where loss aversion is felt. However, it is important to note that in this analysis that the amount of policy in the current period should decrease if people immediately change their preferences. This is due to the fact that $p_2^{pre-election} > p_2^{post-election}$. If individuals do select $p_1 = p_2$ then the amount of policy they would desire would drop along with the change in policy path. If however, after the election individuals still select their $p_1 = p_1^{pre-election}$ you have the scenario where voters want a higher amount of policy than is being put forward, accompanied by the loss of benefits being incorporated.

4.3.2 With Policy Stickiness

Pre-election voters solved their p^1 policy as

$$\arg\max \quad \frac{\partial B(t_i, p^1)}{\partial p^1} - (1+\lambda)\frac{\partial C(t_i, p^1)}{\partial p^1} + \lambda \frac{\partial C(t_i, p^0)}{\partial p^0}\frac{\partial p^0}{\partial p^1} = 0$$

Post-election voters solved their p^1 policy as

$$\arg\max \frac{\partial B(t_i, p^1)}{\partial p^1} - \frac{\partial C(t_i, p^1)}{\partial p^1} + \lambda[\frac{\partial B(t_i, p^1)}{\partial p^1} - \frac{\partial B(t_i, p^2)}{\partial p^2}\frac{\partial p^2}{\partial p^1}]$$

$$-\lambda[\frac{\partial C(t_i, p^2)}{\partial p^2}\frac{\partial p^2}{\partial p^1} - \frac{\partial C(t_i, p^0)}{\partial p^0}\frac{\partial p^0}{\partial p^1}] = 0$$

So when you set these two cases equal to each other and assuming that p^1 is the

same for both cases you get

$$\lambda[\frac{\partial B(t_i,p^2)}{\partial p^2}\frac{\partial p^2}{\partial p^1}-\frac{\partial B(t_i,p^1)}{\partial p^1}+\frac{\partial C(t_i,p^2)}{\partial p^2}\frac{\partial p^2}{\partial p^1}-\frac{\partial C(t_i,p^1)}{\partial p^1}]=0$$

or written another way

$$\frac{\partial B(t_i,p^1)}{\partial p^1}-\frac{\partial B(t_i,p^2)}{\partial p^2}\frac{\partial p^2}{\partial p^1}=\frac{\partial C(t_i,p^2)}{\partial p^2}\frac{\partial p^2}{\partial p^1}-\frac{\partial C(t_i,p^1)}{\partial p^1}$$

What this says is that when the loss in marginal benefits is equal to the gain in marginal cost savings, you will solve for the same amount of policy for p^1 in case 1 & 4. However, if the loss in benefits is greater than the costs savings then the median voter will choose so pick a higher amount of policy for p^1 in case 4 compared to their case 1 policy. The opposite will occur if the cost savings is greater than the loss in benefits.

This is what voters had to do so they could update their beliefs, with the policy path going from case 1 to case 4. They had to think about their loss in the marginal benefits and how it compares to their gain in marginal costs. The other important thing to observe is that the loss of marginal benefits only would be incorporated after the expected sequence of policy changes goes from case 1 to case 4. And when looking at the cost cutting measures put forward in the Republican bill, the tax cuts went to only a small minority of the American population. So for the certain groups of Americans, especially those who are sick or older, would view the loss of marginal benefits as being greater than the cost savings. That would mean that they prefer more healthcare benefits than that being given to them with the Republican House and Senate bill. This then means that in the current period, p^1, more individuals are more likely to prefer more policy than their previous preference.

For both possibilities, with and without policy stickiness, the shift from expecting the amount of policy to increase to it now decreasing will cause a dramatic and sudden

shift in the amount of policy they desire in the current period. This helps explain why there is only a significant increase in the approval ratings and number of google searches immediately after the election.

Chapter 5

Data Calibration

This chapter looks at the different sources of data used to examine this problem. It will first look at the current population survey used to examine the changes in healthcare coverage in the United States. Then it will examine the polling data displayed in this paper. This will be followed by a section on Google trends and Google correlate data.

5.1 Current Population Survey

Health care coverage and the uninsured rate data is also looked at from the Current Population Survey Annual Social and Economic Supplements (Barnett and Vornovitsky, 2016). This provided yearly data with health care coverage across states and gives the uninsured rate from 2008-2015 through table HIC-04. 2016 and 2017 data on the uninsured rate in America is not available at the time of this paper. Only aggregate data on America was displayed in this paper.

5.2 Polling Data

The main data source that was used to provide the approval rating on the Affordable Care Act was the Kaiser Health Tracking Poll provided by the Kaiser Family Foundation. It provides monthly public opinion data on the ACA from April 2010 to July 2017 which is available to the public with only a few gaps in their monthly data. The survey is asked on the first of every month and categorizes the respondents by political allegiance, income, age, gender, and ethnicity with the possible answers being "Favorable", "Unfavorable" and "Dont Know". The most recent data sample was collected via a random digit telephone sample of 421 landline numbers and 785 cell phone numbers in both English and Spanish (Kirzinger et al., 2017). The results were weighed to consider the current pattern of phone use and the fact that those who have both landlines and cell phones have a higher probability to be surveyed.

There is a notable difference in values present among different public opinion polls. Gallup, another organization that provides public opinion polls on the ACA, showed that 55% of Americans were in favor of the ACA in April 2017 (Norman, 2017). Real Clear Politics also has a poll average which aggregates data from other organizations, shows that there are more Americans in favor of the ACA than those against starting in January 2017. This aggregate poll data has an issue of weighting each poll and the selection bias for each individual poll. Only the Kaiser Health Tracking Poll and the Real Clear Politics poll (RealClearPolitics, 2017) will be displayed.

5.3 Google Trends and correlate

Google trends along with google correlate were used to understand how information was searched at different points in time from January 1^{st}, 2004 onwards. Google Trends has distinct categories that you can examine which are search terms, topics and categories. Topics are an aggregation of the same concept while terms are just show

how many times your query was searched. You can also refine specific searches while excluding certain words, having it look for one of a multiple of searches, making it look for a combination of searches, or just look for an exact phrase (Stephens-Davidowitz and Varian, 2017). Google trends then allows you to restrict the geographical location, the time frame and category. You can examine different sub-regions which for the United States is at the state, metro and city level.

Google Trends displays all of its data on a relative 0 to 100 scale. The 100 point represents the point in time that a specific search term reaches a maximum. All other values represent the percentage of that maximum search term. You can do upwards of 5 searches on the same scale.

Google correlate allows you compare a country's search terms with other search terms time series, US states data sets, or any other weekly or monthly time series from an external source. It provides the top 100 search terms that are most correlated with the data you put in. Google correlate can do these operations for any period of time. Along with many other uses, it allows you to see what individual search terms are most correlated with the aggregated topic.

Chapter 6

Data Analysis

The data analysis section focuses on the aggregate level data of healthcare in America, followed by the polling data, and finally the google trends search results. This allows us to look at the trends of healthcare in America, and to see if loss aversion is a likely explanation for the changes perception. The chapter will then end with a short discussion section.

6.1 Uninsured Rates

Data from the Current Population Survey (CPS) show that the uninsured rate in America (Figure 6.1) reached a peak in 2010 at 15.5% which was when the Affordable Care Act was initially enacted. From 2010 onwards, the uninsured rate in America has dropped considerably reaching a new low in 2015 of 9.4%. 2016 and 2017 data was not available at the time of this paper. This shows that the ACA has had an effect at decreasing the number of individuals that were without health insurance. Over the same time period the two main forms of government health care, Medicaid and Medicare (Figure 6.2), have increased. This is important to see how far reaching the ACA has been, how large of an impact it has had at decreasing the uninsured rate in America. This also helps show that the trend of health care coverage has been

constantly increasing since the establishment of the ACA. This helps the hypothesis that the loss aversion felt post-2016 election is due to the fact that voters didn't think there was the possibility of repealing or reducing their healthcare coverage. It also show that the status quo policy path was increasing healthcare coverage in America.

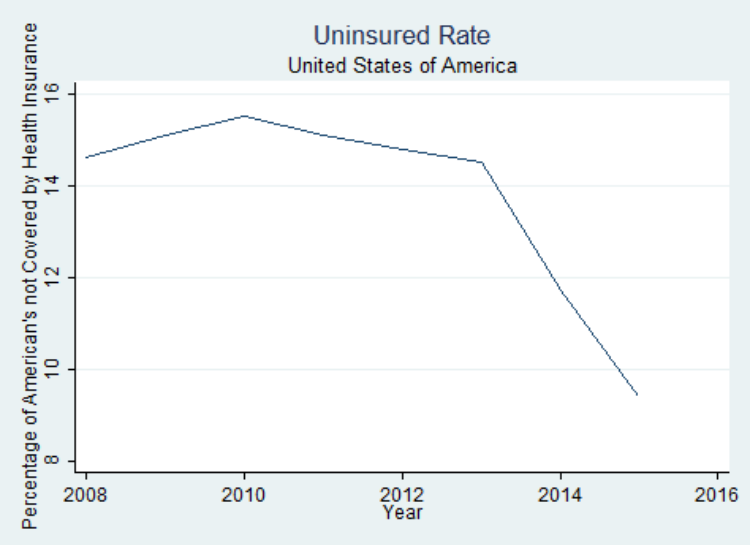

Figure 6.1: Uninsured Rate: Current Population Survey

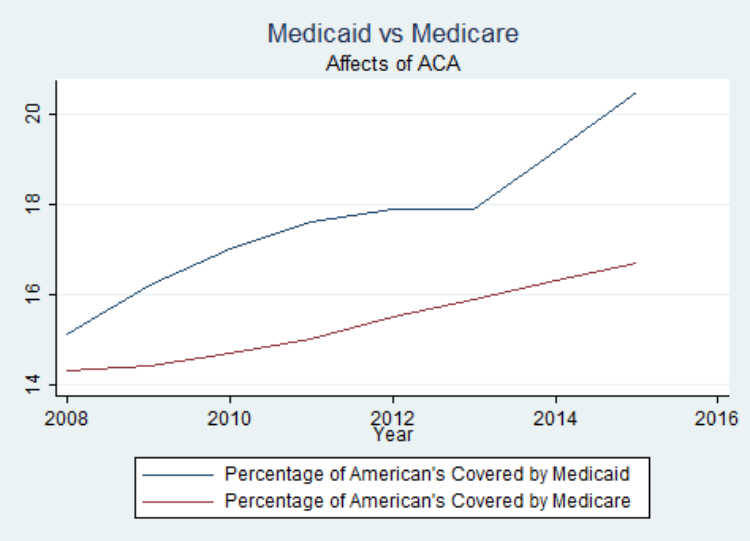

Figure 6.2: Medicare and Medicaid: Current Population Survey

6.2 Polling Data

Total population's values (Figure 6.3) show a clear pattern. Initially there is relatively high approval ratings, a low period in 2013 coinciding with the debut of healthcare.gov (Holan, 2013) lasting until mid-2014, a period of increasing approval ratings from mid-2014 to mid-2016, and a sharper increase in approval ratings from November 2016 onwards, after American elections took place. The two red lines represents when healthcare.gov was revealed and when the 2016 presidential election took place respectively. Another important piece of information how the uncertainty evolved. The "don't know" response reaches a peak in April 2013 just before the debut of healthcare.gov. Up until that point people were not sure what the policy fully provided as certain provisions did not take place until January 2014. The amount of uncertainty has a downwards trend with a sharp drop of in September 2016, just 2 months before the election. As people were getting ready to vote the amount of uncertainty decreased. This helps show that people started to learn more about the policy, or at least become sure of their beliefs, before the election which allows then to better understand what the possibility of repeal would mean after Donald Trump was elected.

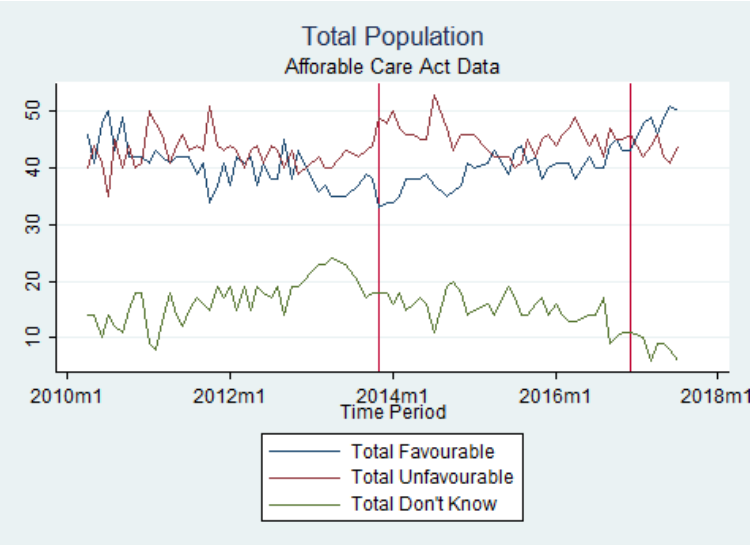

Figure 6.3: Total Population: Kaiser Health Tracking Poll

For individuals that are aged 65+ (Figure 6.4), they have a different pattern within their approval ratings when compared to the 18-64 age group (Figure 6.5). Since the ACA was enacted in 2010, it has almost always been unfavorable for the older age category, with there being a larger difference between "favourable" and "unfavourable" responses when compared to that of their younger counter parts. However, post 2016 election onwards there has been a large increase in the approval rating with views converging to the 18 to 65 age category in the most recent time periods. The increase post-election is also much larger for the older age category. This result is important since those who are in the highest age category stand to lose the most from the repeal of the law. As stated before in Johnson et al. (2006), loss aversion increases with age making the 65+ age category potentially the most loss averse to the possibility of repealing the ACA.

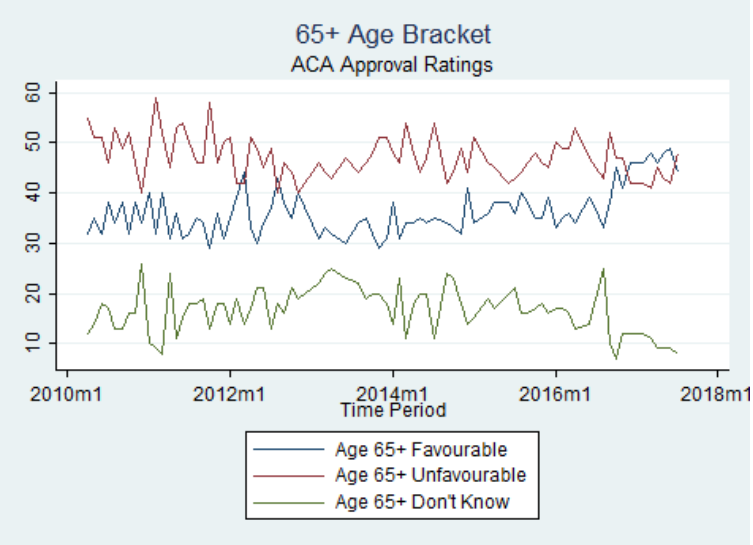

Figure 6.4: 65+ Age Bracket

There are slightly different patterns that emerge when you examine different income brackets. For the lowest income bracket (Figure 6.6), people who earn less than $40, 000, there have been periods previously where the ACA has been more favorable than unfavorable. There is not the same dramatic increase as the bill had its popularity rising before the election took place. The low income bracket also has the highest

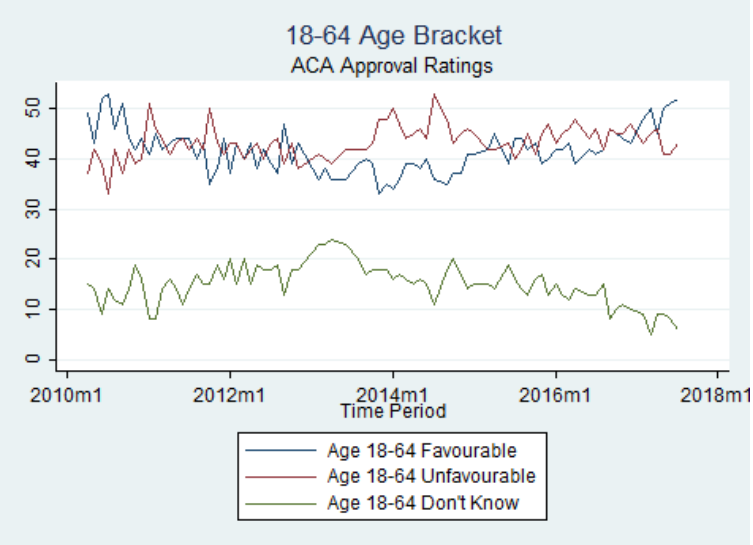

Figure 6.5: 18-64 Age Bracket

amount of "don't know" response compared to the other income brackets. For people in the middle income bracket (Figure 6.7), those making in-between $40, 000 and $89, 999, it was the bracket where the largest the largest increase in approval post-election took place. This increase is from an increase in those who responded favorable and by a decrease of those who responded unfavorable. This is most likely due to the fact that they received less support than the lowest income bracket and paid more in taxes. They also relied more on government support than those in the highest income bracket, who could most likely pay for insurance no matter the political landscape. This is the group of people, the middle income bracket, who didn't fully incorporate the benefits of the law until the repeal became more likely. They also are the ones whose costs were the largest burden, meaning that they were likely more loss adverse to the cost of the policy previously. There is a drop off in approval ratings in the most recent time period but I would attest that to the increasing political uncertainty around the law that is happening in July and August of 2017. The highest income bracket actually had rising approval ratings before the election but did have a larger shift just after the election took place. As with the middle income bracket there is variability of the approval ratings in the most recent time periods, which I would put

to political uncertainty.

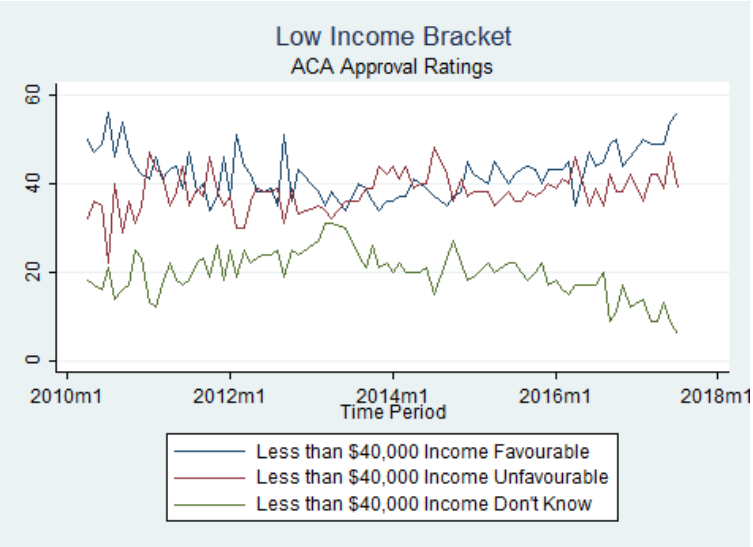

Figure 6.6: Low Income Bracket

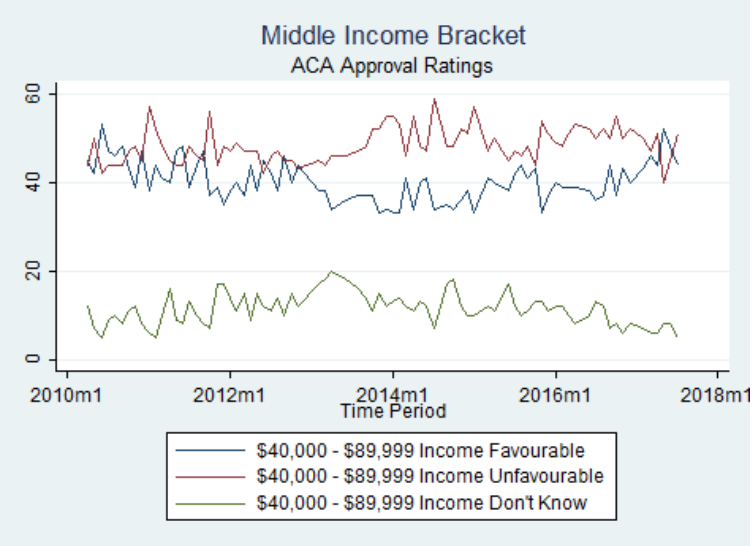

Figure 6.7: Middle Income Bracket

Real Clear Politics (Figure 6.9) also has an aggregate poll with sources from numerous online sources ranging from the Economist to Fox news (RealClearPolitics, 2017). Only the time frame from January 1^{st}, 2016 to August 2^{nd}, 2017 is displayed. This poll is daily, with new information being received at non-regular time intervals. This poll assumes that the previous approval rating is the value until new information

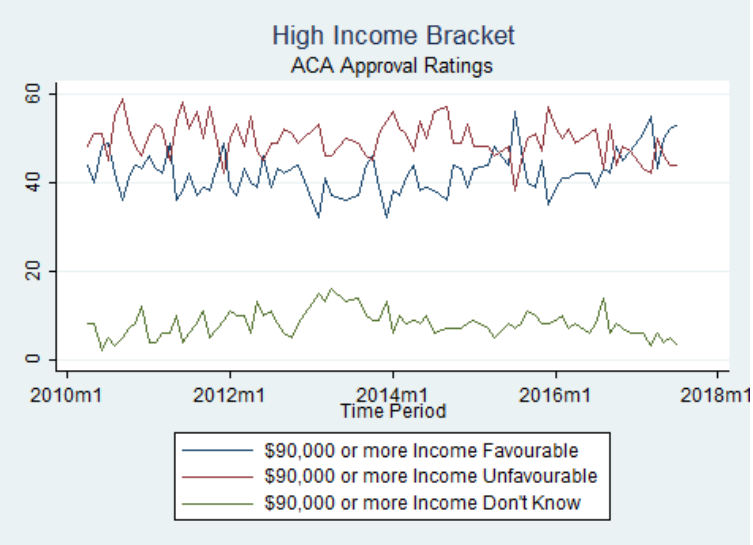

Figure 6.8: High Income Bracket

is received. The red line represents November 6^{th}, 2016, the date of the election, and the sharp increase is seen in the first poll which occurred after Donald Trump become President. Gallup's poll has the same effect in the same time period (Norman, 2017). What this shows is that this is not anomaly is not exclusive to one source of information.

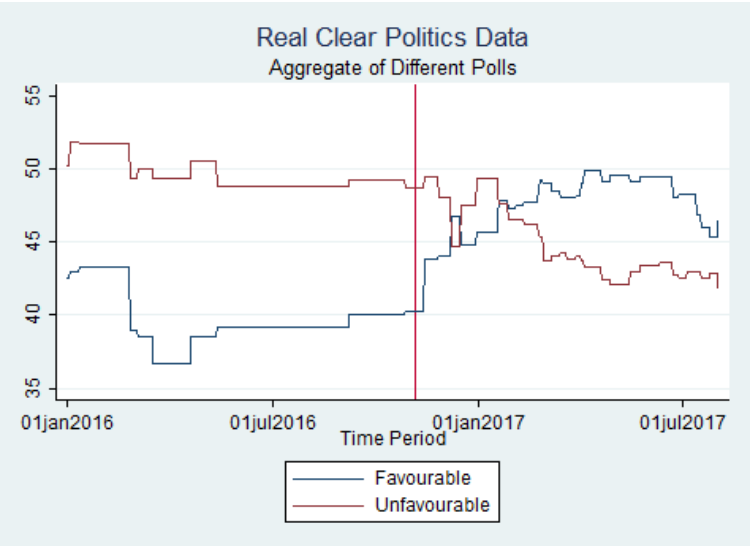

Figure 6.9: Real Clear Politics poll: Jan 2016 to Aug 2017

6.3 Google Trends and Correlate

Figure 6.10 is the Google topic which aggregates individual Google searches that are related to the ACA. This topic includes searches for "obamacare", "aca", and any other related search terms. The peak in mid-2012 coincidences with the Supreme Court decision to uphold certain ACA provisions, the largest peak is related with the 2013 release of healthcare.gov, and the final group of searches occurs just after the 2016 election. The main changes in policy coincide with the most searches.

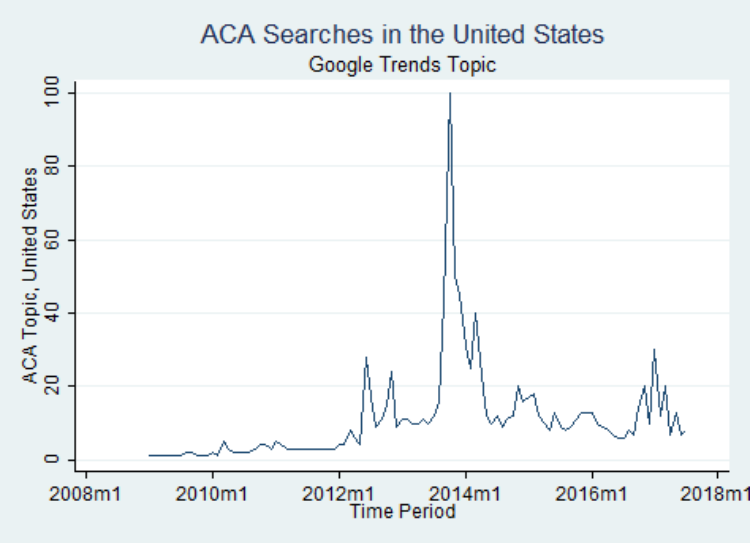

Figure 6.10: ACA Topic, United States: Google Trends

By putting this time series into google correlate you can see what type of searches individuals most used at each point in time. The three time periods selected are March 2010 to March 2013 (Table 6.1), March 2013 to March 2015 (Table 6.2), and March 2015 to July 2017 (Table 6.3). This is in order to get each peak in each time period and to have a large enough frame of reference so that non-healthcare related searches are less likely to be correlated. Below are the tables of giving a representative sample of the top 100 more correlated search terms in each time frame.

These correlations show that what is being searched about the Affordable Care Act is changing over time. Initially, from March 2010 to March 2013, most searches

Correlation	Search Term
0.9835	understanding obamacare
0.9768	obamacare provisions
0.9750	explanation of obamacare
0.9715	what does the affordable care act do
0.9705	penalty of obamacare
0.9678	how does obamacare affect doctors
0.9666	how does obamacare affect me
0.9663	is obamacare good
0.9653	cons to obamacare
0.9622	affordable care act small business

Table 6.1: March 2010 to March 2013

Correlation	Search Term
0.9922	obamacare coverage
0.9901	what is the obamacare
0.9867	obamacare in virgina
0.9858	obamacare plans
0.9841	who is eligible for obamacare
0.9822	healthcare calculator
0.9808	medicaid and obamacare
0.9795	kentucky health care
0.9751	states expanding medicaid
0.9739	how much is obamacare

Table 6.2: March 2013 - March 2015

coincide with gathering information such as “understanding obamacare”, “what does the affordable care act do”, and “how does obamacare affect me”. Then from March 2013 to March 2015 the focus shifts on what the coverage of the law is. With searches from “obamacare coverage”, “obamacare plans”, and “obamacare in virgina” this shows that people are now focusing on the details and how they affect individuals insurance coverage. Then leading up to and after the 2016 election the focus shifts to look at what the situation was before the ACA, “before obamacare” and “meaning of repeal” were searched. As well there is still a search for information at this point in time, “facts about obamacare” for example, but it more backwards looking.

When looking at the search term “obamacare repeal” (Figure 6.11) you see that there is a sharp and sudden increase just after the election. There is no other time

Correlation	Search Term
0.9365	obamacare effects
0.9344	facts about obamacare
0.9208	repeal means
0.9175	obamacare deductibles
0.9120	before obamacare
0.9106	meaning of repeal
0.9095	problems with obamacare
0.9050	repeal obamacare
0.8993	healthcare pre existing conditions
0.8980	cost of aca

Table 6.3: March 2015 - July 2017

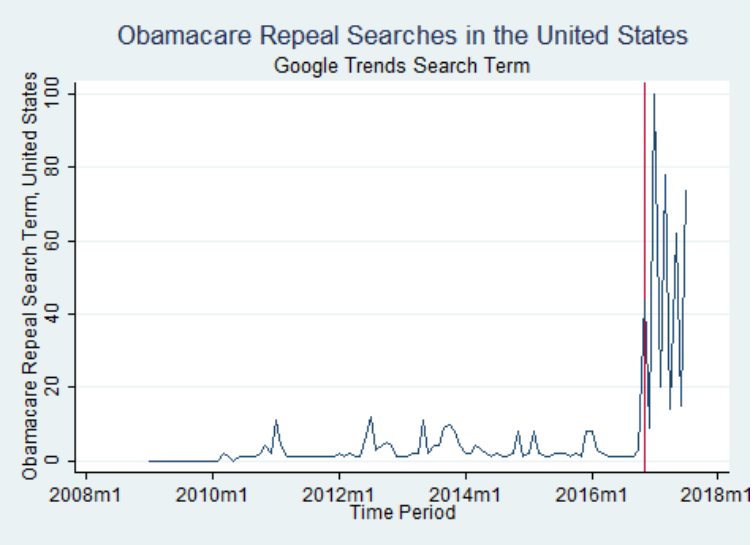

Figure 6.11: Obamacare Repeal Search Term, United States: Google Trends

period when there is a large amount of searches about "obamacare repeal". The red line is for Nov 2016, when the 2016 election took place. Even though this was a main campaign promise, it is only after the election that individuals started to fully learn about the repercussions of the Republican efforts. By googling, even those who would want the repeal of the ACA would gain information about the consequence of this action. This pattern is repeated in the other google search terms in the March 2015 July 2017 time period. It helps to show that the benefits of the 2010 Healthcare bill were not felt with loss aversion until after the efforts to take it away had become more likely.

6.4 Discussion

One would expect that during a time when a Republican was elected to the White House, there would be a decrease in the approval rating on the ACA; however we see the opposite effect. When the repeal of the ACA was promised, and became increasingly more likely post-election, there was the greatest positive shift in the approval rating. Loss aversion is a possible explanation for the increasing approval rating during a period when a Republican president was elected which coincides with an increased probability of the repeal of the law. There is also a large enough time for the reference point for Americans who previously didnt have health insurance to shift.

The uninsured rate and Medicare/Medicaid graphs show that the status quo was constantly increasing healthcare coverage. There does not seem to be a direct relationship with the decreasing on the uninsured rate and the increasing ACA popularity. The increase in popularity all starts to occur immediate after the 2016 election. Through the use of google trends and google correlate you can see the change in search behavior and how the benefits of the ACA become highlighted all around the same time period. Individual's loss aversion, of the potential decrease in the ACA benefits, is a likely mechanism and explains the patterns that are seen in the data.

Chapter 7

Future Work and Discussion

Loss aversion's effect on public policy cannot be understated. By looking at the Affordable Care Act you can see how this behavioral anomaly can affect an entire nation. By extending the model created by Alesina and Passarelli (2017), through adding policy stickiness, you can examine what happens when people's expectation about the policy changes. Then by examining how individuals reacted to the changes in expected policy, with the help of polling data and google trends, you can see a clear pattern of how the change in beliefs took place. It was only after there was a significant change in the status quo that people started to incorporate the possibility of ACA repeal. It also leads to the idea that people are "backwards" looking with their preferences but also incorporate what they believe is going to be the longer term outcome. When it comes to policies that have major impacts that are felt nationwide, it is important to look at not only what the status quo policy is but also what the public believes will happen to the policy in the future.

The addition of policy stickiness to the model created by Alesina and Passarelli (2017) allows you to better examine policies that go through a sequence of events. It also helps show that before the election, if the expectation is that Hilary Clinton would win and expand healthcare, that the benefits would not be incorporated until

there was a change in the sequence. That happens immediately after Donald Trump won the election and stated that he would make the repeal and replace of the ACA an immediate priority. Even without the policy stickiness, the change from an increase to a decrease in the future policy would change the behavior in the current period.

Using google trends helps enhance the discussion on policy changes. It provides real time information about how people gain information and can be very useful to supplement and provide context to polling data. It also helps give an idea about why the changes in approval rating occurred when they did. One of the most important questions was not only why did the Affordable Care act become more popular but why did the increase in popularity only happen after the 2016 election? The search data helps explain this with increase number of searches about "obamacare repeal" that was not done until post-election even though this was a Republican campaign promise.

I would recomend this approach be used for further studies on this topic or of this nature. This analysis can be used to look at other large scale legislative changes. The model can also be extended to look at the political polarization. Google trends data also allows you to see how different regions, at the state or municipal levels, react to policy changes differently.

Chapter 8

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