Loss Aversion in Politics

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Abstract

We study loss aversion in elections by investigating a median voter model (full convergence in a two-candidate election) and a model of partial divergence of policy proposals. First, we show a status quo bias, an endowment effect, and a moderating effect of policies. Second, we show the occurrence of "long-term cycles" in policies with self-supporting movements to the right or the left. Finally, we prove that younger societies should be more prone to change and less affected by the status quo bias than older ones.

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1 Introduction

When the Affordable Care Act (ACA) was approved by Congress in 2010, many opinion polls indicated that more Americans opposed than approved of the law. During his presidential campaign in 2016, Donald Trump promised to repeal it, but he miscalculated the changing views of Americans. In fact, as of January 2017, for the first time a majority of Americans were favorable toward Obamacare.[1] This preference reversal undermined several subsequent attempts at eliminating it. Perhaps many Americans had gotten used to ACA and viewed it as the "new normal". Treuer et al. (2012) document similar preference reversals in the case of the Smoke Free Air Act, introduced in New York City in 2002, and the carbon tax introduced in British Columbia in 2007.

In the behavioral/experimental literature, this phenomenon is widely recognized as the endowment effect (Samuelson and Zechauser, 1988). When people get used to a certain status quo, that is a "new normal", they become attached to it. Kahneman and Tversky (1979) argued that it is because of *loss aversion*, namely a psychological attitude according to which individuals "perceive outcomes as gains and losses, rather than as final states of wealth or welfare" (page 274). Gains and losses are relative to a reference point, which is usually the status quo, and "losses loom larger than gains" (page 279). Loss aversion became a fundamental component of Prospect Theory, their seminal theory of individual behavior.

Loss aversion is rooted in a common human attitude of experiencing a stronger negative emotion when losing something than the positive emotion from gaining the

[1] Sanger-Katz and Haeyoun Park, "Obamacare more popular than ever, now that it may be repealed", New York Times, February 1, 2017. In October 2018 those against the law were 40.4% and those in favor were 50.0%. These data are based on a variety of polls, with questions asked in different ways (cf. www.realclearpolitics.com).

same thing (see Rick, 2011). Many scholars have emphasized the importance of loss aversion in political behavior.[2] However, to our knowledge, there is no general political model incorporating voters' loss aversion. In this paper, we parsimoniously introduce loss aversion into canonical spatial voting models and show that it leads to significant and realistic departures from the "standard" results.

We begin with a two-candidate election in a Black-Downs setting. Without loss aversion, the policy outcome is the one preferred by the median voter, and the status quo is irrelevant. With loss aversion, we have a status quo bias. For any initial policy level, a mass of voters with "intermediate" preferences will prefer the status quo to a change. Thus, the status quo survives small shocks in voters' preferences. A policy change occurs only when the shock is sufficiently large and the median voter is "pushed" out of the mass of voters who prefer to keep the status quo. Once a new policy becomes the status quo, a preference reversal occurs: a larger majority of voters wants to maintain it. We call it the *political endowment effect*. It explains, for instance, the preference reversal regarding Obamacare. Our model also predicts an *entrenchment effect*: when the policy changes, the final outcome depends upon the initial status quo. In other words, past policies affect reforms in the long run. Entrenchment due to loss aversion might explain why societies are unable to eradicate certain ingrained policies.[3] Finally, loss aversion tends to have a *moderating effect*: the most extreme types will prefer less extreme policies. Absent loss aversion, none of these effects would emerge in the standard median voter model.

Of course, this is not the only model that delivers a status quo bias. In Krehbiel

[2] See, for instance, Quattrone and Tversky (1988), Berejikian (1997), Druckman and Lupia (2000), Mercer (2005), Soroka (2014), and Sheffer et al. (2018).

[3] Entrenchment is informally discussed by Jost et al. (2004).

(1998) and the extensive subsequent literature on pivotal voting, a status quo bias may occur because the majority's ability to act is tempered by the executive veto and filibuster procedures, which in practice operate as a super-majority threshold. In our model the bias and its size do not depend upon institutional rules, order of voting, agenda setting, etc. They simply arise from voters' preferences. We view this as a significant difference from the institutional models of status quo bias. To the extent that policy reforms often seem difficult, the status quo bias might be quite general and it may depend directly on the electorate's preferences and apply to any institutional setting. Of course, institutional rules may reinforce the status quo bias, but a society might prefer such rules precisely because the voters are loss averse. For instance, Attanasi et al. (2017) claim that loss averse voters want more protection against the risk of being expropriated by the majority. This leads voters to prefer high super-majority rules and overly protective checks and balances. Pierson (2000) argues that the preference for the status quo may lead individuals to design rules that make pre-existing arrangements hard to reverse.

In a multi-period setting, our model yields a novel intergenerational conflict about policy reforms based purely upon the time horizon of voters. A period is defined as the length of time in which the status quo becomes the new reference point. Voters take into account the dynamic effect of their loss aversion in future periods. They place less value on their current loss because it is compensated for by future gains. Thus, they are more prone to change the current status quo. This effect is stronger, ceteris paribus, among young voters with a longer horizon. Aging societies should be less prone to change. In young societies, typically the least developed countries with high birth rates, political change should be more radical (perhaps with more political instability).

We then move to a "partisan" model of elections based upon Wittman (1977), Calvert (1985), Alesina (1988) and Alesina and Rosenthal (1995). In this model, candidates (or parties) have policy preferences. They trade off the gain in terms of the probability of winning by moving toward the median voter against the cost, if elected, of having to implement a policy that is further from their preferred one. Voters' loss aversion implies that the two candidates will converge more thank in a model without it. In addition, we derive a "dynamic" status quo bias. Imagine that the left-wing candidate wins an election. Then the status quo will turn to the left. In the next election, the expected policy outcome will move to the left. Under certain conditions, both the left-wing and the right-wing candidates will then move to the left. The right-wing candidate would need to converge more in order to fight against the loss aversion of a mass of voters who now are in a left-wing status quo. The left-wing party in contrast has more latitude to move closer to its ideal policy. Put differently, the voters become used to a left-wing status quo and it may take a more and more extreme realization of a right-wing median voter to switch the equilibrium to the right. Introducing loss aversion into this canonical model yields a kind of long-term cycle in policies. Perhaps the pro-market policies of Bill Clinton in part were determined by the post-Reagan status quo bias; the same may apply to Tony Blair as post-Thatcher (and Major).

Our model further delivers a specific form of incumbent advantage. Winning today's election will improve the winner's prospect in future elections. Quattrone and Tversky (1998) were the first to argue that loss aversion may justify the incumbent's advantage. Lockwood and Rockey (2015) propose and empirically test a model of electoral competition in which incumbents, because of loss aversion, adjust their platforms less than do challengers in response to a shock affecting voters'

preferences. These authors assume that the shock is exogenous. In our dynamic model, the change in voters' preferences occurs endogenously because the policy implemented by the incumbent today will represent the new reference point tomorrow. Somer-Topcu (2018) empirically shows that parties shift their platforms more when they have lost votes in the previous election than when they have gained votes, a result that echoes Prospect Theory. Schumacher et al. (2015) find that, compared to parties with high office aspiration, parties with low office aspiration are more likely to make radical reforms when they are in government. Their expectation of losing in the next election is high. Loss aversion leads them to take the risk of making radical reforms (see also Van de Wardt, 2015).

Many scholars claim that anomalies postulated by Prospect Theory may help us understand important patterns that are hard to reconcile with existing political science theories (e.g., Levy, 2003; Boettcher, 2004; McDermott, 2004; Mercer, 2005; Vis, 2011; Wilson, 2011). Patty (2006) claims that loss aversion offers a simple justification for the puzzle of the president's party typically losing in the mid-term election.[4] Erikson and Stoker (2011) study how the 1969 Vietnam draft lottery affected American males' political preferences. Those exposed to higher risk became more anti-war and more Democratic in the long run. The authors argue that this happened because the risk of being drafted shaped males' reference points, an explanation that is consistent with Prospect Theory.[5] Acharya and Grillo (2018) study canonical "crisis bargaining" situations in which the leader of a country has to choose whether to challenge a foreign country. Such a leader may incur "audience

[4] For a different but non mutually exclusive argument, see Alesina and Rosenthal (1995).

[5] See also Vis and Van Kersbergen (2007) on risky reforms and loss aversion. Murat-Tezcur (2016) argues that Kurdish people living in desperate conditions are more willing to take the gamble of participating in high-risk rebellion.

costs" as a result of his citizens punishing him for backing down from the challenge. These authors provide a micro-fundation of audience costs that hinges on loss aversion. Indeed, loss aversion also may explain why individuals pay more attention to negative information than to positive information (the so-called negativity bias). Soroka and McAdams (2015) study this bias in political communication. Brie and Dufresne (2018) rely on loss aversion to explain why negativity bias played a crucial role in the 2014 campaign for the Scottish independence referendum.

Other behavioral distortions recently have been invoked to explain political puzzles. Bendor et al. (2011) study voting models with bounded rationality. Krusell et al. (2010) examine optimal government policies when agents are affected by self-control problems. Lizzeri and Yariv (2017) look at majority voting when voters are heterogeneous in their degree of self-control. Bisin et al. (2015) present a model of fiscal irresponsibility and public debt. Passarelli and Tabellini (2017) consider how emotional unrest affects policy outcomes. Ortoleva and Snowberg (2015) point at imperfect information processing; this can exacerbate differences in ideology and fuel extremes in political behavior. Grillo (2016) studies information transmission; Freund and Özden (2008) and Tovar (2009) focus on trade policy.

This paper is organized as follows: Section 2 lays out the voters' policy preferences with and without loss aversion; Section 3 introduces loss aversion in a standard model adopting the majority rule and derives several results in a static setting; Section 4 incorporates overlapping generations and presents the intergenerational conflict due to loss aversion; Section 5 extends the static model to electoral competition with partial convergence; Section 6 analyzes dynamic aspects of political competition in the presence of loss aversion. The last section concludes. Proofs for all propositions are in the Online Appendix.

2 Policy preferences

2.1 Without Loss Aversion

Consider a society with a continuum of voters who are heterogeneous in some parameter t, which we call *type* and which reflects preferences on a unidimensional policy space. Let $F(t)$ be the distribution of t, which is common knowledge. Heterogeneity may arise because of any dimension that affects individual preferences (e.g., ideology, income, wealth, productivity, etc.). This society has to choose a policy $p \in \mathbb{R}$ that entails benefits and costs. Let $V(t_i, p)$ be the indirect utility function of individual i:

$$V(t_i, p) = B(t_i, p) - C(t_i, p) \tag{1}$$

where $B(t_i, p)$ and $C(t_i, p)$ are individual i's indirect benefit and cost functions, respectively. This assumption, that individuals separately bracket benefits and costs, is without loss of generality under rationality. It becomes relevant under loss aversion. See below for more discussion of this specific functional form. We also assume that, for any p and any t_i:

A1. Benefits are increasing and strictly concave in the policy: $B_p(t_i, p) > 0$, $B_{pp}(t_i, p) < 0$;

A2. Costs are increasing and convex in the policy: $C_p(t_i, p) > 0$, $C_{pp}(t_i, p) \geq 0$;

A3. Types are indexed such that higher types bear lower marginal costs and/or enjoy higher marginal benefits from the policy: $C_{pt_i}(t_i, p) \leq 0$, $B_{pt_i}(t_i, p) \geq 0$ with at least one of these inequalities being strict.

Thus, for all types, $V(t_i, p)$ is concave in p and, for any voter i, there is a unique policy maximizing indirect utility $V(t_i, p)$, called p_i, which solves:

$$B_p(t_i, p) = C_p(t_i, p) \tag{2}$$

By A1 and A2 the second-order condition is satisfied. By A1-A3, implicit differentiation of (2) yields $\frac{\partial p_i}{\partial t_i} \equiv -\frac{B_{pt}(t_i,p_i)-C_{pt}(t_i,p_i)}{B_{pp}(t_i,p_i)-C_{pp}(t_i,p_i)} \geq 0$. This means that higher types prefer (weakly) higher policies (cf. the dotted line in Figure 1).

2.2 With Loss Aversion

Let p^S be the status quo policy, which is the *reference point* for the voters. Increasing the policy (i.e., $p > p^S$) entails more benefits and larger costs. $\lambda > 0$ captures loss aversion. Higher costs yield a psychological experience of loss that amounts to $\lambda \left[C(t_i, p) - C(t_i, p^S)\right]$. Vice versa, lowering the policy (i.e. $p < p^S$) entails a loss. The psychological component of it is $\lambda \left[B(t_i, p^S) - B(t_i, p)\right]$. Sensitivity to losses may differ across individuals. Thus λ should be indexed by i. Moreover, for the same individual, λ might be different if it regards higher costs rather than lower benefits. Here we assume that λ is the same for all i. This assumption greatly simplifies the model and is consistent with experimental evidence.[6] In any case, future work may further explore extensions with heterogenous loss aversion parameters.

The indirect utility with loss aversion, $V(t_i, p \mid p^S)$, is given by the material indirect utility of the policy, $V(t_i, p)$, minus the psychological loss due to possible

[6] In the laboratory, individuals tend to systematically weigh a one-dollar increase in costs almost twice as much as one-dollar increase in benefits (specifically, $\lambda \simeq 2.25$; cf. Abdellaoui et al., 2007; DellaVigna, 2009; Vis, 2011). Qualitatively similar results have been found recently by neuroscientists (cf. Tom et al., 2007).

departures from the status quo:

$$V(t_i, p \mid p^S) = \begin{cases} V(t_i, p) - \lambda \left[C(t_i, p) - C(t_i, p^S)\right] & \text{if} \quad p \geq p^S \\ V(t_i, p) - \lambda \left[B(t_i, p^S) - B(t_i, p)\right] & \text{if} \quad p < p^S \end{cases} \tag{3}$$

The utility functions are single peaked, display a kink in the status quo, and are transitive for given status quo.[7] Moreover, when computing losses and gains, individuals evaluate indirect benefits and costs separately. This property is known as "decomposability". It was introduced by Tversky and Kahneman (1991, p. 1048) and it is common in reference-dependence literature (e.g., Köszegi and Rabin, 2006; Herweg and Schmidt, 2014). The decomposition in benefits and costs applies directly to many policy issues. For instance, increasing taxes to provide more public goods; or introducing regulation that increases production costs in order to protect the environment; or more generally, any limitation of individual freedom to provide a common good (say speed limits to reduce the probability of accidents, etc.). In some cases the unbundling is more subtle. Imagine an increase in the progressivity of the tax system to reduce inequality. The rich may bear the cost of more taxes but may enjoy the benefits of achieving more fairness and, perhaps, of guaranteeing social harmony. The poor instead may enjoy only benefits, lower taxes and less inequality, unless more progressivity implies lower investment and employment, in which case the poor also face costs. Take a typical left-wing platform, advocating equalitarianism and government regulation. The latter may yield valuable benefits, more to some voters than others, but those benefits also come at the cost of less

[7] Preference ordering may change when the status quo changes. A voter may prefer A to B, if the status quo today is C, while she may prefer B to A if the status quo tomorrow will be D. Preference reversal occurs only if there is a change in the reference point, which in turn yields a change in the utility function. The fact that preferences are state-dependent is the essence of the loss aversion assumption.

economic freedom and more market distortions, which may negatively affect some voters more than others. Other things equal, individuals embracing more of a left-wing ideology value the benefits of equity and/or regulation more (and the costs less) than right-wing individuals. One could extend our model to a case in which the cost and benefit of policy can be unbundled for some voters, but not for others. The former would have a loss aversion preference structure as shown above. The latter would not.

The optimality condition (w.r.t. p) is:

$$\begin{aligned} B_p(t_i,p) - (1+\lambda)C_p(t_i,p) &\gtreqless 0 \qquad \text{if} \quad p \geq p^S \\ (1+\lambda)B_p(t_i,p) - C_p(t_i,p) &\gtreqless 0 \qquad \text{if} \quad p < p^S \end{aligned} \tag{4}$$

Voter i sets her desired policy, p_i, according to the following rule:

$$p_i \;\; \text{solves} \;\; \begin{cases} (1+\lambda)B_p(t_i,p) - C_p(t_i,p) = 0 & \text{if} \quad t_i < \check{t} \\ p = p^S & \text{if} \quad \check{t} \leq t_i \leq \hat{t} \\ B_p(t_i,p) - (1+\lambda)C_p(t_i,p) = 0 & \text{if} \;\; t_i > \hat{t} \end{cases} \tag{5}$$

where $\check{t}$ is implicitly determined by $(1+\lambda)B_p(t,p^S) - C_p(t,p^S) = 0$, and $\hat{t}$ is implicitly determined by $B_p(t,p^S) - (1+\lambda)C_p(t,p^S) = 0$. Note that $\check{t} < \hat{t}$, and both $\hat{t}$ and $\check{t}$ depend on the status quo policy. By (5) an individual's most preferred policy depends not only on her type but also on the status quo. There are two differences here relative to the case of no loss aversion. First, ideal policies are closer to each other; we call it the "moderation effect" (cf. Proposition 1-iii below). This is due to higher sensitivity to losses than to gains, which in turn affects the cost and benefit

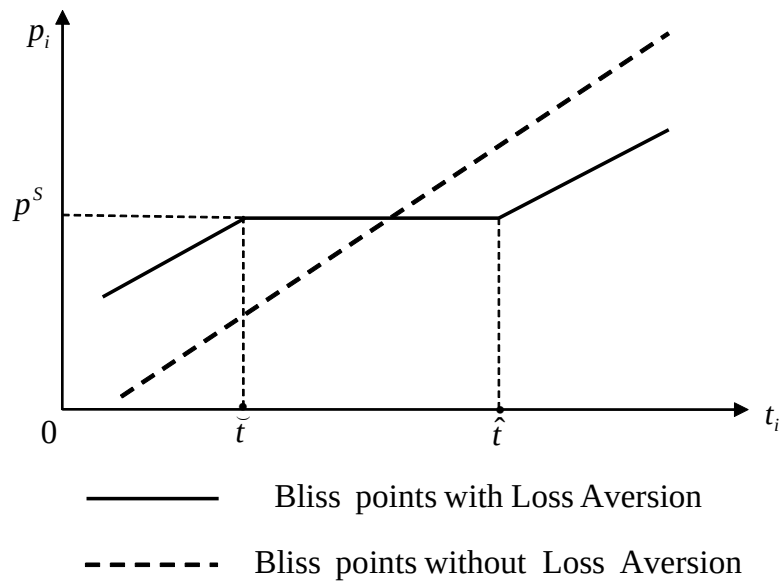

Figure 1: The relationship between bliss points and types

of changing the policy at the margin.[8]

Second, for a range of types the ideal is simply the status quo. Specifically, the population is split into three groups (cf. the solid line in Figure 1): 1) a group of *intermediate* types (i.e., all i such that $\check{t} \leq t_i \leq \hat{t}$) who prefer to keep the status quo; 2) a group of *high* types (i.e., $t_i > \hat{t}$) who want a higher policy level relative to the status quo; 3) a group of *low* types (i.e., $t_i < \check{t}$) who prefer a smaller level of the policy relative to the status quo. The intermediate type group will be bigger when the loss aversion parameter λ is larger.

[8] Loss aversion is different from a general "change aversion", which would occur if changing the status quo implied a fixed cost, x. In this case, indirect utility would be $V(t_i, p)$ if $p = p^S$ and $V(t_i, p) - x$ if $p \neq p^S$. Individuals would make a change only if additional utility was larger than x, and the optimality condition (2) would be the same as in the case with no loss aversion. This means that, in the case they make a change, their bliss points would be the same as in the case with rationality. Thus no moderation effect would occur. Also note that loss aversion typically captures a recurrent psychological attitude of individuals. By contrast, if x was a material cost of making a change, then "change aversion" would be perfectly rational.

3 The median voter model

We begin with the basic Downsian model of electoral between two candidates who care only about winning the election. They converge to the preferences of the median voter.

Proposition 1 (Median voter equilibrium)

i) (Status quo bias) *The policy outcome is the status quo if the median voter is an intermediate type; i.e.* $t_m \in \left[\check{t}, \hat{t}\right]$.

ii) (Inertia) *If* $t_m \in \left[\check{t}, \hat{t}\right]$, *a shock affecting the preferences of the median will lead to a policy change only if it is sufficiently large. The size of the "inertia" interval* $\left[\check{t}, \hat{t}\right]$ *increases in the loss aversion parameter* λ.

iii) (Moderation) *Voters' ideal policies are less dispersed with loss aversion than without it. If* $t_m \notin \left[\check{t}, \hat{t}\right]$, *a policy change occurs, but it is smaller than with no loss aversion.*

iv) (Entrenchment) *Suppose a) the status quo is low and the majority decides for a higher policy; or suppose b) the status quo is high and the same society decides to change it for a lower policy. In the first case the majority chooses a lower policy, compared to the second case.*

v) (Political endowment) *Once a new policy has been approved and becomes the status quo, more than the strict majority of people do not want to return to the previous status quo.*

Parts *i)* and *ii)* of the proposition characterize a status quo bias. Part *iii)* states that loss aversion yields a *moderation effect* on voters' preferences. The distances between the voters' ideal policies are lower, dampening polarization within society (compare solid and dotted lines in Figure 1). If $t_m \notin \left[\check{t}, \hat{t}\right]$, moderation leads the

majority to make smaller changes than with no loss aversion. Statement *iv)* says that the status quo continues to exert an influence on the policy outcome even when the majority would like to abandon it, if $t_m \notin \left[\check{t}, \hat{t}\right]$. If the status quo is a relatively high policy, the majority will make a change. But it will opt for a relatively high policy (e.g., from p^{S1} to p_m^1 in Figure 2). If the status quo is a low policy, that *same* society will choose a relatively low policy (e.g., from p^{S2} to p_m^2, and $p_m^2 < p_m^1$). This is consistent with path dependence of policies.[9] Point *v)* is the *political endowment effect*. Suppose a sufficiently large shock leads to an increase in the policy. Only the bare majority of voters cast votes in favor of the new policy. All voters to the left of the median would prefer a lower policy. All those to the right would prefer a higher one. Once the new policy has been set up, this policy becomes the new reference point. Some of the voters to the left of the median change their minds and start considering this new policy as their most preferred one. This means that a new lower policy needs more than the simple majority to beat the status quo, while a higher policy only requires the simple majority. Thus, the political endowment effect might help explain "ice-breaking" effects in politics: reforms that had hard time to be approved gain popularity some time later, leading to further more ambitious reforms in subsequent periods.

[9] Technically, entrenchment is caused by two factors. First, the status quo influences how voters rank policy alternatives. As mentioned earlier, a voter might prefer policy p^A to p^B under a certain status quo, while she might prefer p^B to p^A under a different status quo. This consequence of loss aversion was pointed out, among others, by Quattrone and Tversky (1988) and Druckmann and Lupia (2000). Second, the status quo is the reference point. Many scholars believe that voters are used to compare benefits and costs of reforms to the status quo (e.g. Vis and Van Kersberger, 2007; Pierson, 2000; Van deWardt, 2015; Sheffer et al., 2018).

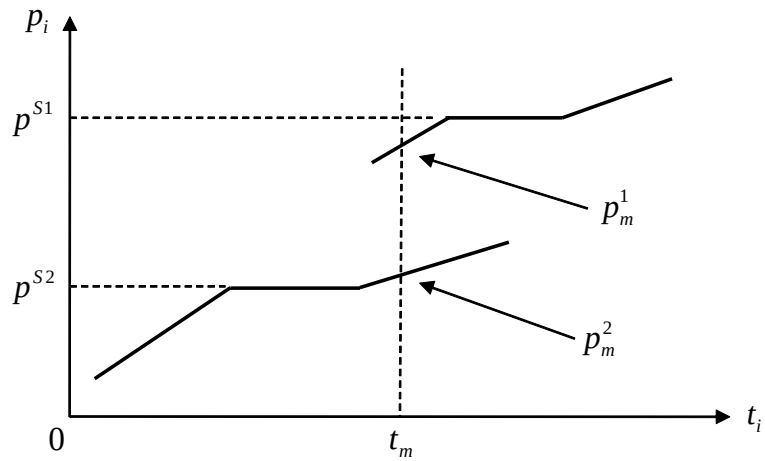

Figure 2: Equilibria with different status quo policies

4 *Old* and *Young* Voters

Because of loss aversion, changing the policy today is psychologically costly. However it could imply a better status quo tomorrow. Relative to older voters, young voters have a longer horizon during which they can benefit from a better status quo, after bearing the psychological cost of a policy change today. Thus, old voters are more subject to status quo bias while young voters are more open to change. This seems rather realistic.

More formally, consider a population of voters split into two overlapping generations, the young and the old. The two generations are identical in all respects, except for their residual life: the loss aversion parameter, λ, and the distribution of types, $F(t)$, are the same for young and old; also, at any period any individual voter i, faces the same current "material" benefit and cost functions, $B(t_i, p)$ and $C(t_i, p)$, independent of age. Without loss aversion there would be no difference in the policy preferences of the two groups. This does not apply with loss aversion simply because

of the different time horizon of young and old voters. Suppose the old live only one period and the young live two periods. Voting takes place at the beginning of each period $k = 1, 2$. The status quo is the policy of the previous period. Thus the status quo in period 1 is policy p^0 of period 0. Let p^0 be exogenously given.[10] Let $b \gtreqless 0$ be the constant population birth rate. At the beginning of period k the number of young has increased by a factor $(1+b)^k$, the number of old (who were young one period earlier) has increased by $(1+b)^{k-1}$. The young's share in the population, σ, and old's share, $1-\sigma$, are the following:

$$\sigma = (1+b)/(2+b) \tag{6}$$

$$1-\sigma = 1/(2+b) \tag{7}$$

By (6-7), $\sigma = S(b)$, with $S_b > 0$. The higher the birth rate, the larger the young's share. In each period the voters maximize residual lifetime utility. Since the shares of young and old cohorts are independent of k, then the equilibrium in period 1 remains unchanged in all subsequent periods. Thus we can focus on the first period. Old voters behave as in the static model, discussed above. A young voter i maximizes the sum of her current and future utilities, $V(t_i, p^1 \mid p^0)$ and $V(t_i, G(p^1) \mid p^1)$. For simplicity there is no discounting for future utility, thus her current bliss point, p_i^1, is such that,

$$p_i^1 \in \arg\max_{p^1} \left\{ V(t_i, p^1 \mid p^0) + V(t_i, G(p^1) \mid p^1) \right\}$$

The bliss point in period 1 is sequentially rational. Policy p^1 is a choice variable in period 1 and a state variable in period 2. The young voter i takes into account the

[10] If a new policy is introduced in period 1 the no-policy of period 0 is simply $p^0 = 0$, with $B(t_i, p^0) = C(t_i, p^0) = 0$ for all i, independently of voters' age.

consequences of her choice today on her future preferences. Specifically, her future bliss point, p_i^2, depends upon the future status quo, which is a function $G(.)$ of the first period's policy, $p_i^2 = G(p^1)$.

Proposition 2-i below states (and Appendix proves) that, since the young live two periods, their *perceived* loss aversion is $\lambda^y = \lambda/2$, while loss aversion *perceived* by old voters is $\lambda^o = \lambda$. The psychological cost of a policy change today is borne today only, while the material benefits of that change are enjoyed also in the future. Living for two periods gives young voters the chance to *spread* the psychological cost over two periods. This is why, despite λ is the same in both groups, the young perceive less loss aversion than the old. This result can easily be extended to the case in which a voter's residual life consists of n periods. In this case, her perceived loss aversion is $\frac{\lambda}{n}$.

By Proposition 1-*ii)*, the status quo bias in the young cohort is smaller than in the old cohort ($\check{t}^o < \check{t}^y$ and $\hat{t}^o > \hat{t}^y$). The majority of young voters may want a change in policy, but the majority of old voters do not. This is the case shown in Figure 3, where $\hat{t}^y < t^m < \hat{t}^o$ implies that the majority of young voters want a higher policy while the majority of the old voters prefer the status quo (recall that t^m is the same in the two groups). Proposition 2 says (and Appendix, p. 5, proves) that a higher policy would pass if inequality in (8) is satisfied, while a lower policy would pass if (9) holds. The proposition also says that a status quo change is less likely to occur when the birth rate is lower.

$$p^1 > p^0 = p^S \quad \text{iff} \quad (1 - S(b))F(\hat{t}^o) + S(b)F(\hat{t}^y) < 0.5 \tag{8}$$

$$p^1 < p^0 = p^S \quad \text{iff} \quad (1 - S(b))(1 - F(\check{t}^o)) + S(b)(1 - F(\check{t}^y)) < 0.5 \tag{9}$$

Proposition 2 (Chance and size of reforms)

i) The young generation perceives a lower degree of loss aversion than the old one: $\lambda^y = \lambda/2$ and $\lambda^o = \lambda$. The share of people who want the status quo is always larger amongst the old generation than the young one.

ii) The status quo remains unless either (8) or (9) is satisfied.

iii) The lower the birth rate, b, the larger the set of parameter values for which the status quo remains.

iv) Assume a constituency for a reform exists in period $k \geq 1$. The reform is smaller in absolute value if the birth rate is lower.

Thus one should expect less frequent policy changes in aging societies. Since the old perceive higher loss aversion, more old than young voters do not want to change, and those who do want to change want to do it less. With a lower birth rate, the fraction of old people is larger. Therefore, the bliss point of the pivotal voter shifts towards the status quo. This has two implications. First, the chance to make a reform is smaller. Second, whenever there is a majority in favor of a change, the reform is less drastic.

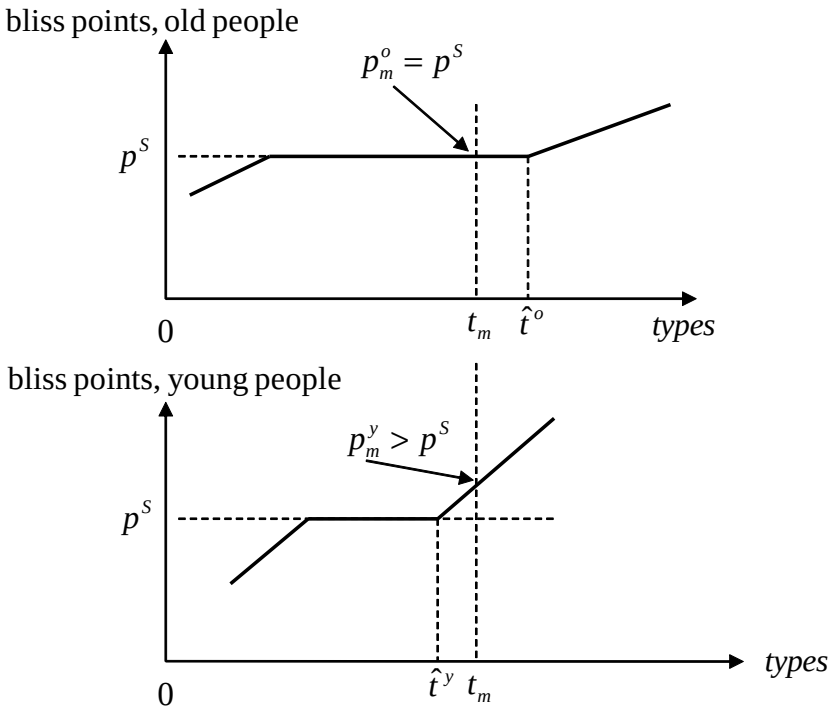

Figure 3: The intergenerational conflict

5 Policy motivated parties

We now move to a model of candidates/parties (terms used interchangeably) with policy preferences. These candidates only get utility from a policy, not from taking a seat, even though the model could easily be extended to the case of candidates who, in addition to caring about policy, also attribute some value to being in office.[11] Thus, they trade off the probability of taking a seat against the utility of implementing their most preferred policy, their "type". The parties thus can make binding commitments to their proposed platforms.[12]

5.1 No loss aversion

Let l and r label the two candidates with $\bar{l}$ and $\bar{r}$ be their most preferred policies; $\bar{l} < \bar{r}$. We assume that $\bar{l} < p_m < \bar{r}$ where p_m is the bliss point of the expected type of the median, t_m. This is not necessary to solve the model, but we make it to reduce the number of cases to consider and it seems the most natural case. We refer to l as the left-wing candidate/party and to r as the right-wing one. Let x be the platform proposed by candidate l, and y the platform proposed by r. Given these two platforms, there will be an "indifferent" type t_{ind} enjoying the same utility from either platforms:

$$V(t_{ind}, x) = V(t_{ind}, y) \tag{10}$$

By (10), the indifferent type is a function $T(.)$ of the two platforms: $t_{ind} = T(x, y)$. It represents the "cutoff type". All types higher than t_{ind} strictly prefer the right-wing platform y; all types lower than t_{ind} prefer the left-wing platform

[11] See Wittman (1977), Alesina (1988), and Alesina and Rosenthal (1995) on this point.
[12] For a discussion of this assumption see Alesina (1988).

x. Candidate l wins if the indifferent type t_{ind} is higher than the median. The two candidates do not know the exact location of the median. By choosing their platforms they can only affect the probability of winning. Specifically, the median type's location is $t_m + \epsilon$, and we assume ϵ to be uniformly distributed on $[-\delta, \delta]$. As such, l's probability of winning, call it $P(x, y)$, is given by the probability that the indifferent type is above the median:

$$P(x, y) \equiv \Pr\{T(x, y) > t_m + \epsilon\} = \frac{1}{2\delta}(T(x, y) - t_m + \delta) \tag{11}$$

Of course l's probability of losing is $1 - P(x, y)$. By (11), $P_x(x, y) = P_T \cdot T_x = \frac{1}{2\delta}T_x > 0$, where $T_x > 0$ can be computed by implicit differentiating the indifference condition (10).[13] Given the right-wing party's platform, the left-wing candidate can increase his chance of winning by proposing a "more right-wing" policy, thus moving x rightward. Equivalently, $1 - P_y(x, y) = -P_T \cdot T_y = -\frac{1}{2\delta}T_y < 0$. This means that the right-wing candidate also has an incentive to move his platform towards the center of the policy space in order to increase his chance of winning. Let $u^l = U(p, l)$ be candidate l's utility function and let it be decreasing in p for any $p > \bar{l}$. She chooses his platform x so as to maximize the following expected utility:

$$U^l(x, y) = U(x, l) \cdot P(x, y) + U(y, l) \cdot [1 - P(x, y)] \tag{12}$$

$U(x, l)$, is candidate l's utility in case of victory, and $U(y, l)$ is his utility in case the other candidate wins.

[13] Specifically, $T_x = -\frac{V_x(t_{ind},x)}{V_t(t_{ind},x)-V_t(t_{ind},y)} > 0$. This derivative is positive because the denominator is negative (i.e. a marginally higher type than t_{ind} is not indifferent, rather she prefers y to x) and the numerator is positive (since t_{ind}'s bliss point is larger than x). Following the same steps, $T_y = -\frac{-V_y(t_{ind},y)}{V_t(t_{ind},x)-V_t(t_{ind},y)} > 0$.

Candidate r's utility is $u^r = U(p, r)$, with $U_p(p, r) > 0$, for any $p < \bar{r}$. His objective function is:

$$U^r(x, y) = U(x, r) \cdot P(x, y) + U(y, r) \cdot [1 - P(x, y)] \tag{13}$$

The following two FOCs to maximize (12) and (13) implicitly define the reaction functions of the two candidates:

$$U_x(x, l) \cdot P(x, y) + [U(x, l) - U(y, l)] \cdot P_x(x, y) = 0 \tag{14}$$

$$U_y(y, r) \cdot [1 - P(x, y)] - [U(y, r) - U(x, r)] \cdot P_y(x, y) = 0 \tag{15}$$

The equilibrium platforms, x^* and y^*, converge (partially) towards the expected median of the political space. Specifically, $x^* < t_m < y^*$. High enough concavity in the two parties' utility functions ensures stability at the equilibrium point (cf. Appendix, pp. 12-15, for details).

5.2 Loss aversion

We now include loss aversion for the voters, but not for the parties. Suppose $x < p^S < y$, which is the most interesting case. The Appendix, pp. 12-17, considers the other two cases, when both equilibrium platforms are either above or below the status quo.[14] The indifference condition which pins down the cutoff voter's type,

[14] See Cases 1 and 2 in the proof of Proposition 3. Results for these two cases are consistent with those presented here.

call this type t_{ind}^{LA}, is now

$$V(t_{ind}^{LA}, x) - \lambda \left[B(t_{ind}^{LA}, p^S) - B(t_{ind}^{LA}, x)\right] = V(t_{ind}^{LA}, y) - \lambda \left[C(t_{ind}^{LA}, y) - C(t_{ind}^{LA}, p^S)\right] \tag{16}$$

The left-hand side of (16) is the utility of the cutoff type t_{ind}^{LA} when policy x is implemented. Since $x < p^S$, it includes the feeling of loss due to lower benefits with respect to the status quo. The right-hand side is the utility with $y > p^S$ By (16), $t_{ind}^{LA} = T^{LA}(x, y, p^S)$, with $T_x^{LA}, T_y^{LA} > 0$. If, say, either candidate l or r proposes a more right-wing policy, then the cutoff type shifts to the right leading more voters to vote for candidate l.[15] Loss aversion has a moderating effect. This concentration of preferences implies that a candidate can "gain" a lot of new voters by moving his or his platform marginally towards the center of the policy space (i.e. towards the bliss point of the expected median). Hence, in equilibrium platforms are more similar, compared to the case with no loss aversion:

Proposition 3 (Convergence)
Loss aversion leads the two candidates to propose closer platforms than without loss aversion.

We can also show that if not only the voters but also the party activists and candidates are loss averse we will have even more convergence than in the previous case (cf. Appendix - Case 3 in the proof of Proposition 3). For simplicity, hereafter we assume that only the voters are loss averse.

[15] Details are in Online Appendix. Moreover, by Proposition 4-*i)* below, $T_{p^S}^{LA} < 0$: a more right-wing status quo leads more voters to prefer right-wing policies, thus the cutoff voter is more a left-wing type.

6 Dynamic Electoral Competition

In this section we derive a "dynamic status quo bias" leading to long term cycles in policies. Suppose that the status quo is a right-wing policy. The right-wing candidate can propose a more right-wing platform that is closer to his ideal policy. The left-wing candidate faces a trade-off. On the one hand, a more right-wing status quo implies that a marginal change in his platform will affect the decision of a smaller number of voters. As a result, the left-wing candidate has less leverage when he tries to shift the cutoff voter upwards by proposing a higher x. This leads him to propose a lower x.[16] On the other hand, losing the elections is now a worse prospect than before, since y is a more right-wing policy. The fear of losing leads the left-wing candidate to propose a higher x. If his utility function is sufficiently concave and decreasing, then the fear of losing is so strong that he finally chooses to propose a higher x; i.e., a more right-wing platform. Thus if the status quo is say a right-wing policy, both parties will move to the right, and the expected policy outcome will move to the right as well, even though we are holding constant the material preferences of the voters. This can be summarized as follows:

Proposition 4 *Proposition* (Equilibrium platforms)

i) (Status quo bias) *If both candidates' utility functions are sufficiently steep and concave, then equilibrium platforms x^* and y^* are positively correlated to the status quo.*

ii) (Expected policy) *If the loss aversion parameter λ is also sufficiently large, then the expected policy outcome is positively affected by the status quo.*

[16] This hinges on assumption A3, namely $\frac{\partial B_p(t_i,p)}{\partial t_i} \geq 0$. Since p^S is higher, the cutoff type is lower. By A3 her marginal benefits in the policy are lower: increasing the policy has a smaller impact on the cutoff voter's benefits.

A large λ insures that the rightward movements of both equilibrium platforms are sufficiently large. This yields a positive correlation between expected policy and the status quo for any set of parameter values. Otherwise, one might have cases in which, despite both platforms moving to the right, the left-wing one becomes more likely so the expected policy is actually more left-wing.

Now consider a two-period model where, without discounting as above, a "period" is defined as the length of time in which a new policy is the status quo. Suppose that loss aversion is sufficiently strong so that Proposition 4-ii) holds. Let $V(t_i, p^k \mid p^{k-1})$ denote voter i's indirect utility in period k with $k = 1, 2.$. The status quo in period 1, p^0, is exogenous, while the status quo policy in period 2, p^1, is chosen by the winning party in period 1. The two parties' bliss points, $\bar{l}$ and $\bar{r}$, are fixed and voters consider only the current election when they go to the polls. Results (available upon request) also hold when the voters consider both elections when voting in the first one.

We characterize the equilibrium, working backwards.

Period 2

The voters observe the realization of the policy in period 1, p^1, and adopt this policy as their reference point. Because they live for one period, they perceive a loss aversion parameter λ. Candidates propose their policy platforms, x^2 and y^2 to maximize their expected payoffs:

$$U^{2l}(x^2, y^2, p^1) = U(x^2, l) \cdot P^2 + U(y^2, l) \cdot \left[1 - P^2\right] \tag{17}$$

$$U^{2r}(x^2, y^2, p^1) = U(x^2, r) \cdot P^2 + U(y^2, r) \cdot \left[1 - P^2\right] \tag{18}$$

where $P^2 \equiv P(x^2, y^2, p^1)$ is the the winning probability of the left-wing candidate. Note that this probability depends on the status quo policy, $p^1 \in \{x^1, y^1\}$, which is the realization of the *probabilistic* voting at period 1. Winning the election in period 1 puts the winner in a favorable position in period 2, because the expected policy outcome is closer to his ideal policy (cf. Proposition 4). Specifically, suppose the right-wing candidate won the elections in period 1. The status quo in period 2 is the relatively right-wing policy he proposed in period 1, $p^1 = y^{*1} > x^{*1}$. Due to loss aversion, voters become attached to that policy and thus more willing to vote for the right-wing candidate in period 2. The expected policy outcome, $\boldsymbol{E}(p^2, p^1)$, will be a more right-wing policy.[17] Because of loss aversion the electoral outcome in period 1 affects the outcome in period 2. This is the dynamic status quo bias defined by the following proposition:

Proposition 5 (Dynamic status quo bias)
If a candidate wins the election in the first period, then the expected policy in period 2, $\boldsymbol{E}(p^2, p^1)$, is closer to his ideal policy, compared to the case in which he loses that election: $\boldsymbol{E}(p^2, x^{*1}) < \boldsymbol{E}(p^2, y^{*1})$.

This positive relationship between the winner's policy in period 1 and the expected outcome of subsequent periods may trigger "long-term cycles in politics". A sequence of victories of, say, the right-wing candidate may bring the status quo far to the right. A victory of the left-wing candidate might not be sufficient to bring it back.

Period 1

[17] Given the status quo in the second period, p^1, the expected policy outcome is defined as $\boldsymbol{E}(p^2, p^1) = x^{*2} \cdot P(x^{*2}, y^{*2}, p^1) + y^{*2} \cdot (1 - P(x^{*2}, y^{*2}, p^1))$.

In period 1 candidates set x^1 and y^1 to maximize the following lifetime utilities, respectively:

$$U^{1l}(x^1, y^1, p^0) + P^1 \cdot U^{2l}(X^2(x^1), Y^2(x^1), x^1) + \left(1 - P^1\right) \cdot U^{2l}(X^2(y^1), Y^2(y^1), y^1) \tag{19}$$

$$U^{1r}(x^1, y^1, p^0) + P^1 \cdot U^{2r}(X^2(x^1), Y^2(x^1), x^1) + \left(1 - P^1\right) \cdot U^{2r}(X^2(y^1), Y^2(y^1), y^1) \tag{20}$$

$P^1 \equiv P(x^1, y^1, p^0)$ is the winning probability of the left-wing candidate in the first period, and $x^{*2} = X^2(p^1)$, $y^{*2} = Y^2(p^1)$ are the equilibrium platforms in period 2. The first term in (19) is the expected utility of the left-wing candidate in the first period. The second term is the expected utility in period 2 in case he wins in the first period (cf. expression (17)). The platform x^1 is implemented and it represents the status quo of the second period. This event occurs with probability P^1. The third term is the left-wing candidate's expected utility of the second period in case the right-wing candidate wins in the first period. This happens with probability $(1 - P^1)$ and the status quo of the second period is y^1. The three terms in (20) have similar meanings.

At an interior optimum the platforms proposed by the two candidates in period 1, x^{*1} and y^{*1}, satisfy the following optimality conditions:

$$U^{1l}_{x1}(.., p^0) + P^1_{x1} \cdot \left[U^{2l}(.., x^1) - U^{2l}(.., y^1)\right] + P^1 \cdot U^{2l}_{x1}(.., x^1) = 0 \tag{21}$$

$$U^{1r}_{y1}(.., p^0) - P^1_{y1} \cdot \left[U^{2r}(.., y^1) - U^{2r}(.., x^1)\right] + (1 - P^1) \cdot U^{2r}_{y1}(.., y^1) = 0 \tag{22}$$

Take the left-wing candidate. $U_{x1}^{1l}(..,p^0)$ in (21) is the first-order condition of the static model. The second term is positive. It says that in period 1 the left-wing candidate has an incentive to propose a higher x^1 in order to increase his chance of winning and then to benefit from a more favorable status quo (x^1 instead of y^1) in the second period. The third term may be either positive or negative. The Appendix (p.22) proves that if the candidate's utility function is sufficiently concave, which we assume, the entire expression (21) is positive at the equilibrium point of the static model. This implies that the left-wing candidate has an incentive to propose a higher x^1 than the equilibrium in the static model. A similar incentive leads the right-wing candidate to propose a lower y^1. In a dynamic framework, political competition is tougher than in a static framework. It leads the candidates to propose more convergent platforms. This is what Proposition 6 says.

Proposition 6 (Equilibrium Period 1)
Compared to the static model with loss aversion, candidates propose more convergent platforms in the first period.

A victory in period 1 generates the expectation of a more favorable equilibrium in the second period. Intending to achieve this political gain, each candidate strives to increase his chance of winning in period 1, and finds it optimal to propose more "competitive" platforms than in the static model. This mechanism hinges on the dynamic effects of a policy change today, which leads to an endogenous change in voters' preferences tomorrow.

7 Conclusions

We have shown that a simple and parsimonious introduction of loss aversion into a standard voting model yields quite a few implications that seem to be realistic, important, and can be tested against alternatives. Take, for instance, the status quo bias. With loss aversion, it should hold under any institutional set up, even with simple majority voting in a small committee. Instead, the status quo bias only applies under certain specific procedural rules in institution-based models. We believe that the status quo bias is indeed a general feature of social choice that goes above and beyond specific voting and procedural rules, an hypothesis which can be tested empirically. Loss aversion can shed new light on old political problems, such as entrenchment and moderation. It also offers novel and unique predictions of the effects of the age structure of voters on politics. These predictions can be tested, for instance, by comparing politics in younger (developing) countries and older (developed) ones. In partisan models the presence of long-term political cycles seems to be realistic, testable, and we are not aware of other models with similar predictions.

Our model can be extended to study the effect of reference points that are not the status quo. In some cases, the reference point may reflect, for instance, aspirations, or the promises made by politicians. The same political option can be considered a loss or a gain if it is evaluated relative to different reference points. Thus, because of loss aversion, a shift in the reference point may affect voters' preferences. An especially inspiring politician, for instance say Margaret Thatcher, or John F. Kennedy, may with his or her campaign and speeches be someone who manages to switch the reference point of voters. The definition of a "political leader"

may be exactly that: somebody who manages to change the reference point of voters. Our model can be used to analyze how the semantic of political campaigns affects the political equilibrium.

A vast empirical literature shows that loss aversion systematically affects individuals' decision-making. Recent studies show that the effects of loss aversion may be reduced if choices are repetitive or if the amounts in question are not very high (see Erev et al., 2008). Future research should investigate whether similar patterns also emerge when individuals make political choices.

One important question concerns timing: when does a new policy become the status quo? We do not know much about how long it takes to get accustomed to a new policy. Perhaps joint work by psychologists and political scientists can shed light on this issue. Interestingly, the answer to this question may depend on the type of policy, leading to testable implications for different policy issues. Different type of voters may have different level of loss aversion, an additional extension which can be pursued and our model can be the stepping stone for it. Loss aversion implies an extreme form of risk aversion around the reference point (utility functions are kinked in the status quo). Our model offers a suitable framework to explore the relationship between loss aversion and risk aversion when the political environment is stochastic. Finally, normative questions spring to mind. To what extent does loss aversion dampen the majority's ability to set up a socially optimal policy? What are the welfare losses from loss aversion, and how do we measure them? Are certain voting rules more effective than others in mitigating the welfare cost of loss aversion? These important subjects are left for future research.

8 References

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