

# Prospect Theory, Loss Aversion, and Political Behavior

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### Abstract

How do cognitive anomalies postulated by prospect theory affect people’s preferences for risky political changes? This chapter offers a parsimonious framework to compare and contrast the political preferences of a rational agent that behaves according to expected utility theory versus one behaving according to prospect theory.

Prospect theory introduces several anomalies in the behavior of rational agents, including loss aversion, the *reflection effect*, *loss aversion*, *probability weighting*, and the *certainty effect*. Loss aversion occurs relative to a state of the world, called a *reference point*. Being loss averse causes people to prefer the current state of affairs above and beyond the expected utility that comes from a risky political change, engendering a status quo bias. Yet, bias is asymmetric due to the reflection effect: People are too tepid toward advantageous platforms or candidates, whereas they are not critical enough against detrimental policies or bad politicians. Both rich and poor citizens take similar stances on nonpartisan issues (such as national defense): This happens because they evaluate uncertain policy changes relative to a reference point. Citizens welcome radical political platforms with greater enthusiasm than incremental proposals.

Generally, under prospect theory societal conflict is smoother than under expected utility theory. Older societies are more prone to preserving the status quo than younger ones. These properties affect also the choice of voting rules. Loss aversion induces people to prefer more prudent voting rules and preserve the status quo. Hence, agents favor higher majority thresholds or even unanimity over simple majority in constitutional choice. The status quo bias supports the persistence of policy cycles, with prolonged drifts in one direction before a trend reversal. In sum, loss aversion and other anomalies pinpointed by behavioral sciences offer insightful predictions to study at political phenomena.

**Keywords:** loss aversion, prospect theory, behavioral political economy, rational choice, voting, majority rule, weighted votes, reflection effect, status quo bias

# 1 Introduction

How do loss aversion and other cognitive distortions affect people's preferences in the face of risky political changes? Long before the advent of prospect theory [Kahneman and Tversky, 1979], Adam Smith in the *Theory of Moral Sentiments* (1759 [1981]) illuminated many ways in which peoples behavior departs from rational choice theory [Ashraf et al., 2005]. But psychological intuitions that are key to behavioral political economy abound in the works of Jeremy Bentham, Irving Fisher, William Jevons, and many others. Two-hundred and fifty years after Adam Smith, behavioral political economy is an emerging and promising field spanning across economics, political science, psychology, and evolutionary science (see e.g. [Atanasi et al., 2017, Bisin et al., 2015, Grillo, 2016, Jackson and Yariv, 2015, Lau and Levy, 1998, Lizzeri and Yariv, 2017, McDermott et al., 2008, Ortoleva and Snowberg, 2015b, Passarelli and Tabellini, 2017, Vis and Van Kersbergen, 2007]). Yet, behavioral political economy is the recent development of a tradition as old as social science.

Already at the end of the 19th century, Thorstein Veblen criticized the trajectory taken by the discipline due to its faulty conception of human nature. Instead, Veblen envisioned economics as an evolutionary science that should leave behind the outdated, but still prevalent misconceptions about human nature: The psychological and anthropological preconceptions of the economists have been those which were accepted by the psychological and social sciences some generations ago. [...] The later psychology, re-enforced by modern anthropological research, gives a different conception of human nature. According to this conception, it is the characteristic of man to do something, not simply to suffer pleasures and pains through the impact of suitable forces. [Veblen, 1898, p. 389].

But efforts to incorporate advances in psychology into economic models did not take flight until the mid-20th century, when Herbert Simon introduced his *Behavioral Theory of Rational Choice* [Simon, 1955]. Simon's theory simplified the assumptions from rational choice and introduced new elements that would be the cornerstone of Kahneman and Tversky's Prospect Theory [Kahneman and Tversky, 1979]. Such elements include how agents gather information, how the ordering of payoffs can be partial, and the concepts of wins and losses when agents evaluate payoffs as they relate to their aspiration levels [Simon, 1955, p. 110].

After Kahneman and Tversky's seminal contributions, ideas and methods from nascent behavioral economics percolated into political science [Simon, 1985, Peterson and Lawson, 1989, Shafir, 1992]. Yet, as far as political issues are concerned, the application of ideas such as prospect theory has remained largely confined to international relations [Boettcher III, 1995, Boettcher, 2004, Fanis, 2004, Stein, 2017]) and especially international political conflict [Levy, 1992, Levy, 1996, Levy, 2003, McDermott, 1992, McDermott, 2001b, McDermott and Kugler, 2001].

Despite the relatively limited use of prospect theory in theoretical political models<sup>1</sup>, behavioral economists have pointed to numerous cognitive distortions that are relevant for political behavior. These anomalies, which are likely the byproduct of our evolutionary past [Petersen, 2015], occur in many domains, including preferences over candidates or policy platforms; choices over risk, ambiguity, and time preferences; beliefs update and learning [Anderson and Sunder, 1995, Eckel and Grossman, 1996, Kahneman and Tversky, 1979, McDermott and Kugler, 2001, Tversky and Kahneman, 1992]).

In this chapter we apply prospect theory to a simple model of political choice. We show that it leads to several empirically plausible implications. Specifically, we focus on the role of loss aversion.

## 2 Prospect Theory

When people vote, they often face a choice between the status quo and a political change that carries uncertain consequences. This is typically the case with new reform proposals, party platforms, or candidates. In these instances, voters' decisions may be subject to cognitive limitations or distortions, so that actual voting behavior is far from what rational choice theory would predict.

Scholars can take these distortions into account introducing elements from prospect theory into models of politics. This can be a fruitful strategy to improve the predictive and explanatory power of rational choice models, which sometimes fall short of their tasks. In fact, there are appreciable differences in behavior between a *psychological* agent who behaves according to prospect theory and a *rational* agent who behaves according to expected utility theory.

Being recalcitrant toward political changes and preferring the status quo is perfectly rational if an individual dislikes risk. Here we compare a *rational* agent with a *psychological* agent who is subject to several anomalies from prospect theory, including the *reflection effect*, *loss aversion*, *probability weighting*, and the *certainty effect*. It turns out that psychological agents can have more nuanced and peculiar attitudes toward political changes than their rational peers. Hence, it is crucial to present the role that each cognitive anomaly derived from prospect theory plays in determining individual preferences for a risky political change.

Since the seminal paper by [Quattrone and Tversky, 1988], prospect theory has slowly made its way into political science [Druckman and McDermott, 2008, McDermott and Kugler, 2001, Jervis, 2004, Mercer, 2005]. However, apart from a few noticeable exceptions, the use of prospect theory in theoretical political models is

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<sup>1</sup>A few exceptions include [Alesina and Passarelli, 2015, Attanasi et al., 2017, Bendor et al., 2011, McDermott, 2001a, Ortoleva and Snowberg, 2015a, Ortoleva and Snowberg, 2015b, Passarelli and Tabellini, 2017].

quite limited. This is unfortunate since prospect theory yields insights that are alien to models of rational choice, and yet often coincide with some of their empirical difficulties.

## 2.1 Prospect Theory Anomalies

Unlike rational choice theory, prospect theory has been derived from observing human behavior in lab experiments. [Kahneman and Tversky, 1979] proposed it to incorporate the key departures from expected utility theory without losing its explanatory power. The term prospect refers to a lottery or a gamble in which an individual must choose between two or more prospects (for instance,  $P_1$ : [+\$200 with  $p = .2$ ; +\$100 with  $p = .25$ ; +\$100 with  $p = .25$ ; -\$50 with  $p = .3$ ] vs.  $P_2$ : [+\$200 with  $p = .2$ ; +\$150 with  $p = .5$ ; -\$100 with  $p = .3$ ]).

An agent's decision-making process is distinguished in two phases: an *editing* phase and an *evaluation* phase. In the editing phase people organize, reformulate and possibly simplify their options. They normally perceive outcomes as gains and losses, rather than as final states of wealth or welfare [Kahneman and Tversky, 1979, p. 274].

Gains and losses are relative to a *reference point*, that is the current asset position, or the status quo. After fixing the reference point, other editing operations occur, including: *combination* of probabilities that refer to identical outcomes (e.g. combining the two prospects of +\$100 with  $p = .25$  in  $P_1$  into one of +\$200 with  $p = .5$ ); *segregation* of the riskless components of a prospect from their risky part; *cancellation* of components that are shared by all prospects; *simplification* with, for example, discarding of extremely unlikely outcomes and treatment of extremely likely event as certain (*certainty effect*).

Many anomalies in preferences result from the editing phase. For instance, simplification may cause intransitive choices, meaning that an agent may prefer option A over C, and option B over C, but also option B over A. In the evaluation phase, the decision maker chooses the prospect with the highest value. At this stage, high probabilities are underweighted, and low probabilities are overweighted due to the subproportionality of weights (*probability weighting*). The certainty effect, underweighting of high probabilities, and overweighting of low ones are important features of the prospect theory function (Figure 1a).

Another essential feature of prospect theory is that changes in wealth or welfare carry value, rather than final assets. Thus, value  $v$  is zero in the status quo position, which serves as a reference point. Moreover,  $v$  is normally concave for positive changes of wealth and convex for negative changes. This means that individuals are assumed to be risk averse in the realm of gains and risk seeking in the realm of losses (*reflection effect*). An additional characteristic is that losses usually loom larger than gains. This causes the so-called loss aversion, which corresponds to a

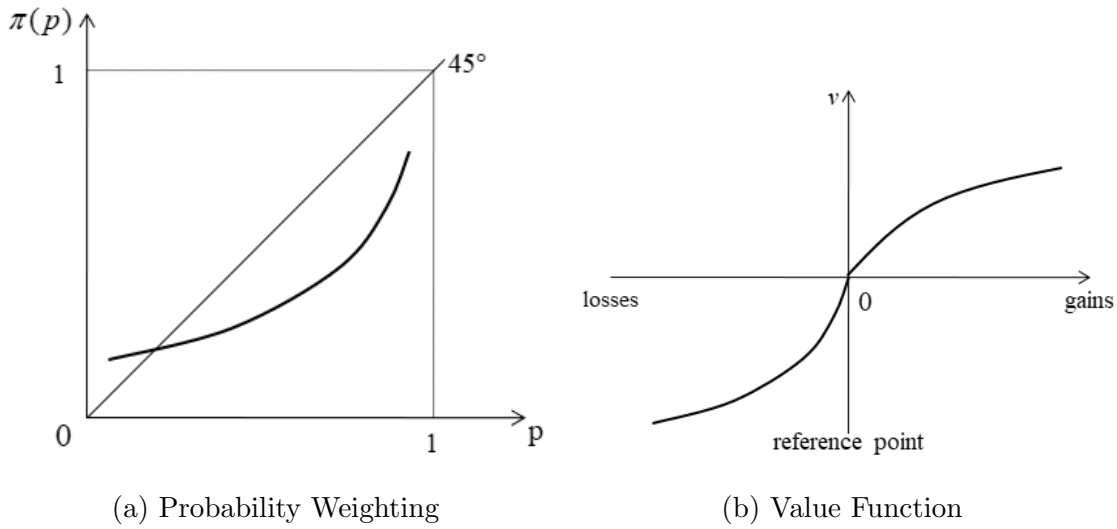


Figure 1: Prospect Theory Anomalies

$v$  function that, when gains and losses are symmetric, is steeper for losses than for gains, producing the characteristic kink of Figure 1b.

Among dozens of anomalies, why is loss aversion so important? Loss aversion relates to the observation that in peoples decision-making losses loom larger than gains [Kahneman and Tversky, 1979]. The aversive experience of loss underlies fundamental features of human psychology related to property rights. People have an evolved sense of ownership [DeScioli and Wilson, 2011, Gintis, 2007] that motivates them to defend what they own, store resources for hard times [Del Ponte and DeScioli, 2018, Sherratt and Mesterton-Gibbons, 2015, Stake, 2004], and attribute greater value to owned objects [Jones and Brosnan, 2007, Kahneman et al., 1990, Morewedge and Giblin, 2015]. In ancestral hunter-gatherer societies, our progenitors faced an uncertain food supply, which posed a constant threat to their survival. Hence, feeling a special pain for losses may have been critical to induce our ancestors into balancing two delicate ends: the necessity to make risky gambles to catch game, and the prudence required in a dangerous environment to survive the attacks from predators and other humans [McDermott et al., 2008].

### 3 Prospect Theory vs. Expected Utility Theory

People often perceive political changes as risky: The prospect of a political change presents some chance of ending up worse off or better off. Specifically, there may be several circumstances where political change is seen as the risky choice and the status quo as the safe alternative. For example, people may have trouble evaluating

the consequences of a reform proposed in a legislature or in a direct ballot. The reason could be that voters find the proposal complex and ambiguous, or they may simply be uninformed about the analytical background. Hence, voters might not know for sure if they will gain or lose from it [Fiorina, 1981].

The same kind of uncertainty may regard the platform of a challenger opposed to an incumbent in an electoral competition. Voters may perceive the incumbent as a continuation of the status quo, whereas they may consider the challengers victory as a prospect rife with uncertain gains or losses. Voters may not know enough about the challengers ability, they may find her messages ambiguous, or may experience difficulties in evaluating her promises [Shepsle, 1972]; [Dacey, 1979]).

Call  $\alpha$  the monetary equivalent of a favorable policy outcome (the win case). Let  $\chi$  be the status quo, i.e. the monetary equivalent of not embracing any change. Let  $\beta$  be the monetary equivalent of an unfavorable policy outcome (the losing situation). Of course, Assume that  $\alpha > \chi > \beta$ . The idea that policy alternatives may be represented as lotteries is present in many theoretical political models on the political economy of reforms. Yet, these models usually assume rational agents. Consider a representative rational agent and let  $u(\cdot)$  be her utility function. Let  $u$  be increasing, continuous and twice differentiable overall. Call  $Pr_i\alpha$  and  $Pr_i\beta$  the winning and losing probabilities, respectively;  $1 - Pr_i\alpha - Pr_i\beta$  is the probability that the political change does not actually change anything. A rational agent prefers the risky political change if her expected utility is larger than the utility from the status quo:

$$Pr_i\alpha \times u_i(\alpha) + Pr_i\beta \times u_i(\beta) + (1 - Pr_i\alpha - Pr_i\beta) \times u_i(\chi) \geq u_i(\chi)$$

or,

$$\frac{u_i(\alpha) - u_i(\chi)}{u_i(\chi) - u_i(\beta)} \geq \frac{Pr_i\beta}{Pr_i\alpha} \tag{1}$$

A rational individual has an open attitude toward political change if inequality (1) is easily satisfied. This may happen when winning is relatively likely, the winning outcome is large compared to the status quo, or the loss is small. In the opposite cases, she will be reluctant toward political change. Notice that the factors at play are probabilities, outcomes and risk attitudes.

Now, consider a psychological voter. Recall that a psychological voter is an agent that behaves according to the anomalies from prospect theory. Prospect theory assumes that an agent assigns a value  $v$  to gains and losses rather than to final outcomes. Thus, the argument of the value function is  $(\alpha - \chi)$  in case she wins, and  $(\beta - \chi)$  in case she loses. It is zero in the case of the status quo persisting. Recall also that probabilities are replaced by decision weights,  $\pi(p)$ . Thus, under prospect theory an individual prefers a risky political change if its value is higher

than the value of the status quo, which is zero:

$$\pi(p_\alpha) \times v(\alpha - \chi) + \pi(p_\beta) \times v(\beta - \chi) \geq 0 \quad (2)$$

then,

$$\frac{v(\alpha - \chi)}{|v(\beta - \chi)|} \geq \frac{\pi(Pr_i\beta)}{\pi(Pr_i\alpha)} \quad (3)$$

We can contrast expected utility theory and prospect theory by comparing (1) and (3). For example, we will say that a rational agent has a more open attitude toward the change if (1) is easier to be satisfied than (3). This means that there might be cases in which the rational agent votes for the change and the psychological agent does not, but the contrary cannot happen.

## 4 Reflection Effect and Loss Aversion

Due to the reflection effect, a psychological voter is always risk averse in gains and risk seeking in losses. A rational voter, instead, may either be systematically risk averse or risk seeking. Hence, we compare psychological and rational agents with risk aversion and risk seeking separately.

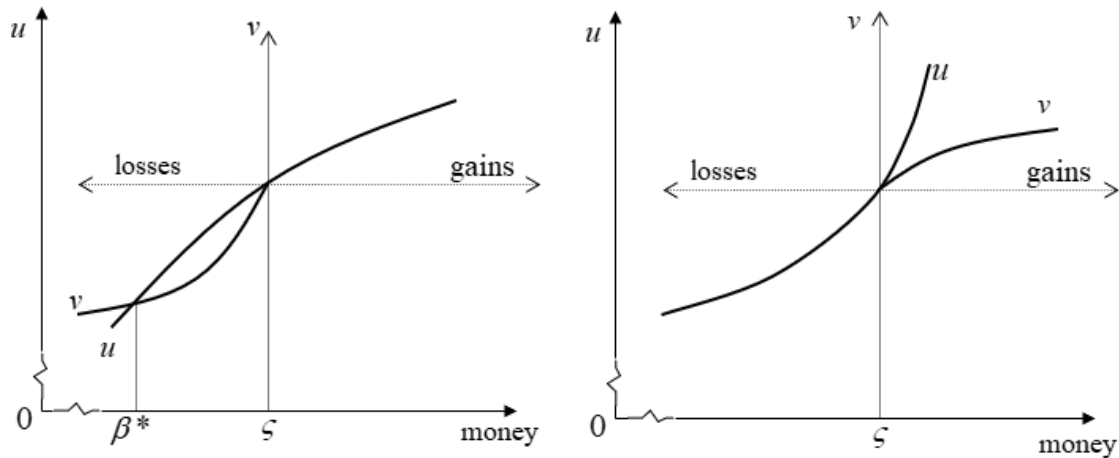
### 4.1 Prospect Theory vs. Expected Utility with Risk Averse Agents

A rational and risk averse agent fears the losses associated with an unfavorable political change. Hence, she propends toward the status quo. Yet, a psychological individual exhibits bias toward the status quo as well. Who is more biased? To answer, we need to assume that both agents are equally risk averse toward favorable outcomes and evaluate gains in the same way. Therefore, any possible differences between them are only due to how they look at unfavorable outcomes.

A rational agent is highly sensitive to political losses because she is risk averse. But, a psychological agent is subject to two anomalies, loss aversion and the reflection effect, which operate in two different directions. Loss aversion implies high sensitivity to small losses. The reflection effect, i.e. being risk-seeking in the domain of losses, yields low sensitivity to big losses. Consequently, a psychological agent is less open than a rational agent toward a political change when the unfavorable outcome is relatively small ( $L > L^*$ ) in Figure 2a. Vice versa, when losses and gains are relatively large ( $L < L^*$ ), she is more open than the rational risk averter.

Notice that if the loss is sufficiently high, a psychological voter may prefer political change and a rational risk averter may prefer the status quo, but the opposite cannot occur. In contrast, if the loss is sufficiently low, a psychological voter may





(a) Psychological vs. Rational & Risk-Averse Maximizer

(b) Psychological vs. Rational & Risk-Seeking Maximizer

Figure 2: Utility and Value Functions

prefer the status quo and the rational risk averter may prefer the political change, but the opposite cannot happen.

Notice that both agents are rather reluctant toward political changes; thus, both are subject to a status quo bias. However, for small political changes, bias is stronger under prospect theory than under expected utility theory. Vice versa, when deviations from the status quo are large, bias is weaker under prospect theory.

These considerations imply that when voters behave according to prospect theory, a platform containing bigger changes has more chances to win. A challenger who takes big risks may benefit from the voters' risk-seeking attitude toward unfavorable outcomes. On the contrary, a detailed platform of small proposals would give an advantage to the incumbent, because in this case loss aversion generates a strong bias in favor of the status quo. This may explain why sometimes politicians take big risks, such as calling for risky referenda or announcing ambitious reforms that put their political career on the line.

Then, how can a challenger make a detailed platform of small proposals be palatable to voters? An astute challenger can lump a large number of small proposals together and package them into one ambitious plan to overcome the status quo bias. The same rationale applies to a reform proposed in a committee: a radical reform is less subject to a status quo bias than an incremental one.

## 4.2 Prospect Theory vs. Expected Utility with Risk-Seeking Agents

Assume now that a rational individual loves risk. To make the comparison with prospect theory, let us assume that a rational and a psychological individual have the same risk seeking attitude toward unfavorable outcomes (as shown in Figure 2b). Then, a rational risk seeker is always more open toward political changes than a psychological agent. The idea is simple: both individuals evaluate losses in the same way, but gains receive a higher evaluation by a rational agent. This is sufficient to ensure that a risky political change is more likely under expected utility than under prospect theory. In other words, a psychological agent is biased toward the status quo, whereas a rational risk seeker prefers political change. Thus, prospect theory could provide an alternative argument for why voters sometimes stick too long with policies they do not like. This would complement existing work attempting to explain voter inaction on solely rational premises [Howitt and Wintrobe, 1995].

# 5 The Role of Probability Weighting

## 5.1 Certainty Effect

The certainty effect occurs when an event is extremely likely or highly improbable. Psychological individuals treat highly probable events as certain and highly improbable ones as impossible. For example, if a reform is extremely likely to yield a positive outcome, a psychological individual considers it as a risk-free prospect that can only improve the status quo. Independently of how large the possible losses are, she will support that reform. A rational voter behaves differently: despite the high chance of winning, she would not accept political change if there was a small chance of huge losses on the line. On the contrary, if winning is very unlikely, a psychological voter always prefers the status quo whereas a rational voter prefers change, if prospective gains are sufficiently large or losses sufficiently low.

Notice that in this case the certainty effect fully explains differences between prospect theory and expected utility. The implication is that sometimes politicians may have a strong temptation to pass bills on policies that allow for disastrous consequences if a low-probability event were to happen. Examples include natural resource exploitation, the construction of nuclear plants, and rearmament policies. For instance, the certainty effect may explain politicians behavior in critical historical moments, such as the US Congress decision to authorize the Iraqi war in 2003. The losses that would come with a prolonged war were enormous. Yet, the negative outcome was perceived as extremely unlikely and discarded in the calculus of voting.

Another famous instance of the certainty effect was Hillary Clinton's decision

to put little effort in her campaign in states like Michigan, Pennsylvania, and Wisconsin. The Democratic candidate and her entourage considered these the three Midwestern states a safe win in the 2016 presidential election race. Yet, Clinton lost the presidential race due to those three states, where her opponent Donald J. Trump prevailed by a few thousands of votes.

## 5.2 Underweighting and Overweighting

Let us now consider non-extreme probabilities. In this case agents tend to underestimate the difference between probabilities of failure and success. For example, if the probability of winning is high and the probability of losing is low, a psychological individual has the tendency to underweight the former and overweight the latter. As a result, a risky political change appears less attractive. Vice versa, if losing is substantially more likely than winning, a psychological individual is less opposed to change.

Notice that under prospect theory there is a status quo bias specifically due to probability weighting. Yet, the status quo bias works asymmetrically: When winning is more probable than losing, the bias is in favor of the status quo. When losing is the most likely outcome, the bias is toward change. This means that a psychological agent is overly cautious when challengers or reforms have good chances of success, and she is too imprudent when a loss is the most likely outcome. This may explain why good reforms that have clear positive prospects (e.g. regarding market liberalization, foreign trade, or institutional efficiency) are frequently rejected. For instance, countries with an inefficient government like Italy often experience difficulties in passing reforms that will change their institutions, despite the clearly positive prospects of those reforms [Ceccarini and Bordignon, 2017].

## 6 Reference Points

In general, we expect that people with different levels of wealth will react to a political change differently. Under expected utility theory, this happens because risk attitudes may change along the utility function. Under prospect theory, this mechanism disappears, because the status quo represents the reference point. However, the same policy may give rise to different deviations from their status quo for different individuals. This is what usually happens for partisan policies such as in the realm of taxes, which yield larger gains for some people and lower gains for others. The status quo plays a different role in prospect theory and expected utility theory depending on whether we consider partisan issues (such as taxation) and nonpartisan issues (such as national defense).

## 6.1 Nonpartisan Policies

A nonpartisan policy (for instance, national defense) yields the same gains and the same losses to different people, independently of their wealth. The reason is that nonpartisan policies tend to provide public goods, which are non-rivalrous and non-excludable in consumption. Consider two individuals,  $r$  is rich, and  $p$  is poor. Their status quo incomes are, say,  $\chi_r = 1000$  and  $\chi_p = 100$ , respectively. They are proposed a nonpartisan policy that might increase their status quo incomes, say, by 50 or decrease it by 30. Thus, the rich person has the chance to get  $\alpha_r = 1050$ , but she faces the risk to end up with  $\beta_r = 970$ . The poor person might get either  $\alpha_p = 150$ , or  $\beta_p = 70$ . The chances of winning and losing are the same for the two individuals. Does the rich person evaluate the political change differently from the poor person? Are their relative evaluations different under expected utility rather than under prospect theory?

Let us consider prospect theory first. Recall that prospect theory postulates that the status quo is taken as a reference point and the value function is the same for all people. Hence, the nonpartisan risky policy is equally desirable to all people, independently of their status quo incomes. Psychological agents have the same attitudes toward nonpartisan political changes. Therefore, voting behavior on nonpartisan issues is independent of income. Is this what we also expect from rational agents?

Under expected utility theory things change. Since the evaluation concerns differences in utilities, risk attitudes matter. Suppose that both a rich and a poor agent are risk averse. A rich agent is less attracted by the prospective gain, but also less discouraged by the possible loss. Thus, without further information, we cannot say if a rich agent is more or less open to change than a poor one. What matters is not only risk aversion per se, but how risk aversion changes as a function of the status quo. Intuitively, rich agent is more prone to change if her degree of risk aversion is lower than a poor agents degree of risk aversion. This is the measure of absolute risk aversion proposed by [Pratt, 1964] and [Arrow, 1965]. It follows that a rich individual is rationally less conservative toward nonpartisan issues than a poor one if absolute degree of risk aversion decreases, and vice versa.

There are two common arguments supporting the evidence of low correlation between income and voting behavior, particularly when voting concerns social issues. One is that lower-income voters are distracted by social issues, even if they should be paying more attention to their own economic interests [Gelman et al., 2010]. Another argument is that values and cultural concerns trump bread-and-butter issues in post-materialist, rich societies [Inglehart, 1971]. Our analysis shows that for Ingleharts logic to work, peoples reaction to bread-and-butter issues must be independent of their wealth. This always occurs if people behave according to prospect theory. This may happen under expected utility theory as well, but only if peoples absolute risk

aversion is constant, which is a strong assumption.

Another puzzle in the political economy literature is why people change their mind about a reform despite its initially favorable impact [Rodrik, 1996]. [Jain and Mukand, 2003] argue that this occurs if future redistribution of gains becomes less likely because of the reform. Prospect theory offers an alternative argument: once a favorable reform occurs, the reform becomes the new reference point for voters. But since voters are risk seeking in the domain of losses, they are more open to change.

## 6.2 Partisan Policies

Now consider a partisan issue, such as a redistributive tax favoring the poor. Uncertainty often arises if rich or poor individuals are unsure if they will be net payers or net recipients. For instance, both individuals may ignore the exact income distribution over the population or be unable to make complex computations. We can assume that a rich agent assigns a low probability to the event of receiving a small positive net transfer. Vice versa, a poor agent is likely to get a large one. The two agents have different baseline preferences: a poor one is more inclined toward reform, whereas a rich one is reluctant toward change. Will their attitudes toward reform change if they behave according to prospect theory instead of expected utility theory?

Here, more than one anomaly comes into play. First, a rich agent overweights the low chance of being a net recipient of tax benefits and underweights the high probability of being a net payer, whereas a poor agent does the opposite. In addition, due to the reflection effect, a rich agent is less sensitive to the large loss and more sensitive to the small gain. Finally, loss aversion causes a poor agent to be very sensitive to the small loss. All these anomalies operate in the same direction. Under prospect theory, a rich agent is more open toward a reform favoring the poor than under expected utility, while a poor agent is less open toward such reform. As a result, the degree of policy conflict on partisan issues is lower under prospect theory than under expected utility. Under prospect theory, preferences about partisan issues are less polarized than they could be. This observation provides a further rationale for the common view that low-income voters are not sufficiently concerned about economic policies that would benefit them.

[Fernandez and Rodrik, 1991] argue that when an individual cannot identify himself as winner or loser beforehand, even a reform that benefits a majority gets voted down because pivotal individuals consider winning unlikely. [Jain and Mukand, 2003] show that this might also happen when the government is able to tax winners to compensate losers. But prospect theory grants a different insight. Partisan policies targeted to the majority might not receive adequate support because of loss aversion: large and likely gains loom smaller whereas small and unlikely losses loom larger.

### 6.3 Satisfaction About the Status Quo

How does peoples satisfaction with an incumbent affect their decision to vote for a challenger? The same logic to reforms and the status quo can apply here. When people are satisfied with an incumbent, a challenger represents a prospect with small gains and large losses. In this case, both psychological and rational individuals are reluctant toward change. However, under prospect theory, voters are risk seeking in the domain of losses. Hence, a psychological agent is less sensitive to large losses than a rational one. Thus, a psychological individual is less opposed to a challenger. Vice versa, when people are unhappy with an incumbent, choosing a challenger would yield small losses or large gains. In this case, loss aversion prevails. Thus, a psychological agent is more reluctant toward a challenger.

In sum, under prospect theory, status quo bias makes psychological individuals too conservative when the current situation is bad and too progressive when it is good. Paradoxically, people are more inclined to support change even if the current policy is good for them. Yet, people tend to stick with the status quo even though the current policy puts them at a disadvantage.

This result weakens the relationship between an incumbents performance and her chance to be re-elected. It is consistent with the evidence suggesting that incumbent politicians are often re-elected [Friedman and Holden, 2009], even though political change would be in their best interest (status quo bias). Under prospect theory, the direction of the bias depends on how good or bad the current situation is. For instance, [Erikson, 1990] and [MacKuen et al., 1992] show that an incumbents chance to be re-elected is positively affected by current economic conditions. [Bloom and Price, 1975] find that recessions and prosperity have an asymmetric impact on the electoral fortune of the US incumbent President; they look at this as an evidence of the reflection effect. Related to these empirical findings, prospect theory agents are relatively too indulgent toward a bad incumbent and too demanding toward a good one. Similarly, when the current economic situation deteriorates, people turn more favorable toward reform, but support may be irrationally too low. The relationship between crises and adoption of economic reforms is quite controversial [Alesina et al., 2006, Bean, 1998, Galasso, 2014].

Prospect theory also provides an argument for why even partisan voters may be surprisingly disloyal sometimes. A partisan supporter of the incumbent who behaves according to prospect theory has a high status quo. Hence, she would obtain small gains and large losses from voting for a challenger. Yet, she is less likely to defect and vote for the challenger compared to a rational partisan.

## 7 A Voting Model with Loss Aversion

So far we have seen how the behavioral distortions postulated by prospect theory affect individuals' preferences of a policy reform. We have assumed that when more people prefer a certain outcome (say, they prefer a challenger over an incumbent) that outcome becomes more likely. But we did not pin down exactly the mechanism through which society makes policy decisions. [Alesina and Passarelli, 2015] introduce loss aversion in a standard majority voting model and study how the policy outcome is affected by loss aversion. Here we present an application of their model to the case in which society has to choose the level of public good provision, in the spirit of [Meltzer and Richard, 1981].

Consider a continuum of voters indexed by  $i$ . The population size is normalized to one, so all variables are also expressed in per-capita terms. Voters are heterogeneous in income,  $y_i$ , and let  $\bar{y}$  denote the average income. The policy consists in the provision of a non-excludable public good financed by a proportional income tax.

Voters draw utility from the consumption of a private good,  $c_i$ , and the public good,  $g$ . Suppose there is *no loss aversion*. Let the utility function be the following

$$u(c_i, g) = c_i + \ln g$$

The government budget is balanced, so that  $\tau\bar{y} = g$ . Indirect utility of voter  $i$  is then:

$$V(y_i, g) = y_i + \ln g - \frac{y_i}{\bar{y}}g$$

The socially optimal policy maximizes a benthamite welfare function,  $W(g) = \int V(y, g)dF(y) = y_i + \ln g - g$ . It is easy to see that the socially optimal policy is  $g^o = 1$ .

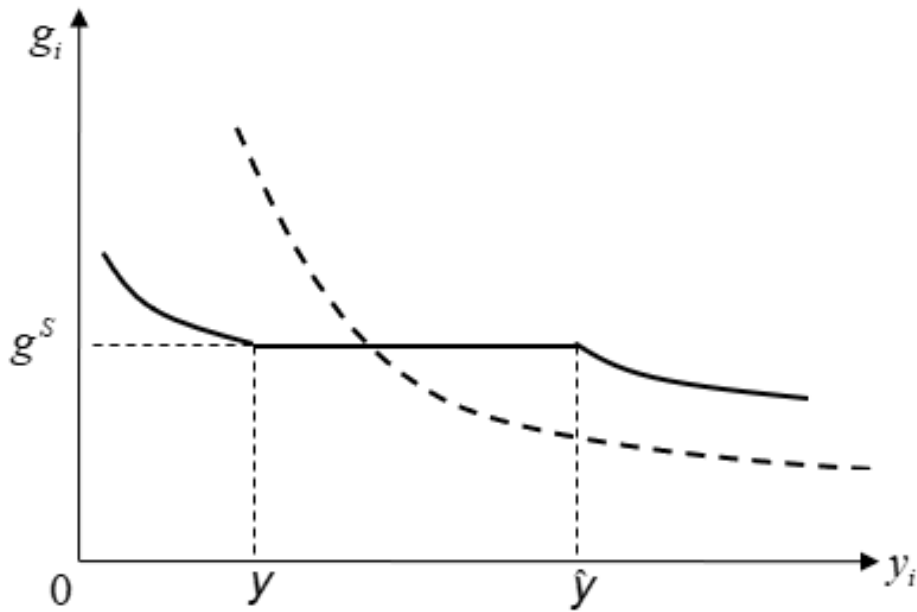
Society chooses the policy through majority voting. Individual  $i$ 's most preferred policy, call it  $g_i$  maximizes  $V(y_i, g)$  above. Thus,

$$g_i = \frac{\bar{y}}{y_i} \tag{4}$$

The concavity of  $V(y_i, g)$  takes care of the second-order conditions. Observe that the voters' bliss points are negatively related to individuals' income: richer individuals want less public good provision (i.e., smaller government size) because the private cost of one unit of public good,  $\frac{y_i}{\bar{y}}$ , is higher for them.

Let  $m$  denote the individual with the median income. Since bliss points are monotonic in income, the policy that is chosen through majority voting is the median's bliss point:

$$g_m = \frac{\bar{y}}{y_m}$$



### Most preferred policies with and without loss aversion

Figure 3: Most Preferred Policies With and Without Loss Aversion

The normative implication is that the majority rule or downsonian electoral competition implement the social optimum only if the median voter's income equals the average income. In this case, we have that  $\bar{y} = y_m$ , hence  $g_m = g^\circ = 1$ . If instead the income distribution is skewed toward the right (i.e.  $y_m < \bar{y}$ ), the voting outcome is overspending and overtaxation. Underprovision and undertaxation occur in the opposite case.

Let's now study what happens if voters are subject to loss aversion. As explained by [Alesina and Passarelli, 2015], their policy preferences are reference-dependent, and the reference point is the status quo policy,  $g^S$ . The latter is a reasonable reference point in politics because when voters evaluate a policy reform they usually compare gains and losses to the current policy  $g^S$ . Because of loss aversion, losses loom larger than gains. To account for it, we multiply losses by  $(1 + \lambda)$ , where  $\lambda > 0$  parametrizes loss aversion. Indirect utility  $V(g, y_i | g^S)$  is then given by the status quo utility,  $V(y_i, g^S)$ , plus gains from a change in the policy, minus losses. And the latter are over-weighted to account for loss aversion.

Less utility from the public good or additional taxes are both a loss. They occur when  $g < g^S$ , or when  $g \geq g^S$ , respectively, and they must be multiplied by  $(1 + \lambda)$ .



More public good or less taxes are gains. Under loss aversion, indirect utility is then:

$$V(g, y_i | g^S) = \begin{cases} V(y_i, g^S) + \ln g - \ln g^S - (1 + \lambda) \frac{y_i}{\bar{y}} (g - g^S) & \text{if } g \geq g^S \\ V(y_i, g^S) + (1 + \lambda) (\ln g - \ln g^S) - \frac{y_i}{\bar{y}} (g - g^S) & \text{if } g < g^S \end{cases}$$

Voter's most preferred policy under loss aversion is given by:

$$g_i^{LA} = \begin{cases} \frac{\bar{y}}{y_i(1+\lambda)} & \text{if } y_i < \tilde{y} \\ g^S & \text{if } \tilde{y} \leq y_i \leq \hat{y} \\ \frac{\bar{y}(1+\lambda)}{y_i} & \text{if } y_i > \hat{y} \end{cases} \quad (5)$$

where  $\tilde{y} \equiv \bar{y} \frac{1}{(1+\lambda)g^S}$ , and  $\hat{y} \equiv (1 + \lambda) \bar{y} \frac{1}{g^S}$ . The population is split in three groups (cf. the solid curve in figure ...):

1. A group of sufficiently poor voters (i.e. all individuals such that  $y_i < \tilde{y}$ ) who would like higher level of public good provision;
2. A group of sufficiently rich people ( $y_i > \hat{y}$ ) who would like smaller government size;
3. A group of intermediate income individuals ( $\tilde{y} \leq y_i \leq \hat{y}$ ) who want to keep the status quo.

Thus, for any given initial level of the policy, a positive mass of voters would vote for the status quo.

The median voter theorem applies in this framework with loss aversion. The policy outcome is the median's bliss point. If the median's income varies, but it still lies on the interval  $[\tilde{y}, \hat{y}]$  no policy change is going to occur if there is loss aversion. This is what [Alesina and Passarelli, 2015] refer to as the *status quo bias* due to loss aversion. This kind of bias does not occur without loss aversion (cf. the dotted curve in Figure 3).

In the standard model, a change in the median's income would always imply a change in policy. In the model with loss aversion, an increase in income inequality may lead to no changes in taxation as long as the inequality change does not push  $y_m$  outside the range in which the status quo prevails. This result may help rationalize why the recent increase in inequality in many OECD countries has not always translated into immediate moves toward more redistribution. The level of disagreement about the size of government is lower in a loss averse society: bliss points are less dispersed compared to a framework with no loss aversion (cf. Figure 3). This is what Alesina and Passarelli call the *moderation effect*. It might help explain why in democratic societies with relatively high levels of inequality we do not always observe extreme redistributive policies.

Consider now a multi-period setting. Under loss aversion voters take into account how their current voting choices affect their future reference points. [Alesina and Passarelli, 2015] show that in such setting voters with longer planning horizon (e.g. younger generations) are more prone to change the status quo. Let's see why, using a model where individuals vote on public good provision.

Suppose the population is split in two cohorts, the young and the old. Young and old citizens are the same in all respects, except for their residual life span: the old live only one period; the young live two periods. The two generations share the same material interests (i.e. their material utility function  $V(y_i, g)$  is the same). Their preferences are equally distorted by loss aversion (i.e., the loss aversion parameter  $\lambda$  is the same for the young and the old). Finally, the distribution of income in the two groups is the same.

[Alesina and Passarelli, 2015] show that, despite the young and the old share the same loss aversion parameter  $\lambda$ , the young behave as individuals who live one period with loss aversion  $\lambda/2$ . Thus, despite all the similarities with the old generation, they are less subject to the status quo compared to old voters. The reason is that the young are more willing to bear the psychological cost of changing the policy today because tomorrow they will enjoy the benefits of a better status quo.

Assume income is uniformly distributed in  $[\frac{1}{2}, \frac{3}{2}]$  in both groups. The median's income equals the average:  $y_m = \bar{y} = 1$  in both groups. Suppose the status quo is  $g^S = \frac{3}{2}$ , a socially too high level. The perceived loss aversion parameter of old voters is  $\lambda$ . Thus the majority of old voters does not want to change the inefficient status quo for less public good if the median is lower than  $\hat{y}^o \equiv (1 + \lambda) \bar{y}_{g^S}^{-1} = \hat{y} \equiv (1 + \lambda) \frac{2}{3}$ . The perceived loss aversion of young voters is  $\lambda/2$ , thus the majority of them do not want to vote for less public good if the median income is lower than  $\hat{y}^y \equiv (1 + \lambda/2) \bar{y}_{g^S}^{-1} = \hat{y} \equiv (1 + \lambda/2) \frac{2}{3}$ .

For any value of  $\lambda$  such that  $\frac{1}{2} \leq \lambda \leq 1$ , the majority of young voters wants to change (for less public good) and the majority of old voters does not want to change. The reason does not rely on differences in material interests. It is only a psychological reason related to perceived loss aversion.

How will society choose? Let  $a$  be the share of old voters in the society, and  $(1 - a)$  the share of young voters ( $0 \leq a \leq 1$ ). Since in both groups income distribution is uniform in  $[\frac{1}{2}, \frac{3}{2}]$ , the mass of old voters who do not want to lower  $g$  is  $a [\frac{2}{3}(1 + \lambda) - \frac{1}{2}]$ , while the mass of young voters is  $(1 - a) [\frac{2}{3}(1 + \lambda/2) - \frac{1}{2}]$ . If these two masses of voters are not smaller than a half of the population, the status quo remains:  $a [\frac{2}{3}(1 + \lambda) - \frac{1}{2}] + (1 - a) [\frac{2}{3}(1 + \lambda/2) - \frac{1}{2}] \geq \frac{1}{2}$ . Solving this inequality yields the condition for the status quo:

$$a \geq \frac{1}{\lambda} - 1 \tag{6}$$

This inequality tells us that older societies (higher  $a$ ) are more likely to remain in

the status quo. For instance, suppose that  $\lambda = \frac{9}{10}$ . In this case,  $\frac{1}{2} \leq \lambda \leq 1$ , thus the majority of young voters would like to change, and the majority of old voters would like to remain in the status quo. However, by (6), if  $a \geq \frac{1}{9}$ , the society remains in the status quo. Even though the old voters are only one ninth of the population, the entire society sticks to the status quo.

The general idea is that loss aversion favors political cohesion within older generations. Older societies (for instance those with low fertility) tend to become more averse to change and may remain more often “stuck” in a status quo even when the latter is quite inefficient.

## 8 Loss Aversion and Vote Choice

[Alesina and Passarelli, 2015]’s voting model with loss aversion yields a status quo bias. In [Attanasi et al., 2017] the same aversion to losses is translated into the demand for more protection against the risk of being expropriated. They present a model of stylized constitutional choice in which individuals must reach an agreement on the voting rules to make future decisions. Namely, they have to agree on the majority threshold, i.e. the number of voters needed to pass a bill.

Individuals have subjective beliefs regarding how others will vote in the future. The basic trade-off is between decisiveness and protection. On the one hand, an individual wants a decisive voting rule (i.e. a low threshold) that eases the formation of a favorable majority. On the other hand, she wants a high majority threshold that protects her against the formation of an unfavorable majority. [Attanasi et al., 2017] endogenize the choice of the majority rule, which depends on several individual characteristics (e.g. attitudes towards risk, individual voting power, beliefs about the preferences of others, ...). Among them, they consider loss aversion.

Let us sketch their model. Consider a society  $N$  which consists of  $n$  individuals indexed by  $i$ . They have to deliberate on two exogenous policy proposals,  $\alpha$  and  $\beta$ . Individual  $i$  prefers  $\alpha$ , to  $\beta$ . The latter is worse than the status quo  $\varsigma$ . Let  $u_i(\cdot)$  be  $i$ ’s utility function. We have,

$$u_i(\alpha) > u_i(\varsigma) > u_i(\beta)$$

Individual  $i$  holds the belief that a percentage  $p_i$  of individuals in the society share the same preference ordering, while the remaining percentage  $1 - p_i$  prefer  $\beta$  to  $\varsigma$  and the latter to  $\alpha$ . Voting is possibly weighted; each individual is endowed with  $w_i$  votes. Let  $q$  be the majority threshold. It represents the minimum number of votes required to pass a decision.

In this framework,  $i$ ’s subjective probability that policy  $\alpha$  will pass,  $\Pr_i \{ \alpha, q \}$ , is given by the probability that a sufficient number of “favorable” votes is collected. It of course negatively depend on the majority threshold. Also the probability that

the unfavorable proposal passes,  $\Pr_i \{\beta, q\}$ , negatively depends on  $q$ . Here is the trade off: higher  $q$  yields more protection against  $\beta$  being adopted, but also less chance of  $\alpha$  being passed. If neither proposal passes the status quo remains.

The choice of the majority threshold consists in the choice of a lottery  $L_i(q)$  where the probability to win is  $\Pr_i \{\alpha, q\}$  and the probability to lose is  $\Pr_i \{\beta, q\}$ . Both of them depend on the voting rule. [Attanasi et al., 2017] show that an individual prefers a higher majority threshold when she is more risk averse, less powerful or less optimistic about how others will vote.

Let  $\lambda > 0$  is the parameter which captures loss aversion. A loss averse individual puts more weight on the possible loss she will bear in case policy  $\beta$  is adopted. The loss is evaluated with respect to the status quo, and is weighted by  $(1 + \lambda)$ . The gain occurs if  $\alpha$  passes, and it is evaluated with respect to  $\varsigma$ . The expected utility of this lottery is then:

$$\Pr_i \{\alpha, q\} \cdot [u_i(\alpha) - u_i(\varsigma)] - (1 + \lambda) \Pr_i \{\beta, q\} \cdot [u_i(\beta) - u_i(\varsigma)]$$

The most preferred majority threshold maximizes the above expression. [Attanasi et al., 2017] show that the higher loss aversion, the higher the most preferred majority threshold. Loss aversion leads individuals to demand more protection against unfavorable majorities. With a higher majority threshold the status quo is more likely. Thus, loss averse individuals display their preferences for the status quo through their demand for higher majority thresholds. This result parallels the one in [Alesina and Passarelli, 2015]. The difference is that policies are endogenous therein while voting rules are exogenous.

## 9 Conclusion

This chapter traced the impact of the anomalies postulated by prospect theory on political choices with uncertain consequences. A simple case with a fixed status quo and a policy alternative that is uncertain and exogenous is sufficient to make a stylized comparison between rational choice and prospect theory. Prospect theory provides credible predictions for a wide set of political phenomena that can hardly be reconciled with expected utility models. For example, according to prospect theory, voters are irrationally attracted by platforms that are ambitious but possibly difficult to achieve, rather than by incremental and detailed policy changes.

People are too skeptical of good reforms and too credulous of bad ones. They fail to appreciate the potentially enormous costs that come with their voting decisions when those costs are attached to low probability events. For instance, city councils may fail to take preventive steps toward disastrous floods that occasionally strike the community.

Voters are unwilling to pay for a policy that would certainly worsen their current status quo and promises to avert a disaster that they irrationally pigeonhole as distant. Voters are also too indulgent toward bad politicians and too demanding toward good performers. Finally, people's preferences on nonpartisan issues are irrationally independent of their wealth. These predictions improve our understanding of political puzzles such as low turnover in legislatures, weak concern about partisan issues in electoral campaigns, and low loyalty rates by partisan voters.

Policy preferences informed by prospect theory may be introduced into an open agenda voting model or a Downs-Hotelling electoral competition model. The simplified setting includes a unidimensional fiscal policy issue, exogenous priors on only two alternative income distributions, and no heterogeneity except individual income. Despite simplicity, results are non-trivial. Voters' policy preferences diverge less sharply than under rationality. Although the median voter is pivotal, the equilibrium does not necessarily coincide with her ideal point. The same policy may persist as an equilibrium even if most people are discontent with it. Moreover, the drift toward new equilibria may take place through sudden and drastic changes. These results improve over rational choice models of politics because they address their empirical difficulties.

An ancillary result of a voting model with loss aversion is that older societies are more politically cohesive around the status quo. Older voters coalesce against younger ones to preserve the current state of affairs. A coalition of older voters in support of the status quo occurs because loss aversion implies that older voters will not live long enough to enjoy the benefits of a policy change. On the contrary, younger voters are more willing to suffer the short-term costs of a policy change, since they have a longer life span to enjoy a new policy. Status quo bias also applies to the working-age youth who has the opportunity to emigrate. Prospective emigrants who have already decided to leave have little incentive to support a policy change in their home country. This effect exacerbates status quo bias and political immobility in older and slow-growing countries, such as Greece and Italy in Southern Europe [Triandafyllidou and Gropas, 2014].

The result that loss aversion induces higher majority thresholds may explain the tendency in highly divided parliamentary democracies or in fragmented political unions such as the European Union to pass electoral laws with higher majority thresholds rather than low ones. This tendency comports with a general trend toward proportional electoral laws in multiparty systems [Boix, 2010, Colomer, 2005]. Existing parties have the incentive to minimize the threat of new entrants and thwart their opponents' efforts to form a parliamentary majority [Colomer, 2005].

## 9.1 Going Forward: Applications

The prospect theory framework may serve for studying other sources of uncertainty, such as incumbent performance, rents extracted by politicians, the amount of avoidance, or a random shock on private income. This framework can be easily extended to more realistic settings, such as multidimensional policy issues and dynamic or multi-party electoral competition.

Scholars can use prospect theory to find behavioral ways to ameliorate the pressing challenges that modern societies face, such as climate change mitigation and the artificial intelligence revolution.

For instance, recent studies on how citizens deal with the social dilemma of climate change have shown that people tend to be insensitive to the negative climate consequences they create for others, but they can be surprisingly efficient in coordinating to find a solution (see e.g. [Del Ponte et al., 2017, Milinski et al., 2008]). Coordination is successful especially if people face the fear of surpassing a critical disaster threshold [Barrett and Dannenberg, 2012]. These behaviors are consistent with prospect theory, and particularly loss aversion, since often participants are irrationally willing to over-invest significant resources of their own to avert a probable loss.

The artificial intelligence revolution, with the advent of self-driving electric cars, drones, and ever-present algorithms, could be thwarted by humans' ancestral fears that result in a status quo bias. Scientific progress and innovations often proceed incrementally, with small and nuanced changes. Yet, governments may irrationally prefer to neglect public investments in technological advances even though the advantages of switching to new technologies vastly outweigh the costs. This may provide a reason for why public investments in new technologies have been long stagnating both in the United States and Europe [Mazzucato, 2015, Nemet and Kammen, 2007].

Prospect theory, and particularly the overweighting of small probabilities, may also help explain governments' recalcitrance toward inclusive immigration policies and voters' skepticism toward policies that facilitate foreigners in the process to acquire citizenship. If voters overweigh the small probability that immigrants will be dangerous to the communities where they arrive, they will likely be opposed to immigration and vote for anti-immigration parties. These considerations are consistent with the political dynamics that dominate European politics since the turn of the century [Geddes and Scholten, 2016].

In sum, incorporating prospect theory into rational choice models of politics presents opportunities for social scientists to formulate rich and interesting predictions that better explain political behavior. Researchers can take these predictions into the lab or the field to tackle the pressing questions of our time.

## 10 Further Reading

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