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Leaping into the dark: A theory of policy gambles

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Non-technical summary

Research Question

The United Kingdom's decision to leave the European Union is an example of a highly uncertain policymaking process where there are no clear blueprints for the appropriate choices to be made. We ask why politicians sometimes engage in such *policy gambles*. We explore why policy gambles can command electoral support, even though they may not be in the best interests of voters. Finally, we analyse whether consensus-building institutions can temper politicians' urges to "leap in the dark" and enhance welfare.

Contribution

We present a model of policy-making in a representative democracy with three key features. First, there are two groups of agents – investors and voters – who face a conflict over the distribution of output. Second, the government's policy influences the aggregate level of output. But when investment decisions are made, incumbent governments lack the ability to pre-commit to maintaining status quo policy into the future. And third, the outcomes of policies that deviate from the status quo are unknown. Voters' attitudes towards such policy gambles are influenced by two forces. First, they are averse to policy risk. Second, they are attracted by the prospect of an increase in the level of output that the gamble might bring.

Results

Voters' aversion to policy risk gives rise to a voting bloc, i.e. despite holding differing attitudes towards policies, a large group of voters nevertheless prefers the status quo. Aversion to policy risk therefore biases policy towards the status quo. When investors are also averse to policy risk, multiple self-fulfilling equilibria can emerge. In one equilibrium, the status quo is implemented, while in the other, a policy gamble is voted upon. In this case, even though the median voter may prefer the status quo, he rationally votes for a policy gamble associated with lower aggregate welfare. We interpret the equilibrium with self-fulfilling gambles as an instance of economic populism.

We contrast the equilibrium where the incumbent government is unable to commit with a solution where all political parties credibly commit to a future policy. We interpret this commitment solution as the outcome of consensus politics and show that it eliminates equilibrium multiplicity and economic populism.

Nichttechnische Zusammenfassung

Fragestellung

Das Votum des Vereinigten Königreichs, die Europäische Union zu verlassen, ist ein aktuelles Beispiel eines politischen Entscheidungsprozesses mit höchst unsicherem Ausgang. In der vorliegenden Arbeit gehen wir der Frage nach, warum gewählte Politiker, trotz damit verbundener Unsicherheit, solche *policy gambles* (politische Wetten) eingehen. Ferner untersuchen wir, weshalb *policy gambles* breite Wählerunterstützung erfahren können, selbst wenn sie nicht im Interesse der Allgemeinheit sind. Schließlich diskutieren wir, ob Institutionen, die der politischen Konsensbildung dienen, den Anreiz von Politikern senken, einen *leap into the dark* (Sprung ins politisch Ungewisse) zu wagen.

Beitrag

Die vorliegende Analyse basiert auf einem einfachen polit-ökonomischen Modell einer repräsentativen Demokratie mit zwei Gruppen von Agenten – Wählern und Investoren. Dem Modell liegen drei wesentliche Annahmen zugrunde. Erstens wird unterstellt, dass Wähler und Investoren in einem Konflikt über die Verteilung der gesamtwirtschaftlichen Wertschöpfung stehen. Zweitens kann die gewählte Regierung die Höhe der gesamtwirtschaftlichen Wertschöpfung durch Politikmaßnahmen beeinflussen. Jedoch kann die amtierende Regierung nicht verbindlich zusagen, dass die vorherrschende Politik des *Status Quo* auch nach der kommenden Wahl beibehalten wird. Vielmehr wird der zukünftige Kurs der Politik durch den Wettstreit konkurrierender Parteien um Wählerstimmen bestimmt. Die Präferenzen der Wähler werden durch den sozial-ökonomischen Zustand bestimmt, der sich aus der Verteilung der Wertschöpfung ergibt. Drittens sind die gesamtwirtschaftlichen Folgen politischer Entscheidungen, die zu einer Abweichung vom Status Quo führen, unsicher. Die Einstellung der Wähler gegenüber solchen *policy gambles* wird durch zwei Faktoren beeinflusst. Einerseits sind die Wähler risikoscheu und wollen daher grundsätzlich keine Politikwechsel mit unsicherem Ausgang. Andererseits ist ein *policy gamble* für die Wähler attraktiv, weil er erwartungsgemäß zu einer höheren gesamtwirtschaftlichen Wertschöpfung führt.

Ergebnisse

Wir zeigen, dass die Wähler aufgrund ihrer Risikoscheu einem Politikwechsel gegenüber abgeneigt sind. Ein *voting bloc* entsteht, d.h. es bildet sich eine Gruppe von Wählern heraus, die, obgleich sie sich in ihren politischen Präferenzen unterscheiden, sämtlich für die Beibehaltung des Status Quo stimmen. Folglich kommt es im Gleichgewicht nur dann zu einem *policy gamble*, wenn der Median-Wähler nicht dem *voting bloc* angehört.

Sind auch die Investoren risikoscheu, können multiple selbst erfüllende Gleichgewichte entstehen. Während in einem Gleichgewicht der Status Quo beibehalten wird, stimmen die Wähler in dem anderen Gleichgewicht für ein *policy gamble*. Obwohl der Median-Wähler in diesem Fall die Beibehaltung des Status Quo präferiert hätte, ist seine Wahlentscheidung rational. Die gesamtwirtschaftliche Wohlfahrt ist im *gamble-Gleichgewicht* geringer als im Status-Quo-Gleichgewicht. Wir interpretieren dies als eine Ausprägung ökonomischen Populismus und stellen es einer Situation gegenüber, in der alle Parteien sich gemeinsam und glaubhaft auf einen zukünftigen Politikkurs festlegen können. Wir zeigen, dass eine solche Konsens-Politik das (populistische) *gamble-Gleichgewicht* ausschließt und folglich die gesamtwirtschaftliche Wohlfahrt steigert. Abschließend wenden wir das Modell an, um das Brexit-Votum des Vereinigten Königreichs zu analysieren.

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Leaping into the dark: A theory of policy gambles*

Kartik Anand, Prasanna Gai and Philipp J. König

Abstract

Why do politicians sometimes pursue policies with uncertain outcomes? We present a model in which politicians are unable to pre-commit to a status quo policy, and where investors and voters face a conflict over the division of output. Politicians may deviate from the status quo and pursue risky policy gambles in order to raise aggregate output to satisfy voters. These policy gambles may have a "populist" and self-fulfilling flavour: they can command electoral support despite being against voters' best interests. We analyse how consensus-building institutions eliminate the gamble equilibrium and enhance voter welfare. We interpret the United Kingdom's decision to leave the European Union through the lens of the model.

Keywords: Policy gambles, policy uncertainty, multiple equilibria, economic populism, Brexit

JEL classification: D72, D78, P16

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...This is a straight democratic decision – staying in or leaving – and no government can ignore that... If the British people vote to leave...this cannot be described as anything other than risk, uncertainty and a leap in the dark that could hurt working people in our country for years to come."

David Cameron, Statement to the House of Commons. 22 February 2016

The United Kingdom's decision to leave the European Union, following a referendum in 2016 and a general election in 2019, is a prominent example of an uncertain policymaking process, where there is no clear blueprint for the appropriate choice to be made. As yet, there is little consensus over the terms of withdrawal and what the economic consequences of the different options might be (Bank of England, 2018). Even though 'Brexit' is widely regarded as a policy gamble, it has enjoyed strong support – particularly amongst voters marginalised by economic transformation, fiscal austerity, and below-average access to public services (Goodwin and Heath, 2016; Becker, Fetzer, and Novy, 2017). Despite efforts by the British government to reassure and compensate firms affected by the policy uncertainty, private investment and jobs have been adversely affected. Bloom, Bunn, Chen, Mizen, Smietanka, Thwaites, and Young (2019) report that Brexit uncertainty has resulted in reductions of 6% and 1.5% in private investment and employment since the referendum.

Why do politicians sometimes engage in policies whose outcomes are highly unpredictable? How are these policy choices shaped by the division of resources in society? Why do policy gambles sometimes command broad electoral support, even though they may not necessarily be in the best interests of voters? And do institutions and norms that foster political consensus temper the urge to "leap in the dark"?[1]

In this paper, we present a parsimonious model of policy gambles in a representative democracy to answer these questions. Our model is based on three

[1]The phrasing "a leap in the dark" is frequently invoked by politicians to describe policy gambles. Callander and Hummel (2014) discuss how it was prominent in the United Kingdom in 1867 during the debate over the Second Reform Act that dramatically extended suffrage to the lower classes. Kaulisch (1985) documents the use of the phrase to describe the German Reich's policy of unrestricted submarine warfare in 1917. More recently, it has also featured in election campaign slogans by Prime Ministers John Major in the United Kingdom and Scott Morrison in Australia (The Guardian, 1997; Australian Financial Review, 2019). The phrase is attributed to Thomas Hobbes on his deathbed ('I am about to take my last voyage; a great leap in the dark.') and also appears in Vanbrugh's *The Provoked Wife* (1697) and Daniel Defoe's *Moll Flanders* (1722).

key features. First, there are two groups of agents, investors and voters, with distinct roles. Investors own the capital needed to produce output. In exchange for investing their capital in individual projects, they receive a portion of project output which, when aggregated, represents investors' overall claim on economic resources. Voters are residual claimants and play no role in production. Second, the government's policy choice influences the aggregate level of output. When investment decisions are made, however, incumbent governments lack the ability to pre-commit to maintaining status quo policy into the future. Instead, policies are set by competing political parties vying to win elections by attracting voters whose preferences are shaped by the investment and their attitudes towards social outcomes that derive from the production process.

Third, the outcomes of policy choices are, in general, unknown. Voters' attitudes towards a policy gamble are, thus, influenced by two forces: on the one hand, they are averse to policy change, while on the other, they are attracted by the prospect of an increase in the level of output that a policy gamble might bring them. As a result, politics, investors' decisions, and voter behaviour are interlinked – rendering policy uncertainty endogenous. Critically, it is the complexity or unpredictability of the policy issue, rather than the inability of politicians to commit to the status quo, that is the key spur for policy uncertainty in the model.

Several findings emerge from the analysis. When policy outcomes are predictable, in the sense that the mapping from policy to outcomes is known to all, the incumbent government's inability to commit to the status quo policy plays no role. So the aggregate compensation sought by investors does not frustrate the subsequent attempts of political parties to satiate the median voter.

When policy outcomes are unpredictable, i.e. the mapping between policies and outcomes is the realisation of a stochastic process, aversion to policy change implies that voters with differing attitudes towards social outcomes nevertheless prefer the status quo. A voting bloc emerges, biasing policy in favour of the status quo. Political parties offer uncertain policies in equilibrium only if the median voter is not a member of the voting bloc. Implicitly, a policy gamble is the vehicle by which politicians, on behalf of the median voter, can alter the way in which resources are shared with investors.

We further show that when investors are sufficiently averse to policy gambles, this opens up the possibility of multiple equilibria. The outcome depends on investors' beliefs – if they anticipate that the government will pursue a policy gamble, they individually require greater compensation to engage in production. In aggregate, these increased investor claims reduce the output available to the median voter who responds by seeking a policy change, thereby validating the investors' initial beliefs. Thus, despite preferring the status quo, the median voter may rationally vote for a policy gamble associated with lower welfare and, thus, seemingly against their interests. The equilibrium with self-fulfilling gambles is

consistent with Dornbusch and Edwards' (1991) notion of economic populism, emerging suddenly as investor beliefs about government policy change.

Finally, we contrast the equilibrium where the incumbent government is unable to commit to future policy, with a solution in which the entire "political class" credibly pledges a policy course to investors. In this set-up, investor participation is respected, and political parties agree at the outset of the game to the policy platform that maximises the expected utility of the median voter. We interpret this commitment solution as the outcome of consensus politics and show that it eliminates the multiplicity of equilibria. Consensus politics increases the size of the voting bloc, thereby sustaining the status quo policy for a larger range of median voter bliss points. It also maximises social welfare when the distribution of voters' bliss points is symmetric. Moreover, as voters become either more polarised or dissatisfied, captured by non-symmetric distributions of bliss points, we show that the relative benefits of consensus politics are further enhanced.

The abstract nature of our framework allows it to be applied broadly. For concreteness, we take as our focus the British decision to leave the European Union. But other prominent policy reversals can also be viewed through the lens of the model. The recent decision by the Trump administration to abandon the North American Free Trade Agreement (NAFTA) and place tariffs on European carmakers that had invested heavily in the United States after being lured by the free-trade agreement is one instance. Autor, Dorn, Hanson, and Majlesi (2017) also document how counties with substantial trade exposure and significant voter heterogeneity over government services voted Republican, heightening policy uncertainty for European carmakers in the process. Similarly, the German and British governments have reversed policies on nuclear energy following public concern over nuclear safety after the Fukushima disaster in Japan, despite having previously provided energy companies with large inducements to build nuclear power plants.

Literature review Our paper has several points of contact with the theoretical literature on policy uncertainty and policy reform. Majumdar and Mukand (2004) present a reputation model of policy gambles to examine the impact of electoral pressures on a government's incentives to experiment with policy and learn from the process. Callander (2011a) and Callander and Hummel (2014) model policy experimentation in a setting where the mapping from policy to outcomes is unknown and characterised by a stochastic process. The focus of Callander and Hummel (2014) is on time inconsistent policymaking and the strategic incentives of an incumbent to experiment with policy in order to influence the informational environment of a successor government. Unlike these papers, we focus on the three-way interaction between voters, investors and political parties and its consequences in a setting where learning is absent. Agents only know one point in the mapping from policies to outcomes, namely the status quo.

A large body of literature focuses on the effects of uncertainty on investment. The real options literature (Bernanke, 1983; McDonald and Siegel, 1986; Dixit and Pindyck, 1994) highlights how firms assign a high option value to delaying investment when uncertainty is high. Rodrik (1991) applies these ideas to the political economy of policy reform and highlights how even modest uncertainty about a policy reform can act as a significant tax on private investment. By contrast, the literature on financial constraints in macroeconomics (Gilchrist, Sim, and Zakrajsek, 2014; Christiano, Motto, and Rostagno, 2014) emphasises the role that uncertainty plays in raising the cost of finance, thereby adversely affecting investment and growth. These papers show how firms respond to exogenous policy uncertainty, whereas policy uncertainty is endogenous in our model. In this respect, our work is closer in spirit to Chang (2010) who presents a model of capital flows that explains why electoral periods are associated with increased macroeconomic and financial sensitivity to exogenous shocks, leading to self-fulfilling politico-economic crises.

Fernandez and Rodrik (1991) argue that uncertainty about the distributional consequences of a reform can act as a brake on its adoption, inducing a status quo bias amongst voters. Inefficient delays can also arise when different groups are involved in a war of attrition (Alesina and Drazen, 1991).[2] Coate and Morris (1999) suggest that one reason for policy persistence is that, once implemented, a policy increases the effectiveness of the lobbying efforts of its beneficiaries. The status quo bias in our model stems from the unpredictability of policy issues – matters with little uncertainty about the link from policy to outcomes, such as taxes on cigarettes, correspond to predictable (or low complexity) issues. By contrast, global warming and Brexit may be viewed as highly complex and lead voters to prefer the status quo. Dewatripont and Roland (1995) study the problem of reform design to overcome the status quo bias, and show that gradualist reforms lower the option value of waiting relative to big-bang reforms.

Our work is pertinent to the literature on the economics of populism. Dornbusch and Edwards (1991) is an influential early contribution that defines populist policies as those that receive support from a significant proportion of the population, but ultimately harm the economic interests of this majority. Acemoglu, Egorov, and Sonin (2013) present a signalling model in which honest politicians choose populist policies as a way of signalling to the electorate that they are not beholden to the interests of a rich elite.[3] Di Tella and MacCulloch (2009) analyse

[2] Bonfiglioli and Gancia (2013) show that uncertainty on economic outcomes can promote reforms by making re-election probability depend more on luck and less on policy action. They suggest that this enables governments to more readily adopt policies with short-run costs and long-run benefits.

[3] See Callander (2008) for a related model that asks if politicians are motivated by policy outcomes or just by holding office.

a situation where corruption by bureaucrats signals to the electorate that elites are not fair and voters, who are assumed to care about fairness, respond by moving to the left. These models and explanations for why populist policies arise are very different from ours, and also do not emphasise the three-way interaction between investors, voters, and politicians.[4]

Finally, the paper is related to the recent literature on Brexit. Dhingra, Huang, Ottaviano, Pessoa, Sampson, and Reenen (2017) discuss the costs and benefits of European Union membership, while Born, Müller, Schularick, and Sedláček (2019) examine the output costs of a Brexit policy. Empirical work by Colantone and Stanig (2018), Hobolt (2016), Goodwin and Heath (2016), Becker et al. (2017) and Fetzer (2019) explore the role played by globalisation and fiscal austerity in driving the referendum result. But these papers do not consider why policy gambles like Brexit arise in the first place.

1 The model

There are three dates, $t = 0, 1, 2$ and a unit mass of identical domestic projects. Each project, $k \in [0, 1]$, requires an investment of one unit of capital at $t = 0$ in order to proceed. The output generated by the representative project is uncertain and publicly observed at $t = 2$. Capital markets are competitive and there are more investors than projects. Investors are small, risk-neutral, endowed with a unit of capital, and in large mass $|\mathcal{I}| > 1$. A measurable set, $\mathcal{I}_k$, of investors competes to invest in project k at $t = 0$, with $\mathcal{I} = \int_0^1 \mathcal{I}_k \, \mathrm{d}k$ and $\mathcal{I}_k \cap \mathcal{I}_{k'} = 0$ for $k \neq k'$. Investor $i \in \mathcal{I}_k$ offers their unit of capital to project k in exchange for a fraction $\alpha_{ki} \leq 1$ of project output. Investors can, alternatively, deploy their capital into foreign projects that yield certain output, $\omega > 1$, at $t = 2$.

Domestic project outcomes are shaped by the broader economic policy stance of the government. Although there is a *status quo* policy, $p = 0$, in place when the representative project is initiated at $t = 0$, project output at $t = 2$ depends on the policy adopted by the government that assumes office at $t = 1$. An election is held at the interim date in which two political parties – an incumbent, I, and an opposition, O – compete by offering policy platforms, $p_j \in \mathbb{R}$, $j \in \{I, O\}$, to the electorate. The parties only care about winning the election. Party j chooses its policy to maximize its share of votes, $s_j(p_j, p_{-j}) \leq 1$, where $p_{-j} \in \mathbb{R}$ is the policy platform of the opponent. If party j wins the election, it earns positive utility and zero otherwise, so that political parties' utility functions depend only indirectly on policy platforms. Political parties are committed to implement the policies upon which they campaign. Policy is implemented when the winning party assumes

[4]There is also an information-theoretic literature that explores how politicians pander to the electorate. See, for example, Canes-Wrone, Herron, and Shotts (2001); Maskin and Tirole (2004).

office at $t = 1$.

Let $\pi(p^w) \in \mathbb{R}$ be the realized output at $t = 2$ from the representative project under the policy of the winning political party, p^w.[5] The victorious party retains the status quo policy when $p^w = 0$. Under the status quo policy, project output, $\pi(0) > 0$, is predictable and is common knowledge to all agents in the economy. But if $p^w \neq 0$, then the winning party offers voters a new, untried, policy that departs from the status quo. Under this policy, project output, $\pi(p^w)$, is a random variable whose outcome cannot be predicted by voters, investors, or political parties at $t = 1$. Following Callander (2011a) and Callander and Hummel (2014), we assume that the mapping from policies to output is chosen by Nature at the start of the game and is the realised path of a Brownian motion that does not change over time. The drift $\mu > 0$ and variance σ^2 of the Brownian motion are known to the agents.

The further an untried policy is away from the status quo, the more uncertain the outcome. For any policy, $p^w \neq 0$, project output is normally distributed with mean $E[\pi(p^w)] = \pi(0) + \mu p^w$ and variance $V[\pi(p^w)] = \sigma^2 |p^w|$. The drift parameter measures the marginal impact of a change in policy on expected output, while the variance captures how predictable policy changes are. We normalise the drift parameter to unity and refer to σ^2 as the extent of *policy unpredictability* – the larger is σ^2, the less precise an agent's beliefs about project outcomes and the less predictable a policy platform. To ensure that it is feasible to attract investors under a status quo policy, we assume $\omega < \pi(0)$.

Since investors are atomistic, an individual investor's claim on their project output, α_{ki}, has no influence on the policy choice of the winning political party. Instead, this policy choice depends only on the aggregate claim of investors on project output, denoted by α. Since the government and the voters are the residual claimants on project output, $(1 - \alpha)\pi(p)$ accrues to the domestic economy and thereby generates a social outcome, $\Omega(\alpha, \pi(p)) \in \mathbb{R}$. Our interpretation is that the behaviour of investors and politicians, through their choices of α and p, shapes the societal outcomes that matter to voters. We suppose that there are positive spillovers from project output to society, i.e. $\frac{\partial \Omega}{\partial \pi(p)} > 0$. And the larger the share of project output that compensates investors, the lower the social outcome, i.e. a higher α induces a negative spillover, $\frac{\partial \Omega}{\partial \alpha} < 0$.[6]

The electorate comprises a large mass, $\mathcal{V}$, of risk-averse voters. Voter $v \in \mathcal{V}$

[5] A change in government policy equally affects the outcomes for all projects, i.e., it induces a perfectly correlated aggregate shock on project outcomes. We abstract away from idiosyncratic shocks to project outcomes. Thus, the aggregate compensation sought by investors captures the risk premium for the aggregate risk induced by shifts in government policy.

[6] For example, in the case of the UK's decision to leave the European Union, the policy space may span a range of withdrawal policies – from the status quo of staying in the European Union ($p = 0$) to a no-deal withdrawal with trade following WTO rules ($p \gg 0$). Each policy, p, and associated aggregate claim by investors, α, generates a specific social outcome that voters in the

has a bliss point over the social outcome, $b_v \in [\underline{b}, \infty)$, and deviations of $\Omega(\alpha, \pi(p))$ from the preferred outcome generate disutility for the voter. Thus, voter v obtains utility

$$U_v(\alpha, p) = -\left[\Omega\left(\alpha, \pi(p)\right) - b_v\right]^2 \tag{1}$$

from a given policy and investors' aggregate claims. We suppose that the bliss points are identically and independently distributed according to a symmetric probability distribution, with cumulative distribution function $F(b)$ and corresponding probability density function $f(b)$. The bliss point of the median voter is denoted by b_m and, by symmetry, $b_m = E[b]$. For analytical tractability, we assume $\Omega\left(\alpha, \pi(p)\right) = (1-\alpha)\pi(p)$ in what follows.

Both political parties honour the claims of investors contracted at $t = 0$. However, investors face a *commitment problem*: at $t = 0$, the incumbent party cannot credibly pledge that a newly elected government at $t = 1$ will retain the status quo policy. So, even though investors' claims are always adhered to, the new government can influence the outcome by changing the background policy.

Table 1 illustrates the timing of events. We solve first for the policy platform chosen by the political parties to attract voters, and then turn to the compensation sought by the investors. All proofs are provided in the Appendix.

$t = 0$	$t = 1$	$t = 2$
1. Investors compete for projects	1. Parties choose policy platforms	1. Project outcome realised
	2. Voters cast ballots	2. Investors' claims honoured
	3. Winning party implements policy	3. Social outcome realised

Table 1: Timeline of events.

2 Politico-economic equilibrium

The expected utility of voter $v \in \mathcal{V}$ if political party j implements policy p_j is

$$EU_v(\alpha, p_j) = -\left[(1-\alpha)\, E\left[\pi(p_j)\right] - b_v\right]^2 - (1-\alpha)^2\, V[\pi(p_j)] \tag{2}$$

UK care about, e.g. access to health services etc.

Marginal changes in policy away from the status quo induce two countervailing effects on the voter. On the one hand, a marginal increase in p_j leads to an increase in expected project output that accrues to the domestic economy. The social outcome is thus brought closer to the voter's bliss point. We refer to this as the *satiating effect* of a policy shift. On the other hand, a marginal increase in p_j increases the variance of output, which voters are averse towards. Voters' exposure to this *risk effect* of a policy change decreases as the aggregate claim sought by investors, α, increases.

Voter v votes for the incumbent, $\nu_v(p_I, p_O) = I$, whenever $EU_v(\alpha, p_I) > EU_v(\alpha, p_O)$. Conversely, if $EU_v(\alpha, p_I) < EU_v(\alpha, p_O)$, voter v votes for the opposition, i.e. $\nu_v(p_I, p_O) = O$. Finally, if $EU_v(\alpha, p_I) = EU_v(\alpha, p_O)$, then voter v is indifferent between the two parties and is equally likely to vote for either one.

At $t = 1$, political parties choose their policy platforms in order to maximise their respective vote shares:

$$p_j = \arg\max_{p_j} s_j(p_j, p_{-j}) \equiv \frac{|\{v \in \mathcal{V} \,|\, \nu_v(p_j, p_{-j}) = j\}|}{|\mathcal{V}|}$$

The winning policy is thus

$$p^w = \begin{cases} p_I^* & \text{if} \quad s_I(p_I^*, p_O^*) > s_O(p_I^*, p_O^*) \\ p_O^* & \text{if} \quad s_I(p_I^*, p_O^*) < s_O(p_I^*, p_O^*) \end{cases}$$

Initially, at $t = 0$, for each project k, the competing investors $i \in \mathcal{I}_k$ choose a share of project output α_{ki}^* such that they break even, given their beliefs about the policy platform of the election winner, p^e. The investors' aggregate share is $\alpha^* \equiv \int_0^1 (\min_{i \in \mathcal{I}_k} \alpha_{ki}^*)\, \mathrm{d}k$. Under rational expectations, investors anticipate the policy that is chosen in equilibrium, i.e. $p^e = p^w$.

2.1 Predictable policy

As a benchmark, we consider the limiting case $\sigma^2 \to 0$ where project outcomes are fully predictable for all policies, not just the status quo policy. Since societal outcomes are then also fully predictable, voters' expected utility functions are 'single peaked' around their respective bliss points. In this setting, the standard median voter theorem (Black, 1948; Downs, 1957) implies that the policy platforms of the two parties converge, $p_I^* = p_O^* = p^w$ and the winning policy is the one that maximizes the median voter's expected utility, i.e. $p^w = p^w(\alpha) = \frac{b_m}{1-\alpha} - \pi(0)$. Since the expected payoff from investing in a domestic project must be the same as the certain payoff from the foreign project, competition among investors implies that

the compensation, α^*_{ki}, sought by investor $i \in \mathcal{I}_k$, is given by

$$\alpha^*_{ki}(p^e) = \frac{\omega}{\pi(0) + p^e}\,. \tag{3}$$

Since all investors bidding to invest in project k have the same outside option, we have $\alpha^*_{ki}(p^e) = \alpha^*_{ki'}(p^e)$ for all $i, i' \in \mathcal{I}_k$. Aggregating over all domestic projects, we obtain that the aggregate share of output for investors is $\alpha^*(p^e) = \frac{\omega}{\pi(0)+p^e}$.

Proposition 1 *The unique equilibrium policy and the aggregate claim on output by investors are* $p^* = b_m + \omega - \pi(0)$ *and* $\alpha^* = \frac{\omega}{b_m+\omega}$*, respectively.*

In equilibrium, the status quo policy is retained if, and only if, $b_m = \pi(0) - \omega$. If the median voter has a smaller (larger) bliss point, then a negative (positive) policy is selected. Relative to the outcome under the status quo policy, a negative policy reduces both the project output and social outcome for voters.[7]

Figure 1 illustrates the equilibrium. The downward sloping schedule shows the aggregate share of output sought by investors as a function of their belief over the winning policy. The upward sloping schedule depicts the winning policy platform as a function of the investors' share. As Figure 2 makes clear, the policy adopted in equilibrium depends on the median voter's bliss point.

The deterministic nature of the policy mapping ensures that, for any value of α, there is always a unique policy that fully satiates the median voter and sets their expected utility to zero. So investors' compensation choices do not frustrate the efforts of political parties to adopt policies that seek to satiate the median voter.

Proposition 2 *An improved outcome under the status quo policy* $\pi(0)$ *reduces* p^**, but has no impact on* α^**. A more valuable outside option for the investor, i.e. a higher* ω*, increases both* p^* *and* α^**.*

Figure 2 illustrates the comparative static results summarised in Proposition 2. In panel (a), an improved outcome under the status quo policy shifts the winning policy schedule downwards. This is because the increase in $\pi(0)$ substitutes for the increase in policy when determining project output. Since the effects of an improved status quo are cancelled out by a one-for-one decrease in p^*, the investors'

[7] The infamous Smoot-Hawley Tariff Act of 1930 that cut the volume of US trade by nearly half within two years and triggered a downward spiral in world commerce (Irwin, 1998), can be regarded as an example of a negative policy. The act passed despite the dangers of foreign retaliation that threatened to wreak havoc on the US economy. Crucini and Kahn (1996) argue that distortions to capital accumulation induced by the tariff and foreign retaliation indeed reduced US GNP by around 2%.

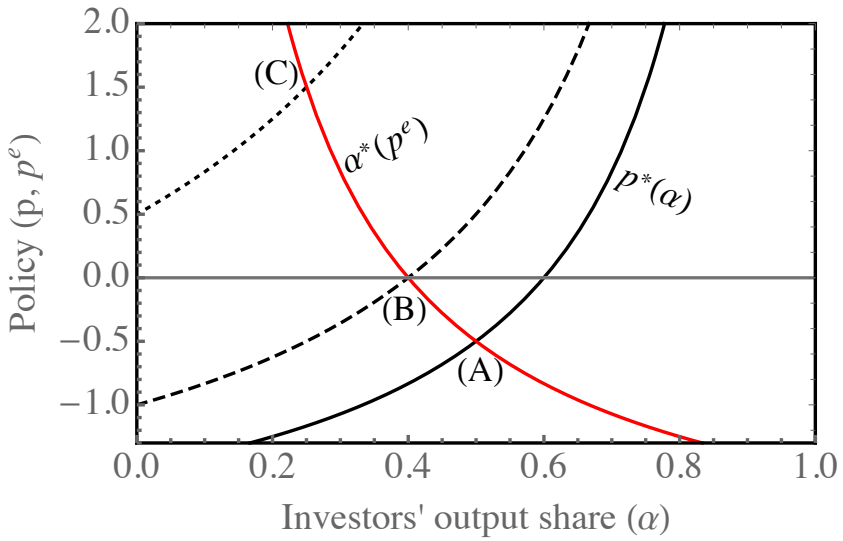

Figure 1: Equilibrium with predictable policy. Equilibrium (A) is characterised by a negative policy, $p^* < 0$, while at Equilibrium (B) the status quo is selected, $p^* = 0$. Finally, under Equilibrium (C) a positive policy is selected, $p^* > 0$. The parameters used in this figure are $\pi(0) = 2.5$ and $\mu = \sigma = \omega = 1.0$. The median voter's bliss points are $b_m = 1.0$ for Equilibrium (A), $b_m = 1.5$ for Equilibrium (B) and $b_m = 3.0$ for Equilibrium (C).

aggregate claim schedule shifts down such that α^* is left unchanged. In panel (b), a better outside option for investors induces them to demand a larger share of output in order to participate. For a given policy, this worsens the social outcome and reduces the expected utility of the median voter. So the median voter prefers, and the political parties consequently implement, a more extreme policy in equilibrium.

2.2 Unpredictable policy

When $\sigma^2 > 0$, voters do not perfectly know the mapping from policy to economic output. Departures from the status quo policy – *policy gambles* – now elicit a risk effect from voters. As a result, voters who might have preferred to deviate from the status quo when $\sigma^2 = 0$ become averse to policy gambles. The aversion to deviations from the status quo gives rise to an endogenous *voting bloc* that favours the status quo policy.[8]

[8]Endogenous voting blocs are also a feature of Callander (2011b). In his model, however, the focus is on situations where the two political parties offer different policy platforms and do not converge.

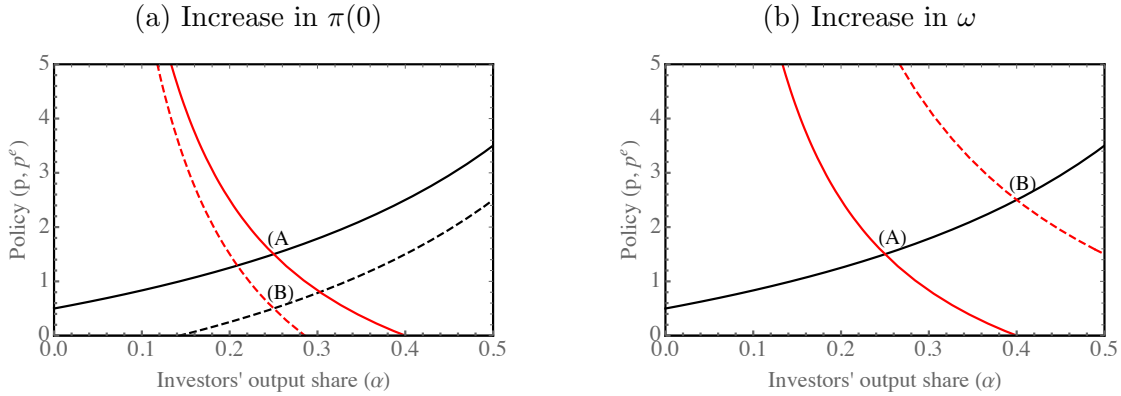

Figure 2: Comparative statics for the equilibrium with predictable policy. Panel (a) shows the change in $\pi(0)$, while panel (b) panel depicts the change in ω. The parameters used to derive Equilibrium (A) in both panels are $\pi(0) = 2.5$, $\mu = \sigma = \omega = 1$, and $b_m = 1.5$. For equilibrium (B) in panel (a) we set $\pi(0) = 3.5$ and for panel (b) we set $\omega = 2.0$.

Definition 1 *A (P, Q) voting bloc is a mass $Q > 0$ of voters whose expected utility is maximised under a policy P whose outcome is perfectly predictable.*

Note that the magnitude of policy risk, $V[\pi(p)] = \sigma^2 |p|$, depends only on the magnitude of policy deviation from status quo, but not on whether policy is positive or negative. So, in general, the voting bloc comprises voters with small bliss points who would have voted for a negative policy if policy outcomes were predictable, as well as voters with larger bliss points who would have chosen a positive policy. To simplify the analysis, and without loss of generality, we rule out those cases where policy could become negative by restricting attention to situations where σ^2 is sufficiently large. Specifically, we assume $\sigma^2 > \frac{2}{1-\frac{\omega}{\pi(0)}}$.[9]

Lemma 1 *There exists a status quo voting bloc $(0, F(\hat{b}))$ with $\hat{b} = (1-\alpha)[\pi(0) + \frac{\sigma^2}{2}]$. The size of the voting bloc is decreasing with α, and is increasing in policy unpredictability, σ^2.*

Lemma 1 makes clear that a mass $F(\hat{b})$ of voters strictly prefer the status quo policy. For these voters, the risk effect outweighs the satiating effect of policy changes. As the aggregate claim of investors over project output decreases, more voters are content with the status quo, relative to policy departures from it. This

[9]The restriction is derived by normalizing the smallest policy that would be chosen if $\sigma^2 = 0$ to $p^* = -1$ and setting $\underline{b} = \pi(0) - \omega - 1$ so $p^* = -1$ if $b_m = \underline{b}$. The choice of $p^* = -1$ in this normalization is not material for our results. In the comparative statics exercises below, we consider marginal parameter changes such that the restriction on σ^2 is satisfied throughout.

is because the negative spill-overs to social outcomes from larger aggregate investor claims are smaller. And, as the policy environment becomes less predictable, more voters perceive a greater cost to deviating from the status quo and so prefer it over other policy platforms.

Proposition 3 *The policy platforms of both parties converge, $p_I^* = p_O^* = p^w$, and the winning policy is*

$$p^w(\alpha) = \begin{cases} \frac{b_m}{1-\alpha} - \frac{\sigma^2}{2} - \pi(0) & \text{if} \quad b_m > \hat{b} \\ 0 & \text{if} \quad b_m \leq \hat{b} \end{cases}. \tag{4}$$

Proposition 3 characterises the political subgame equilibrium of the model. If the median voter is a member of the voting bloc, i.e. the median bliss point satisfies $b_m < \hat{b}$, then the risk effect of any policy gamble is too large for the median voter, and so both political parties choose the status quo policy. Conversely, if $b_m > \hat{b}$, then the satiating effect is strong enough for the median voter to favour a policy gamble. Importantly, as investors' aggregate claim over output increases, the incentives of the median voter to favour a larger gamble increase. The reason for this is two-fold: first, voters desire policy gambles to make up for their reduced share of output; and second, a larger α implies that voters are less exposed to the risk of a policy gamble, cf. Equation (2).

We next turn to the compensation sought by investors for investing at $t = 0$. Since investors are risk-neutral, any investor $i \in \mathcal{I}_k$ bidding to invest in project k only cares about expected output and is immune to the risk associated with policy gambles. The investor's compensation, $\alpha_{ki}^*(p^e)$, given belief p^e over the policy choice at $t = 1$, is given by Equation (3).

Proposition 4 *There exists a unique equilibrium in which the status quo voting bloc is $(0, F(\hat{b}^*))$ with $\hat{b}^* = \left(1 - \frac{\omega}{\pi(0)}\right)\left[\pi(0) + \frac{\sigma^2}{2}\right]$.*

If $b_m \leq \hat{b}^*$, the status quo is the winning policy, $p^* = 0$, and investors' aggregate share is given by $\alpha^* = \frac{\omega}{\pi(0)}$.

Otherwise, if $b_m > \hat{b}^*$, a policy gamble $p^* > 0$ constitutes the winning policy and the aggregate investor share $\alpha^* \in (\omega/\pi(0), 1)$.

Figure 3 illustrates the equilibria obtained for two different values for the median voter's bliss point. The downward sloping schedule shows the combinations of expected policies, p^e, and investors' aggregate claim on output such that investors break even in expectation. The upward-sloping schedule plots the winning policy as a function of the investors' aggregate claim. Unlike the case of predictable policy, the presence of a voting bloc introduces a flat segment into the winning policy schedule. When the share of output ceded to investors is small, the satiating effect

of a marginal policy shift is small relative to the risk effect since, for this α, the social outcome is already relatively large under the status quo. Accordingly, the status quo policy is campaigned upon by both parties. As the share that accrues to investors increases, social outcomes worsen and so voters seek policy shifts that balance the satiating and risk effects.

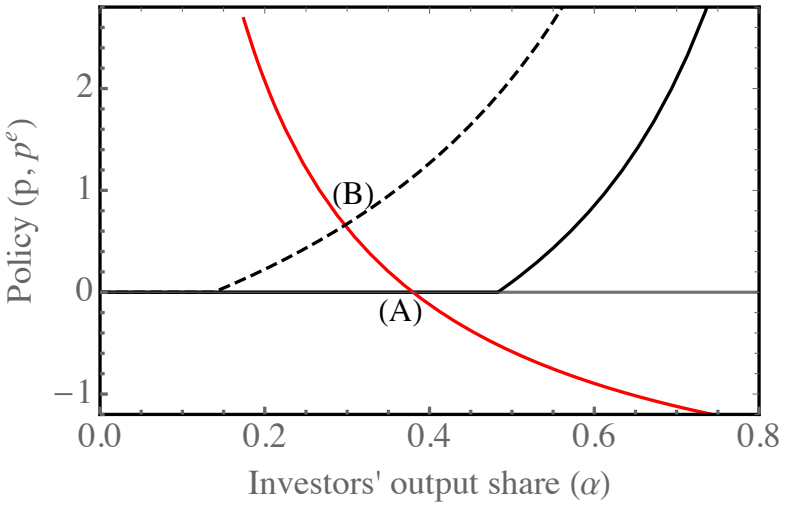

Figure 3: Equilibrium with unpredictable policies. At Equilibrium (A) the status-quo policy is selected, $p^* = 0$, while at Equilibrium (B) depicts a policy gamble with $p^* > 0$. The parameters used in this figure are $\pi(0) = 2.5$, $\mu = \sigma = \omega = 1.0$. The median voter's bliss point was set at $b_m = 1.5$ for Equilibrium (A) and $b_m = 2.5$ for equilibrium (B).

Proposition 5 *The equilibrium policy, p^*, is (weakly) decreasing in the status quo outcome, $\pi(0)$, and in policy unpredictability, σ^2. It is increasing in the payoff from the foreign project, ω. The aggregate share α is (weakly) decreasing in the status quo outcome and in policy unpredictability. It increases in the payoff from the foreign project.*

Figure 2 illustrates the comparative static results. In panel (a), an increase in the project output under the status quo policy, $\pi(0)$, leaves more voters content with the resulting social outcome. So the 'kink' in the policy reaction function shifts to the right. At the same time, expected output is also increased for all domestic projects relative to the foreign outside option, and so investors require less compensation to participate. In panel (b), an increase in the outside option, ω, leads investors to demand larger stakes in the output of domestic projects in order to participate. Since the median voter's bliss point is unchanged, this implies

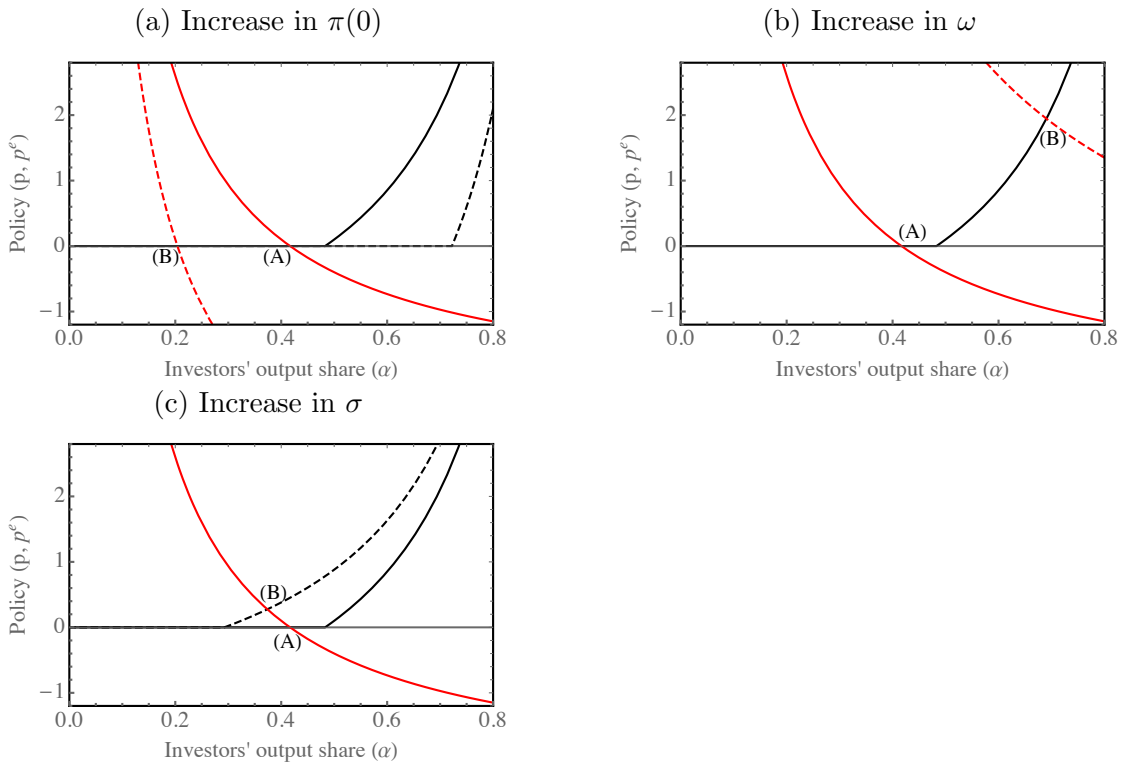

Figure 4: Comparative statics for the equilibrium with unpredictable policy. We show the change in $\pi(0)$ in panel (a); ω in panel (b), and σ in panel (c). The parameters used to derive Equilibrium (A) in all three panels are $\pi(0) = 2.5$, $\mu = \sigma = \omega = 1$, and $b_m = 1.5$. For Equilibrium (B) in panel (a), $\pi(0) = 5.0$; panel (b) $\omega = 3.0$, and panel (c) $\sigma = 0.2$.

that a riskier policy is selected in equilibrium. Finally, panel (c) makes clear that, as σ^2 decreases, voters become less sensitive to the risk effect and this results in a smaller voting bloc. Due to investor risk-neutrality, the schedule mapping investors' aggregate claim into expectations about policy is unaffected by changes in policy unpredictability.

When policy is unpredictable, the risk effect biases individual preferences towards the status quo. A voting bloc emerges as a share of voters, differing in their bliss points, converge in their support for the status quo policy. Policy unpredictability is thus only a necessary precondition for political parties to gamble on policy. In particular, political parties campaign less often on new and untested policies when their outcomes are more difficult to predict and when the (predictable) status quo becomes more valuable.

Unlike voters, risk-neutral investors are immune to the risk effect and respond to policy gambles by lowering their bids for output shares. This induces an equi-

librating effect that ensures the uniqueness of the politico-economic equilibrium: when investors lower their claims –and aggregate α is reduced – in response to the expectation of a riskier policy, voters' risk effect becomes stronger and their preference for riskier policies decreases. So, investor risk-neutrality implies a smooth transition between the status quo and risky policies.

3 Multiple equilibria

We next consider the possibility that investors are also averse to risk. If, like voters, investors are exposed to the risk effect of a policy shift, they may respond to greater policy risk by seeking an increased share of output as compensation. This implies the possibility of multiple equilibria as we discuss below.

Specifically, suppose that investor $i \in \mathcal{I}_k$ has an exponential utility function:

$$u_i(c_i) = (1 - \exp(-\gamma c_i))/\gamma,$$

where $\gamma > 0$ is the coefficient of absolute risk aversion.

The participation constraint determining α^*_{ki} as a function of investor i's policy expectation, p^e, is

$$E\left[u\left(\alpha^*_{ki}\,\pi(p^e)\right)\right] = u(\omega). \tag{5}$$

Solving out the expectation, we can express α^*_{ki} as the solution to the quadratic equation

$$A(\alpha^*_{ki}) \equiv \alpha^*_{ki}\,E[\pi(p^e)] - \frac{\gamma}{2}\left(\alpha^*_{ki}\right)^2\sigma^2|p^e| - \omega = 0\,. \tag{6}$$

For any given belief, p^e, there may be two feasible solutions for the investor's output share (depending on the parameter combination). Since investors bid competitively to take on the domestic project, the smaller root for Equation (6) is the relevant solution. Moreover, as all investors bidding to invest in project k are identical, it follows that $\alpha^*_{ki}(p^e) = \alpha^*_{ki'}(p^e)$ for all $i, i' \in \mathcal{I}_k$. The aggregate claim of investors, α^*, can therefore be obtained as the smaller root to $A(\alpha^*) = 0$. In what follows, we impose two technical conditions in order to simplify the analysis. First, an upper bound on policies, i.e. $p \leq \overline{p}$. This ensures that the smallest root of the investor participation constraint is contained within the unit interval. And second, an upper bound on investors' absolute risk aversion, i.e. $\gamma < \bar{\gamma}$. This assumption guarantees an interior solution for commitment equilibrium in Section 4.[10]

Lemma 2 *There exists a threshold, $\hat{\gamma} \in (0, \bar{\gamma})$, such that investor i's compensation from bidding for project k is decreasing in his belief, $\frac{\partial \alpha^*_{ki}}{\partial p^e} < 0$, if and only if $\gamma \leq \hat{\gamma}$.*

[10] Explicit expressions for the two bounds are provided in Assumption A1 (for $\overline{p}$) and Assumption A2 (for $\bar{\gamma}$) in the Appendix.

When forming expectations about future policies, each investor must also form a belief about the aggregate share α, i.e. a belief about the other investors' behaviour, since the equilibrium policy is a direct response to the distribution of aggregate output between investors and voters that shapes the social outcome.

Lemma 2 implies that if risk aversion is sufficiently low, investor i places a relatively large weight on the associated increase in expected output when expecting a policy shift. Thus, α_{ki}^* decreases in p^e and the results of the model are qualitatively similar to the case of risk-neutral investors in the previous section. Specifically, if investor i believes that all other investors' choices give rise to a large α^*, the investor also expects a large policy response and therefore lowers α_{ki}. As in the case of investor risk neutrality, this behaviour induces an equilibrating effect and equilibrium uniqueness.

But once risk aversion exceeds the threshold $\hat{\gamma}$, investors place a relatively large weight on the risk associated with policy shifts. If investor i now expects that all other investors' choices give rise to a large α, thereby eliciting a large policy shift, the investor requests a greater share of project output in order to invest. A sufficiently large degree of risk aversion therefore implies that investors' individual bids α_{ki} are increasing in aggregate investor behaviour. Investors' choices are thus strategic complements, giving rise to equilibrium multiplicity.

Proposition 6 *If $\gamma \in (\hat{\gamma}, \bar{\gamma})$ and the median voter belongs to the status quo voting bloc, $b_m \leq \hat{b}^*$, then there are multiple, self-fulfilling equilibria: in one equilibrium, the status quo policy is chosen, $p^* = 0$, while in the other equilibrium a risky policy, $p^* > 0$, is selected.*

Under low risk aversion, $\gamma < \hat{\gamma}$, a necessary and sufficient condition for the status quo equilibrium to obtain is that the median voter is part of the voting bloc, (Proposition 4). In contrast, as shown in Proposition 6, under high risk aversion this condition ceases to sufficiently restrict investors' beliefs about aggregate investor behaviour and future policy shifts and cannot rule out policy gambles in equilibrium.

To see the intuition behind this result, suppose that the median voter is part of the voting bloc. The status quo equilibrium is feasible and it arises whenever investors' can coordinate their beliefs on the status quo policy. So if each investor believes that all other investors act on the belief that the median voter votes in favour of the status quo, the resulting aggregate investor share becomes $\alpha^* = \frac{\omega}{\pi(0)}$. This value of α^* leaves voters with a sufficiently large social outcome under the status quo policy and the median voter will indeed prefer the status quo policy, thereby vindicating investors' beliefs.

If, however, each investor believes that all other investors expect a policy shift, then their individually optimal response is to request larger compensation. The

aggregate share α^* increases above its status quo value. As this reduces the residual stake for the domestic economy, the median voter cannot be satisfied with the social outcome under the status quo policy and consequently votes in favour of a policy gamble, again vindicating investors' initial beliefs.

Our analysis therefore suggests that policy gambles can arise suddenly and discontinuously: the same fundamental parameters that support the status quo equilibrium also support a politico-economic equilibrium with an unpredictable, risky policy. Note also that the politico-economic equilibrium can break down. If the median voter is not a part of the voting bloc, then existence of the equilibria depends on how strongly investors react to marginal shifts in policy. When investor risk aversion is sufficiently high, a marginal increase in expected policy may be associated with a very large increase in α^* that cannot be sustained in equilibrium.[11]

Proposition 7 *There exists a threshold, $\tilde{\gamma} \in (\hat{\gamma}, \bar{\gamma})$, such that if the median voter falls outside the status quo voting bloc, $b_m > \hat{b}^*$, then the equilibrium breaks down if and only if $\gamma > \tilde{\gamma}$.*

Figure 5 illustrates the multiplicity of equilibria when the median voter belongs to the voting bloc. Increases in b_m shift the median voter outside the voting bloc leading to a breakdown of the equilibrium.

4 Consensus politics and populism

Our analysis has proceeded under the assumption that the political parties cannot commit to retaining the status quo policy. Instead, they campaign in an adversarial manner, solely seeking to win the election. If, in addition, investors are sufficiently risk-averse, then this can give rise to multiple equilibria caused by investors being uncertain about the behaviour of other investors and therefore about the future policy.

Such belief-driven shifts in equilibrium policy could – in principle – be prevented if the political parties could commit to the status quo policy. Such a commitment, at $t = 0$ when investors choose their shares α_{ik}, would prevent a sudden, self-fulfilling deviation to a policy gamble since it would restrict investors' beliefs to $p^e = 0$. Such a "commitment solution" could be implemented by a form of *consensus politics* where the political parties agree at the start of $t = 0$ to the policy that will be pursued after the election at $t = 1$, taking into account the

[11] Clearly, there may be the possibility that two risky policy equilibria arise. This case is only slightly different from the case where one equilibrium is the status quo equilibrium, so that we ignore this case in the main part of the paper, details can be found in the Appendix.

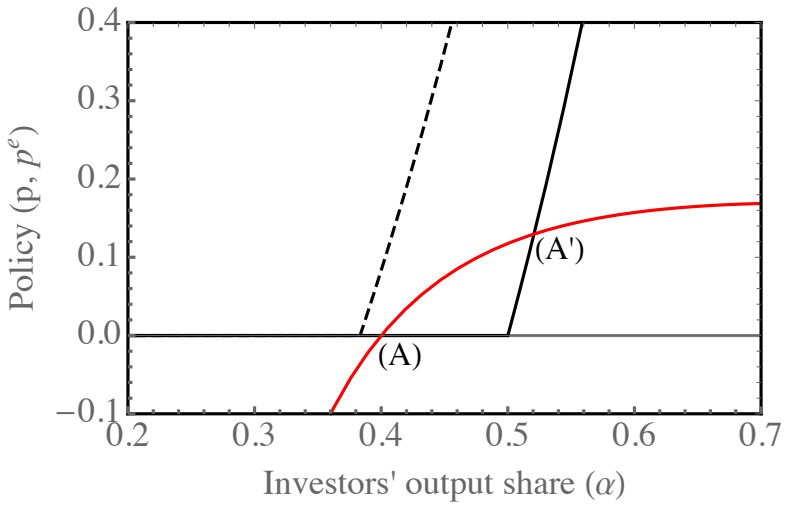

Figure 5: Equilibrium with risk-averse entrepreneurs. When the median voter is part of the voting bloc, then we obtain multiple equilibria: (A) and (A'). But when the median voter is outside the voting bloc, there is no equilibrium. The parameters used to obtain equilibria (A) and (A') are $\pi(0) = 2.5$, $\mu = \sigma = \omega = 1.0$, $\gamma = 21$ and $b_m = 1.5$. But, for $b_m = 2.5$, the policy schedule is given by the dashed curve, which does not intersect with the participation constraint.

welfare of the median voter and the effects of policy on the aggregate claim by investors. In order to demonstrate how consensus politics prevents self-fulfilling policy gambles from arising, we focus on sufficiently risk-averse investors, $\gamma > \hat{\gamma}$.[12]

The consensus-based policy choice can be derived as the solution to the following constrained maximisation problem:

$$\begin{aligned} (\alpha_{ki}^c, p^c) \quad \equiv \quad & \underset{\{\alpha_{ki}\},p}{\arg\max} \quad EU_m(\alpha, p) \\ \text{s.t.} \quad & E[u(\alpha_{ki}\,\pi(p))] = u(\omega) \quad \forall\ i \in \mathcal{I}_k \text{ and } k \in [0,1] \\ & \alpha = \int_0^1 \left(\min_{i \in \mathcal{I}_k} \alpha_{ki} \right) \mathrm{d}k\,, \end{aligned} \tag{7}$$

where the political parties together choose a policy platform and investors' output shares to maximise the median voter's expected utility, subject to investors' participation. Hence, this is as if the entire 'political class' can credibly pledge a policy course to investors.[13]

[12] The case $\gamma \leq \hat{\gamma}$ is provided in the Appendix.

[13] In practice, achieving political consensus requires government decision making bodies to be non-adversarial and civil institutions to protect minority rights. For example, Harrison (1999) highlights how, until the 1970s Anglican bishops actively worked in the House of Lords to promote

Proposition 8 *The status quo voting bloc under consensus politics is given by* $(0, F(\hat{b}^c))$*, where* $\hat{b}^c > \hat{b}^*$*. For* $b_m \leq \hat{b}^c$*, the unique equilibrium consensus policy is the status quo,* $p^c = 0$*. Otherwise, for* $b_m > \hat{b}^c$*, consensus politics is characterised by a policy gamble,* $p^c > 0$*.*

Proposition 8 shows that political consensus eliminates equilibrium multiplicity arising from the coordination failure amongst investors. Moreover, consensus politics strengthens the voters' bias towards the status quo.[14] When choosing whether or not to campaign on platforms away from the status quo, the political parties take into account how policy shifts affect investors' participation in the projects. As risk-averse investors require a larger stake when policies become riskier, this tends to reduce the degree of policy gambling under consensus politics. An equilibrium with policy gambles will arise only if the median voter has a sufficiently large bliss point. For such large bliss points, the satiating effect of a policy shift outweighs the risk effect.

By using the average of voters' individual expected utilities as a measure of social welfare, we can compare consensus politics with adversarial politics in a way that allows to assess whether consensus politics improves welfare. For a given policy p, welfare is given by

$$\begin{aligned} \mathcal{W}(p) \;\equiv\; & \int_{\underline{b}}^{\infty} EU_b(p)\,\mathrm{d}F(b) = \big(1-\alpha^*(p)\big)\Big\{2\,b_m\,E[\pi(p)] \\ & - \;\big(1\,-\,\alpha^*(p)\big)\big[E[\pi(p)]^2\,+\,\sigma^2|p|\big]\Big\} \,-\, \int_{\underline{b}}^{\infty} b^2\,\mathrm{d}F(b)\,, \end{aligned}$$

where $\alpha^*(p)$ is investors' aggregate claim to output, given policy p. The level of welfare depends on both the mean and the second moment of voters' bliss point distribution. Denote the level of welfare under the consensus politics by $\mathcal{W}^c \equiv \mathcal{W}(p^c)$, and welfare under adversarial politics by $\mathcal{W}^* \equiv \mathcal{W}(p^*)$. We retain our focus on the case of high investor risk-aversion, $\gamma > \hat{\gamma}$. To the extent that we obtain multiple equilibria under adversarial politics, we ascribe exogenous (sunspot) probabilities to their realisation: with probability $\chi < 1$, the status quo equilibrium obtains, and with converse probability $1-\chi$ the self-fulfilling gamble equilibrium obtains.

consensus between legislatures and political parties. Moreover, attitudes towards 'fair-play' were enshrined in British public life through institutions or individuals acting as umpire or referee, e.g., judges, royal commissioners, the speaker of the House of Commons or even the monarch. Lijphart (1984) and Anderson and Guillory (1997) argue that in Dutch and Belgian political systems, electoral losers are endowed with significant rights to participate in governmental decision making. These include electoral rules based on proportional representation and written constitutions that include minority vetos.

[14] As shown in greater detail in the proof of Proposition 8 in the Appendix, this is true for the case of sufficiently risk-averse investors. The converse holds for the case where $\gamma < \hat{\gamma}$.

Social welfare is thus a weighted average of welfare under status quo and the gamble equilibrium.

In line with the notion that achieving political consensus is costly and requires additional institutions to be maintained (e.g., setting up and running a Royal Commission in the UK, or the cost of running Congressional committees in the US), we also assume a fixed cost, $\Delta > 0$, that applies only to the consensus equilibrium.

Proposition 9 *For all $\chi \in (0,1)$, there exists a critical cost $\bar{\Delta}(\chi) \equiv \mathcal{W}^c - \mathcal{W}^* > 0$ such that for a symmetric bliss point distribution, consensus politics yields greater welfare than adversarial politics if, and only if, $\Delta \leq \bar{\Delta}$.*

For a symmetric bliss point distribution, the consensus equilibrium maximises social welfare as long as $\Delta < \bar{\Delta}$. In this case, Proposition 9 allows us to interpret the self-fulfilling policy gamble equilibrium that can arise under adversarial politics as a "populist equilibrium" in the sense of Acemoglu et al. (2013) and Dornbusch and Edwards (1991): it entails the implementation of a policy that receives electoral support from the median voter, despite hurting their own interest, i.e., despite being associated with lower welfare. Critically, the populist equilibrium does not arise when investors are risk-neutral. While risky policies may also be selected in this case, these are strictly preferred by the median voter.

Although the notion of populism in our model is similar to Acemoglu et al. (2013), the driving forces of populist policy in their model are weak institutions that enable corruption for the benefit of rich elites. Populist policy is thus a way for politicians to signal that their future policy choices will be in line with the median voter (who, in turn, votes for such policies). In our model, however, the populist equilibrium arises as a consequence of (expected) changes in the division of economic surplus between voters and the investors. The latter, because they are uncertain about the actions of other investors, are also uncertain about potential policy shifts down the road and individually seek a greater share of their project's output. In aggregate this behaviour diminishes the utility of the median voter who then responds to the change in the output distribution by voting for a policy shift.

4.1 Implications of shifting voter attitudes

The relative benefit of consensus politics over adversarial politics depends on the skewness of voters' attitudes. Thus far, we assumed a symmetric bliss point distribution where voters' attitudes are not skewed in any direction. In what follows, we explore the welfare implications of non-symmetric bliss point distributions. Since such distributions are less amenable to analytical solutions, we consider numerical

examples where bliss points follow a log-normal distribution.[15]

We report two experiments. First, we fix the median voter's bliss point and increase the mean bliss point. We achieve this by increasing the variance of the underlying normal distribution, while keeping its mean fixed. This causes the bliss point distribution to 'flatten' with larger masses shifted towards the tails. We interpret this shift in the distribution as greater '*polarisation*' of voters' preferences.

Second, we fix the mean and increase the median bliss point. This is achieved by increasing the mean of the underlying normal distribution, which mechanically increases the median for the log-normal distribution of bliss points. But in order to keep the mean bliss point fixed, we decrease the variance of the underlying normal distribution. Thus, as the median voter's bliss point increases, the distribution of bliss points shifts towards the right. We interpret this as a shift towards greater '*dissatisfaction*' among voters.

Throughout these experiments, we set the cost at its highest possible value such that the welfare under consensus and adversarial politics are equal under a symmetric bliss point distribution, i.e. $\Delta = \bar{\Delta}(\chi)$.[16] Thus, the numerical exercises show how changes in voter polarisation and dissatisfaction affect the welfare advantage of a political regime with consensus-building institutions compared to a regime of purely adversarial politics.

4.1.1 Experiment 1: greater polarisation

Figure 6 plots the difference in welfare under consensus politics and adversarial politics, $W^c - W^*$, as a function of the mean bliss point for different values of the sunspot probability, χ. As voters' preferences become more polarised, the mean voter's bliss points increases. Irrespective of the nature of politics, the parties always campaign on policy platforms to attract the median voter. Under consensus politics, the median voter is in the voting bloc, and so the status quo policy is always campaigned upon. At the same time, the mean voter is also in the voting bloc and hence also prefers the status quo policy. In contrast, under adversarial politics, the mean voter and median voter prefer different policy gambles. This difference is increasing as voters' become more polarised, leaving the mean voter more dissatisfied. Thus, the welfare benefits of consensus politics, relative to that of adversarial politics are most pronounced when the extent of polarisation is large and the probability that the risky equilibrium is selected is high.

[15] Formally, with a log-normal bliss point distribution, the mean and median bliss points are $\bar{b} = \exp\{\eta + \tau^2/2\}$, and $b_m = \exp\{\eta\}$, respectively, where η is the mean and τ^2 the variance of the underlying normal distribution. As discussed below, in our first experiment, where we keep b_m fixed and vary $\bar{b}$, η is fixed, while τ^2 is varied. In the second experiment with $\bar{b}$ fixed but b_m varying, we increase η and simultaneously decrease τ^2 in tandem.

[16] Clearly, this experiment requires to adjust the cost if the sunspot probability, χ, changes.

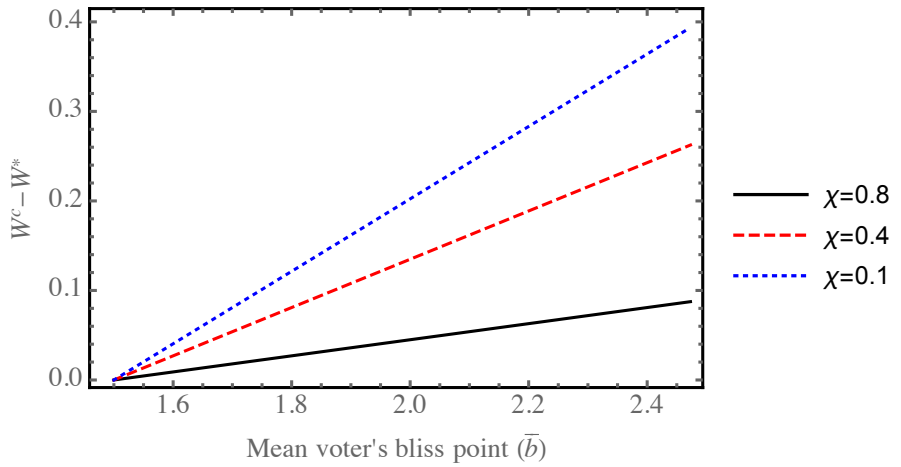

Figure 6: Difference in welfare under consensus politics and partisan politics as a function of the mean bliss point. The parameters used in this figure are $\pi(0) = 2.5$, $\mu = \sigma = \omega = 1$ and $\gamma = 11$. Voters' bliss points are log-normal distributed, where the mean for the underlying normal distribution is $\log(15)$, implying a median bliss point of $b_m = 1.5$. We vary the variance of the underlying normal distribution such that the mean bliss point goes from $1.5 \leq \bar{b} \leq 2$.

4.1.2 Experiment 2: greater dissatisfaction

Figure 7 plots $W^c - W^*$ as a function of the median voter's bliss point (keeping the mean bliss point constant). Going from left to right, the median bliss point moves towards the mean bliss point (and the distribution becomes 'more symmetric'). The larger the distance, the more 'dissatisfied' voters are. The welfare benefit of consensus is most pronounced when voter dissatisfaction is large and when the likelihood of ending up in the status quo equilibrium is rather small. Thus, consensus-building institutions are valuable in reining in deviations from the status quo policy when voter dissatisfaction is large. As b_m increases further and dissatisfaction declines, the difference in welfare between the two regimes shrinks further.

Our welfare results suggest that voters' attitudes towards the government's provision of public services and fiscal policies influence how likely it is for consensus politics to succeed. A further empirical analysis of this issue is beyond the scope of this paper and is left for future research.

5 Brexit through the lens of the model

Although stylised, our model provides a vehicle with which to interpret the debate surrounding the UK's decision to leave the European Union (EU). In this section,

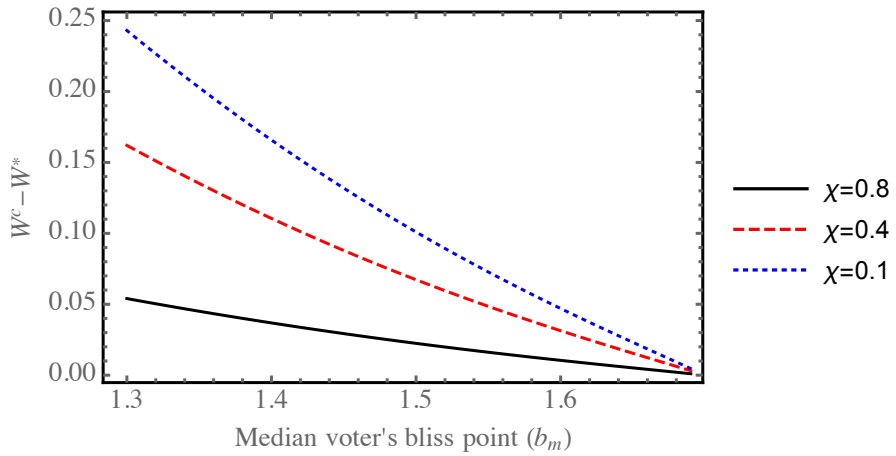

Figure 7: Difference in welfare under consensus politics and partisan politics as a function of the median bliss point. The parameters used in this figure are $\pi(0) = 2.5$, $\mu = \sigma = \omega = 1$ and $\gamma = 11$. Voters bliss points are log-normal distributed with a mean bliss point $\bar{b} = 1.8$. By increasing the mean of the underlying normal distribution, we increase the median voter's bliss point. But, to ensure that the mean bliss point remains unchanged, we reduce the variance of the normal distribution.

we first highlight how key features of the model are consistent with recent UK experience. We then offer a rationale for the unexpected result of the 2016 referendum, where voters opted to leave despite it appearing against their interests to do so. Finally, we consider why consensus politics has been absent in the Brexit debate.

5.1 Key features

Inability of the incumbent to pre-commit to the status quo policy In our model, investors are confronted with a commitment problem. At $t = 0$, the incumbent party cannot credibly pledge to investors that a newly elected government at $t = 1$ will retain the status quo. Deep scepticism about the benefits of EU membership has been a central feature of British politics ever since the UK joined the European Community in 1973 and voted to "remain" in the referendum of 1975. Strident opposition to European integration within the Conservative Party and the fear of being ousted as Prime Minister prompted then Prime Minister David Cameron to initiate a referendum on EU membership in 2016 (The Independent, 2018). The subsequent General Election in December 2019 confirmed the UK's decision to exit the EU. Many foreign firms, such as Nissan and Honda, that have been lured to the UK since the 1980s by the prospect of continued access to

the European market have, therefore, been required to make investment plans in the face of a political inability to commit to the verdict of the 1975 referendum (The Guardian, 2018).

Unpredictable mapping from policy to outcomes The function that maps policy choices into project outcomes is modelled as the realization of a random variable. The parameter σ^2 captures the predictability (or complexity) of the policy issue. The Brexit debate highlights how the mapping from policy to outcomes can be both complex and far from clear-cut, justifying our approach to modelling uncertainty. The policy space spans a range of withdrawal options – from a no-deal Brexit to a variety of schemes for accessing the European market. These schemes range from the "Norway model", entailing membership of the European Economic Area and granting British firms full access to the single market, to a "Canada-style" deal, with preferential access to the single market but with some exceptions (e.g. to financial services). To the extent that some of those schemes are closer to the current arrangement of membership in the European Union, their outcomes are better predictable than of those that are more distinct. Analysis by the Bank of England (2018) highlights how GDP could follow very different paths depending on which policy is adopted and how smoothly firms are able to cope with trade barriers.

Sharing the "economic pie" At root, our framework illustrates how slicing the "economic pie" (between investors and voters) and growing the pie (through government policy) are intertwined in equilibrium. While a larger share of expected output compensates investors and ensures their continued participation, it comes at the expense of reducing the share of output available to voters. The residual claim of the voters then translates into social outcomes, such as the provision of public services. A reduction in the voters' share is, thus, consistent with a policy of fiscal austerity. The idea that fiscal consolidation would placate foreign investors was central to the 2010 Austerity Budget, and resulted in a 16 percent per capita reduction of aggregate spending on social welfare (Fetzer, 2019). The Vote Leave campaign further emphasised how the status quo advocated by the incumbent government that was responsible for austerity was "*...overwhelmingly in the interests of big business and against the interests of workers.*"[17]

Investor risk aversion and mis-coordination A populist equilibrium emerges in our model as a result of (a) investors' aversion to policy risk; and (b) the inability of individual investors to change the aggregate share α and thereby to directly influence policy preferences of the median voter. Taken together, this implies that

[17] Advertisement by the Vote Leave campaign: https://goo.gl/UtX2QG.

investors face uncertainty about the behaviour of other investors that can induce multiple belief-driven equilibria. Evidence of investor risk aversion is provided by surveys of firms' willingness to take risk onto their balance sheets – ahead of the referendum in 2016, these measures declined markedly (Deloitte, 2019). Prominent firms such as Airbus also took steps to warn staff that a vote to leave the EU would result in a rethink of investment decisions (The Guardian, 2016). Firms were also unable to hedge themselves against policy risk. According to the Financial Times (2018), the cost of hedging and speculating on the direction of the UK's Brexit policy rose significantly, with the absence of concrete outcomes leaving investors "confused" about how to position themselves.

Evidence on the aggregate and individual levels of compensation sought by investors is limited. But according to one study (Farnsworth, 2015) some £93-180 billion per year is offered in the form of direct aid, tax breaks and subsidies to firms, including large corporations such as Amazon, Ford, and Nissan. The level of direct aid to firms varies substantially. The average payout from large grants to firms between 2005-2011 was £13.8 million, with Rolls Royce awarded £36 million in 2010 alone. These estimates justify our assumption that atomistic investors do not expect that their individual claims influence the aggregate claim on output and, thus, influence policy choices of the median voter. While it is difficult to establish the strategic complementarity of investors' actions, anecdotal evidence suggests that firms have sought greater compensation for Brexit from the British government in order to match the expected actions of other firms. For example, PSA Group, the owner of Peugeot cars requested and received financial assurances from the government after similar assurances were given to Nissan to mitigate the impact of Brexit (Financial Times, 2017).

Distribution of bliss points The heterogeneity of voters' preferences over the social outcome plays an important role within the model. Support for this assumption comes from the British Social Attitudes Survey (2016) on the impact of austerity. For example, while 48% of voters aged 18-24 supported reduced benefits for people with a spare bedroom ("bedroom tax"), only 31% of voters aged 75 or more were in favour. The Report also illustrates how social attitudes have evolved over time. Public support for more welfare spending on the disabled increased to 61% in 2016, from 53% in 2011. By contrast, over the same time period, support for spending on retired people fell by 8 percentage points.

Table 2 in the Appendix provides a brief timeline of Brexit and relates it to key elements of the model.

5.2 Brexit as a belief-driven policy shift

Our model suggests how an untried policy like Brexit can suddenly emerge, supported by the same fundamental parameters as the status quo. Ahead of the referendum on 23 June 2016, the ruling Conservative party announced that a vote to leave would invite greater taxation and steeper funding cuts of some GBP 30 billion in order to safeguard the economy against a loss of investor confidence and from damage to public finances (BBC News, 2016). Investors also came to increasingly believe that voters might vote to leave the EU and the share of firms reporting that Brexit was a main source of uncertainty rose (Bloom et al., 2019). As fears grew that voters might shift away from the status quo, the spectre of a change in the division of economic surplus in favour of investors incentivised voters to vote for Brexit, validating the initial belief. Consistent with this, the referendum result was sudden and unexpected, with the currency depreciating by 11% against the US dollar and 8% against the euro between 23 and 27 June.[18]

A further implication of our model is that the median voter, who might ordinarily have preferred the status quo, voted to leave the EU despite the risk entailed by such a choice. In this sense, our analysis provides a rationale for why voters "knowingly acted against their own interests" (The New York Times, 2016). Becker et al. (2017) find that Leave voters were those who were deprived from education and employment, while Hobolt (2016) observes that these voters were also "left behind" by globalisation. Such divisions have been successfully mobilised by populist movements who typically attempt to give a voice to voter concerns about their share of the economic pie. Attempts by the Leave campaign to frame the referendum as a battle between ordinary people and the political establishment fit into this category (Mudde, 2017), consistent with our model.

5.3 Consensus politics in the United Kingdom

In our model, consensus politics can prevent the emergence of a self-fulfilling populist equilibrium and strengthen the bias in favour of the status quo policy. In the aftermath of the Brexit referendum, there have been calls for national-unity governments and citizen's assemblies to facilitate a workable compromise between the two parties on policy towards the European Union (Powell, 2019; Brown, 2019). Thus far, attempts to strike a bi-partisan deal to break the indecision over the terms of the United Kingdom's withdrawal from the European Union have been unsuccessful (The Wall Street Journal, 2019). Usherwood (2018) identifies a fundamental unwillingness on both sides of the political spectrum to engage in a strategic debate on the future direction for British society.

[18] Betting markets placed the probability of Remain being successful at 81%, and 19% for Leave ahead of the referendum.

A detailed analysis of the decline of consensus politics in the United Kingdom is beyond the scope of this paper. Smith (2013) observes that during the post-war period 1945-79 there was a broad willingness to compromise between social welfare provision and market forces, despite considerable differences between the major parties. Edgerton (2018) describes how the Conservative party, in particular, was able to forge a form of British national capitalism. The election of Margret Thatcher in 1979 set a tone that broke increasingly with the consensual note of the past. By braving short-term dissension she was able to shift the political agenda and revive economic individualism, bringing the benefits of international capital and transforming British politics in the process (Harrison, 1999; Edgerton, 2018). Powell (2019) suggests that Thatcher-style 'conviction' politics came at the expense of ethics, namely the duty of responsibility of politicians to care about the consequences (intended or unintended) of their actions. He further suggests that, in a political system with an unwritten constitution and reliant on precedent and 'fair play', the decline in ethics eroded faith in consensus-building institutions. The willingness to challenge the good faith of the Speaker and to bypass parliament in order to pursue "no deal" are examples of this (The Guardian, 2019). The decline in ethics has also been compounded by the increasing professionalism of politics, with politicians being increasingly unwilling to take actions that might jeopardise the political careers upon which their livelihood depends. Conceivably, such forces may have set the scene for the sudden lurch to a populist equilibrium suggested by our analytical framework.

6 Conclusion

When policy environments are complex, the mapping from policies to outcomes can be difficult to predict. Why then do those in power sometimes gamble with untested policies, and why do such policies, at times, command broad-based public support? Our paper provides a novel answer to these questions. We show how a simple political friction – the inability of an incumbent politician to commit to a policy stance – interacts with voter and investor risk aversion to give rise to the possibility of policy gambles with a self-fulfilling element. Politics, investor decisions and voter behaviour are interlinked, rendering policy uncertainty endogenous. Although institutions and norms that enhance political consensus building can improve welfare and eliminate the possibility of "populist gambles", their success depends on voter attitudes towards the division of economic surplus. We interpret the events leading up to the United Kingdom's decision to leave the European Union through the lens of this stylised model.

The median voter model adopted in our framework has limitations. In particular, future research might usefully explore the role that political competition, in

the form of third parties and political entrepreneurs, can play in the adoption of policy gambles. Our model also supposes that agents are certain about the drift and slope parameters of the (stochastic) policy process. Imperfect information about these allows for possible disagreements about the nature of policies rather than the outcomes. Finally, the model eschews dynamics and the possibility of policy learning and experimentation – governments may gamble with policy and learn from the information generated before deciding whether to change course mid-way. We leave an exploration of these topics for future work.

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Mathematical Appendix

Proof of Propositions 1 and 2

Consider the political sub-game at $t = 2$, taking the investor's compensation α as given. We normalize $\mu = 1$. For $\sigma^2 \to 0$, the median voter's optimal policy choice is given by

$$p^* = \arg\min_{p \in \mathbb{R}_+} \left[(1-\alpha)(\pi(0)+p) - b_m\right]^2$$

The first-order necessary condition becomes:

$$2\left[(1-\alpha)(\pi(0)+p) - b_m\right](1-\alpha) \;=\; 0$$

which can be solved for the optimal deterministic policy:

$$p^*(\alpha) = \frac{b_m}{1-\alpha} - \pi(0)$$

Consider the investor's choice of α at $t = 1$ for given expectations about the policy outcome, p^e:

$$\alpha^*(p^e) = \frac{\omega}{p^e + \pi(0)}$$

Imposing rational expectations, $p^e = p^*$ yields the equilibrium values of p and α:

$$\alpha^* = \alpha^*(p^*) = \frac{\omega}{b_m + \omega} \quad \text{and} \quad p^* = b_m + \omega - \pi(0)$$

As mentioned in the main text, for $\sigma^2 \to 0$, this equilibrium outcome is equivalent to the equilibrium outcome that obtains when the incumbent policy maker can pre-commit at $t = 0$ to the policy that will be implemented subsequently at $t = 1$. To see this, observe that under commitment by the incumbent, the optimal α and p are jointly determined as the solution to:

$$\max_{(\alpha,p)\in[0,1]\times\mathbb{R}_+} -\left[(1-\alpha)(\pi(0)+p) - b_m\right]^2 \quad \text{s.t.} \quad \alpha(\pi(0)+p) = \omega$$

Denote by λ the Lagrange multiplier on the investor's participation constraint. The first-order necessary conditions are given by:

$$\begin{aligned}
&\underline{p:} && 2\left[(1-\alpha)(\pi(0)+p) - b_m\right](1-\alpha) + \lambda\alpha \;=\; 0 \\
&\underline{\alpha:} && -2\left[(1-\alpha)(\pi(0)+p) - b_m\right](\pi(0)+p) + \lambda(p+\pi(0)) \;=\; 0 \\
&\underline{\lambda:} && \alpha(\pi(0)+p) - \omega \;=\; 0
\end{aligned}$$

Solving this system of equations yields

$$\lambda^c = 2((1-\alpha)(\pi(0)+p) - b_m) \quad \text{and} \quad p^c = \frac{b_m}{1-\alpha} - \pi(0) \quad \text{and} \quad \alpha^c = \frac{\omega}{b_m + \omega}$$

And thus $\alpha^* = \alpha^c$ and $p^* = p^c$. The results in Proposition 2 follow immediately by differentiating the respective expressions for p^* and α^*. □

Proof of Lemma 1

Without loss of generality, consider the policy platform chosen by party R. Voter v's expected utility is maximized at the status quo policy whenever

$$\left.\frac{\partial EU_v}{\partial p}\right|_{p_R=0} \leq 0 \Leftrightarrow -2(1-\alpha)\big((1-\alpha)\, E\pi(p_R)|_{p_R=0} - b_v\big) - (1-\alpha)^2\sigma^2 \leq 0$$

On rearranging, this yields $b_v < \hat{b}$. This implies that for all voters with bliss points within the interval $[\underline{b}, \hat{b}]$, their expected utilities are maximized with the status-quo policy. □

Proof of Proposition 3

First, suppose that $b_m > \hat{b}$. Hence, the median voter is not a member of the voting-bloc. If $p^* = \frac{b_m}{1-\alpha} - \frac{\sigma^2}{2} - \pi(0)$, then the median voter is indifferent between voting for either party. Suppose, without loss of generality, that $p_L = p^*$ and $p_R > p^*$. In this case, all voters with bliss points less than b_m, and some with bliss points greater than b_m vote for party L for sure. Thus, party L will win the elections for sure. This outcome cannot be an equilibrium since party R's best-response would be to set $p_R = p^*$. Thus, in equilibrium, $p_L^* = p_R^* = p^*$.

If $b_m \in [\underline{b}, \hat{b}]$, then the median voter is part of the voting-bloc at the status quo. Suppose, without loss of generality, that $p_L = 0$ and $p_R > 0$. Voters within the voting-bloc strictly prefer party L over party R. Even though some, but not all voters with bliss points greater than $\hat{b}$ will prefer party R's platform to the status quo, party L obtains more than fifty percent of the vote share and wins the election for sure. This cannot be an equilibrium, since party R's best response is to set $p_R = 0$ as well. Finally, if $p_R = p_L = 0$, then all voters are equally indifferent between both parties, whose expected vote shares are equal. Thus, the equilibrium in this case is $p_L^* = p_R^* = 0$. □

Proof of Propositions 4 and 5

The participation constraint of the risk-neutral entrepreneur is given by

$$\alpha E[\pi(p^e)] = \omega \;\Leftrightarrow\; \alpha = \frac{\omega}{\pi(0) + p^e}$$

Suppose that entrepreneurs expect the status quo policy to be implemented, $p^e = 0$, then $\alpha^* = \frac{\omega}{\pi(0)}$. The rational expectations equilibrium will indeed be $(\alpha^*, 0)$ if and only if $b_m \leq \hat{b}(\omega/\pi(0))$, i.e. if and only if

$$b_m \leq \left(1 - \frac{\omega}{\pi(0)}\right)\left[\pi(0) + \frac{\sigma^2}{2}\right] \equiv \hat{b}^*$$

If $b_m < \hat{b}^*$, given that the entrepreneur expects $p^e = 0$ and therefore requires a share $\alpha^* = \omega/\pi(0)$, the median voter is part of the voting bloc and neither L nor R have an incentive to propose a policy platform different from the status quo (as expected by the entrepreneur).

The comparative statics of the equilibrium voting bloc are derived from differentiating $\hat{b}^*$ with respect to ω, $\pi(0)$ and σ^2:

$$\frac{\partial \hat{b}^*}{\partial \omega} = -\left[1 + \frac{\sigma^2}{2\pi(0)}\right] < 0; \qquad \frac{\partial \hat{b}^*}{\partial \pi(0)} = \left(1 - \frac{\omega}{\pi(0)}\right) + \omega\left[\frac{2\pi(0) + \sigma^2}{2\pi(0)^2}\right] > 0;$$

$$\frac{\partial \hat{b}^*}{\partial \sigma^2} = \frac{1}{2}\left[1 - \frac{\omega}{\pi(0)}\right] > 0.$$

If, however, the median voter is not part of the voting bloc, i.e. $b_m > \hat{b}^*$, then the equilibrium will be given by the tuple (α^*, p^*) with $p^* > 0$. Both parties run on a platform that promotes $p^* > 0$. If the entrepreneur expects this outcome, i.e. $p^e = p^* > 0$, he will require a lower share, $\alpha^*(p^*) < \alpha^*(0)$. The resulting optimal policy in the rational expectations equilibrium is implicitly defined by the function

$$\phi(p^*) \equiv p^* - \frac{b_m}{1 - \frac{\omega}{\pi(0)+p^*}} + \frac{\sigma^2}{2} + \pi(0) = 0$$

With respet to equilbrium existence, observe that $\phi(0) < 0$ and $\lim_{p\to\infty} \phi(p^*) > 0$. Since $\phi(\cdot)$ is continuous, there exists an equilibrium point p^* s. t. $\phi(p^*) = 0$.

Moreover, the equilibrium point is unique since

$$\phi_p(p^*) = 1 + \frac{b_m \omega}{(\pi(0) + p^* - \omega)^2} > 0$$

Application of the implicit function theorem yields the comparative statics of the optimal policy p^*:

$$\frac{dp^*}{d\pi(0)} = -1; \quad \frac{dp^*}{d\sigma^2} = -\frac{1}{2\phi_p} < 0; \quad \frac{dp^*}{d\omega} = \frac{b_m/(\pi(0)+p^*)}{\phi_p\left(1-\frac{\omega}{\pi(0)+p^*}\right)^2} > 0.$$

□

Proof of Lemma 2

Given investors' CARA utility $u(x) = -\exp\{-\gamma x\}/\gamma$ where $\gamma \in [0,\infty)$ denotes the coefficient of absolute risk aversion, and taking into account that $\pi(p)$ is normally distributed with mean $\pi(0)+\mu p$ and variance $\sigma^2 p$ allows to express the function $\alpha(p^e)$ implicitly as:

$$A(\alpha) \equiv (\pi(0)+p)\alpha - \frac{\gamma\sigma^2 p}{2}\alpha^2 - \omega = 0 \tag{A1}$$

Investor competition for the tender allows us to focus on the smallest solution $\alpha^*(p^e)$ for $A(\alpha)$ without loss of generality. Observe that $A(0) < 0$ and that $A'(0) > 0$, so that $A_\alpha(\alpha^*) > 0$.

To ensure that the equilibrium is well-defined we impose an upper bound on the policy choice, $\bar{p}$. This bound ensures that the smallest root is in the unit interval for all values of $p \in [0,\bar{p}]$:

Assumption A1 Upper bound on policy. *The set of feasible policies is given by $[0,\bar{p}]$, where the upper bound on p is given by*

$$\overline{p} \equiv \begin{cases} \infty & \text{if } \gamma \le 2/\sigma^2 \\ \frac{\pi(0)-\omega}{\frac{\gamma\sigma^2}{2}-1} & \text{if } \gamma > 2/\sigma^2 \end{cases}$$

Now observe that $A(0) < 0$ and, under Assumption A1, $A(1) \ge 0$. Since $A(\alpha)$ is continuous in α, by the intermediate value theorem, $A(\alpha) = 0$ admits a solution $\alpha^* \in [0,1]$. As $A_\alpha(\alpha^*) = E[\pi(p)] - \alpha^*\gamma V[\pi(p)] > 0$ (by our restriction to the smallest root), the solution is unique.

By the implicit function theorem, $\frac{d\alpha^*(p^e)}{dp^e} = -\frac{A_p}{A_\alpha}$. Since $A_\alpha > 0$, $\frac{d\alpha^*(p)}{dp} \gtreqless 0 \Leftrightarrow A_p \lesseqgtr 0$. We have

$$A_p(\alpha^*) > 0 \Leftrightarrow \frac{2}{\sigma^2\alpha^*} > \gamma$$

Since $\alpha^*(0) = \frac{\omega}{\pi(0)}$, we have that if $A_p > 0$ at $\alpha^* = \frac{\omega}{\pi(0)}$, then $A_p > 0$ must hold for all p (as $\alpha^*(p)$ is strictly decreasing in this case). Conversely, if $A_p < 0$

at $\alpha^* = \frac{\omega}{\pi(0)}$, then $A_p < 0$ for all p and therefore $\frac{d\alpha^*(p)}{dp} > 0$ for all p. Setting $\hat{\gamma} = \frac{2\pi(0)/\omega}{\sigma^2}$ completes the argument.

□

Proof of Proposition 6

Consider $\gamma > \hat{\gamma}$ and note from the proof of Lemma 2 that this implies that $\alpha(p^e)$ is upward-sloping in p^e. Suppose that the median voter is part of the voting bloc, i.e. $b_m < \hat{b}$. The latter is equivalent to $\frac{\omega}{\pi(0)} < \hat{\alpha}$ where $\hat{\alpha} \equiv 1 - \frac{b_m}{\pi(0)+\sigma^2/2}$ is the kink point where the policy schedule $p^*(\alpha)$ starts to slope upwards. Since $\alpha^*(0) = \frac{\omega}{\pi(0)}$, there exists a rational expectations equilibrium where $p^* = 0$ and $\alpha^* = \omega/\pi(0)$.

Consider the policy schedule $p^*(\alpha)$. Since $p^{*-1}(\bar{p}) < 1$, while $\alpha(p) \to 1$ as $p \to \bar{p}$ (by Assumption A1), continuity and monotonicity of the two functions implies that there must be another equilibrium point where $p^* > 0$. Because α^* increases strictly and continuously over $[0, \bar{p}]$, this equilibrium point is implies a larger compensation for the investor, $\alpha^* > \frac{\omega}{\pi(0)}$. □

Proof of Proposition 7

By differentiating $d\alpha^*/dp$ and applying the implicit function theorem, it can be shown that $d^2\alpha^*/dp^2 > 0$ and so α^* is convex. Since α^* is strictly increasing in p^e for $\gamma > \hat{\gamma}$, the inverse α^{*-1} is a strictly concave function.

Now suppose that the median voter is not part of the voting block. Then there are either two risky equilibria, a unique equilibrium (where the policy schedule and the investor's participation are tangential) or no equilibrium at all. We provide a necessary and sufficient condition for the latter case.

To this end, consider the equilibrium where median voter is at the "edge" of the voting bloc, i.e., $b_m = \hat{b}^*$. In this case, $p^* = 0$ and it must be that $\hat{\alpha} = \omega/\pi(0)$. If at this equilibrium,

$$\left.\frac{dp^*}{d\alpha}\right|_{\alpha=\hat{\alpha}} > \left.\frac{d\alpha^{*-1}}{d\alpha}\right|_{\alpha=\hat{\alpha}},$$

then for $b_m > \hat{b}^*$, the equilibrium seizes to exist. This condition is equivalent to

$$\frac{\hat{b}^*}{\left(1 - \frac{\omega}{\pi(0)}\right)^2} > \frac{\pi(0)}{\frac{\omega}{\pi(0)}\left(\frac{\omega}{\pi(0)}\frac{\gamma\sigma^2}{2} - 1\right)}.$$

Observe that the condition fails to hold at $\gamma = \hat{\gamma}$, while strictly holds for $\gamma = \bar{\gamma}$. Thus, since the right-hand side is strictly decreasing in γ, it follows that there exists $\tilde{\gamma} \in (\hat{\gamma}, \bar{\gamma})$, such that for $\gamma > \tilde{\gamma}$, the equilibrium seizes to exist. □

Proof of Proposition 8

Under full commitment, the optimal policy choice takes into account how the policymaker's choice of p influences the entrepreneur's share α. The policymaker's program is given by

$$\begin{aligned} &\max_{\{\alpha,p\}} \left\{ W(\alpha,p) \equiv -\left((1-\alpha)E[\pi(p)] - b_m\right)^2 - (1-\alpha)^2 V[\pi(p)] \right\} \\ &s.t.\ A(\alpha,p) = 0 \end{aligned} \tag{A2}$$

where the function $A(\alpha,p)$ is given as above in equation (A1). We characterize the commitment policy in very general terms in the following Lemma:

Lemma A1 *There exists a threshold $\hat{b}^c$ for the median voter's bliss point such that the optimal commitment policy, p^c, is given by*

$$p^c \begin{cases} > 0 & \text{if } b_m > \hat{b}^c \\ = 0 & \text{if } b_m \in [\underline{b}, \hat{b}^c] \end{cases}$$

Proof of Lemma A1:
We solve $A(\alpha,p) = 0$ for $\alpha(p)$ and rewrite the policymaker's objective function as $W(p) \equiv W(\alpha,p)$. Differentiating $W(p)$ with respect to p yields:

$$\begin{aligned} W'(p) = &-2\left((1-\alpha(p))E[\pi(p)] - b_m\right)(1-\alpha(p))\mu - (1-\alpha(p))^2\sigma^2 \\ &+2\left(\left((1-\alpha(p))E[\pi(p)] - b_m\right)E[\pi(p)] + (1-\alpha(p))V[\pi(p)]\right)\alpha'(p) \end{aligned} \tag{A3}$$

The policymaker chooses

$$p^c \begin{cases} > 0 & \text{if } W'(0) > 0 \\ = 0 & \text{if } W'(0) \leq 0 \end{cases}$$

Thus, the threshold for the median voter's bliss point becomes

$$W'(0) \leq 0 \ \Leftrightarrow\ b_m < \hat{b}^c \equiv (1-\alpha(0)) \left[\pi(0) + \frac{\sigma^2/2}{1 - \frac{\alpha'(0)}{(1-\alpha(0))}\pi(0)} \right]$$

□

We next show how the interval of bliss points where the status quo policy is chosen under the commitment regime compares to the respective interval under the no-commitment regime.

Lemma A2 *The commitment regime prescribes the status quo policy for a smaller range of median voter bliss points than the no-commitment regime if the entrepreneurs' risk aversion is sufficiently low:*

$$\gamma \in [0, \hat{\gamma}] \;\Leftrightarrow\; [\underline{b}, \hat{b}^c] \subseteq [\underline{b}, \hat{b}]$$

Proof of Lemma A2:
The upper bound on the status quo under no-commitment is given by

$$\hat{b} \equiv \left(1 - \frac{\omega}{\pi(0)}\right)\left(\pi(0) + \frac{\sigma^2}{2\mu}\right)$$

Using Lemma A1, we can express the difference between the thresholds $\hat{b}$ and $\hat{b}^c$ as:

$$\hat{b}^c - \hat{b} = \left(\frac{c(0)}{1 - c(0)}\right)\left(1 - \frac{\omega}{\pi(0)}\right)\frac{\sigma^2}{2}$$

where

$$c(0) \equiv \frac{\alpha'(0)}{(1 - \alpha(0))}\pi(0)$$

The claim follows because $\gamma \leq \hat{\gamma} \;\Leftrightarrow\; \alpha'(0) < 0 \;\Leftrightarrow\; c(0) < 0$. □

The next Lemma shows that for low values of risk aversion, i.e. $\gamma < \hat{\gamma}$, and b_m below some $\tilde{b}$, the policy chosen under commitment is strictly larger than the policy chosen under no-commitment.

Lemma A3 *Suppose $\gamma \in [0, \hat{\gamma}]$. There exists $\tilde{b} > \hat{b}^c$ such that:*

$$b_m \in [\underline{b}, \tilde{b}] \;\Rightarrow\; p^* \leq p^c \quad \textit{and} \quad b_m > \tilde{b} \;\Rightarrow\; p^* > p^c$$

Proof of Lemma A3:
Suppose $\gamma \in [0, \hat{\gamma}]$. Then, from the proof of Lemma 2, $d\alpha^*/dp \leq 0$. Suppose first that $b_m \in [\hat{b}^c, \hat{b}]$. Then, $p^* = 0 < p^c$. Second, suppose that $b_m \geq \hat{b}$, so that in both policy regimes $p > 0$. Rewriting $W'(p)$ from equation (A3) yields

$$W'(p) = W_p(p) + W_\alpha(p)\alpha'(p)$$

where

$$W_p \equiv -2\left((1 - \alpha(p))E[\pi(p)] - b_m\right)(1 - \alpha(p)) - (1 - \alpha(p))^2\sigma^2$$

and

$$W_\alpha \equiv 2\left(((1 - \alpha(p))E[\pi(p)] - b_m)\,E[\pi(p)] + (1 - \alpha(p))V[\pi(p)]\right)$$

Observe that $W_p(p^*) = 0$. By the concavity of $W(\cdot)$ and the fact that $\alpha'(p) < 0$, if must be that $p^* \leq p^c \;\Leftrightarrow\; W_\alpha(p^*) < 0$. To derive the condition for $W_\alpha(p^*) <$

0, observe that the expected policy outcome under no–commitment is given by $E[\pi(p^*)] = \frac{b_m}{1-\alpha^*} - \frac{\sigma^2}{2}$. Rearranging the latter yields

$$1 - \alpha^* = \frac{b_m}{E[\pi(p^*)] + \frac{\sigma^2}{2}}$$

Substituting this expression into $W_\alpha(p^*)$ implies that $W_\alpha(p^*) < 0 \Leftrightarrow p^* < \pi(0)$.

Next, observe that p^* is an increasing and continuous function of the median voter's bliss point b_m with $p^*(\hat{b}) = 0$ and $\lim_{b_m \to \infty} p^*(b_m) = +\infty$. Since $\pi(0) > 0$ and finite, the intermediate value theorem implies the existence of $\tilde{b} > \hat{b} > \hat{b}^c$ such that $p^*(\tilde{b}) = \pi(0)$. Thus, for any $b_m \in [\hat{b}^c, \tilde{b}]$, we have $p^* \leq p^c$; while for $b_m > \tilde{b}$, we have $p^* > p^c$. $\tilde{b}$ can be be calculated by evaluating $\phi(p^*) = 0$ at $p^* = \pi(0)$ and solving for $\tilde{b}$:

$$\tilde{b} = 2\pi(0) - \omega\left(1 + \frac{\sigma^2}{4\pi(0)}\right) + \frac{\sigma^2}{2}$$

□

Lemmas A1 - A3 establish that for $\gamma < \hat{\gamma}$ and $b_m < \tilde{b}$, the policies chosen under a commitment regime are weakly greater than the policies chosen under no–commitment.

Next, consider the case where $\gamma \geq \hat{\gamma}$. From Lemma A2 follows that $c(0) > 0$. In this case, we require a technical condition that guarantees that the commitment problem obtains a well-defined maximum, namely $c(0) < 1$. We ensure this by imposing an upper bound on the degree of investor risk aversion.

Assumption A2 *The investor's degree of risk aversion is bounded above by* $\bar{\gamma} \equiv \frac{\pi(0)}{\omega}\hat{\gamma} > \hat{\gamma}$.

Note that $\gamma < \bar{\gamma}$ is equivalent to $c(0) < 1$. Using Assumption A2, it follows from the proof of Lemma A2 that $\hat{b}^c > \hat{b}^*$. By the same argument, for $p^* < \pi(0)$, it must be that $p^c < p^*$. □

Proof of Proposition 9

Suppose that $\gamma \in (\hat{\gamma}, \bar{\gamma})$ and suppose that the bliss point distribution is symmetric, i.e. $b_m = \bar{b}$. Clearly, the symmetry of the distribution implies

$$\arg\max\{W(p)\} \;=\; \arg\max\{\mathcal{W}(p)\}$$

Thus, for $b_m \in [\underline{b}, \hat{b}]$, it must be that $\mathcal{W}(p^*) = \mathcal{W}(p^c)$. However, for $b_m > \hat{b}$, the previous proof showed that $p^* > p^c$. Thus, $\mathcal{W}(p^*) < \mathcal{W}(p^c)$ since p^c is the unique maximizer of $\mathcal{W}(p)$. □

Date	Event	Relation to model
1973	UK joins the European Community	
1975	Referendum on continued membership; UK voters elect to "remain".	Status quo policy (membership of EU) established.
1985-2015	Various UK governments offer subsidies and showcase UK's ability to provide access to the European market. Continued scepticism about UK membership across factions in both main parties. "Leap in the dark" speech by Prime Minister Cameron.	Investors provide capital for domestic projects in exchange for α_{ki}.
2016	Increasing risk aversion by firms in the face of policy risk. Chancellor Osborne threatens to cut public expenditure further if voters opt to leave in order to ensure continued foreign investment. At the referendum, 'Leave' garners 52% of the vote, in particular in areas like the North-East of England (e.g. Sunderland) where voters benefited substantially from foreign investment and EU subsidies.	As investors and politicians increasingly took seriously the view that Brexit was possible, the prospect of increased compensation for investors and a diminished social outcome prompts voters to select a policy departure away from the status quo even though it appears against their interests.
2019	General election held with Brexit dominating the campaign. The pro-Brexit Conservative party gains in electorates where domestic projects by firms (e.g. Honda, Ford) are being scaled down and job losses are on the horizon. The victorious Conservative party pledges increased spending for key social services, including to the North-East of England.	As in the referendum, a similar two-way feedback between the choices of investors and voters accounts for why withdrawal from the EU emerges as the winning policy.

Table 2: Brexit timeline.