DISCUSSION PAPER SERIES

No. 9314

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PUBLIC POLICY

Centre for Economic Policy Research

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ISSN 0265-8003

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Discussion Paper No. 9314
January 2013

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CEPR Discussion Paper No. 9314

January 2013

ABSTRACT

Unraveling Short- and Farsightedness in Politics*

The absence of the deselection threat in incumbents' last term in office can be negative or positive for society. Some politicians may reduce their efforts, while others may pursue beneficial long-term policies that may be unpopular in the short term. We propose a novel pension system that solves the effort problem while preserving willingness to implement long-term policies. The idea is to give politicians the option to choose between a flexible and a fixed pension scheme. In the flexible pension scheme, the pension increases with short-term performance, using the vote share of the officeholder's party in the next election as an indicator. Self-selection yields welfare optimality, as officeholders are encouraged to invest in those activities that benefit society most. We analyze the properties and consequences of such a system. Finally, we extend the pension system with choice to non-last-term situations and derive a general welfare result.

JEL Classification: D7
Keywords: effort, elections, incumbents, political contracts, selection and vote-share thresholds

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*A first version has appeared in March 2012 as CER-ETH Discussion Paper, 12/158. We would like to thank Daniel Sturm, Simone Valente, Joel Watson, Eugenia Winschel, and seminar participants at ETH Zurich and at the Max Planck Institute for Research on Public Goods in Bonn for helpful comments.

Submitted 17 January 2013

1 Introduction

Motivation and Proposal

During a politician's last term in office, the absence of a reelection mechanism may cause inefficiencies in the democratic system. Officeholders may reduce their efforts as they no longer need to fear removal by deselection. On the other hand, a last-term situation also presents an opportunity to pursue policies unpopular in the short term but beneficial in the long term, precisely because the threat of deselection is no longer operative.

We propose a novel mechanism called *pension system with choice* that deals with these two situations simultaneously. This system encourages politicians to work harder in their last term while at the same time not deterring them from implementing beneficial long-term policies that have potential negative effects in the short term. A fundamental feature of the system is the presence of a menu consisting of two pension options that officeholders can choose from. The system works as follows:

- At the beginning of the last term, the incumbent decides whether to select a fixed or a flexible pension scheme.
- The former scheme prescribes a fixed pension, while the retirement income under a flexible scheme increases with the vote share of the officeholder's party in the next election.

There are various motivations for this proposal. First, officeholders choosing a flexible pension scheme have an incentive to work harder in their last term. Second, officeholders choosing a fixed scheme can pursue potentially unpopular long-term policies without fearing adverse monetary consequences. Third, the system should enable officeholders to select themselves into those activities that most benefit the electorate. Fourth, the pension system with choice does not require more information than that which is already generated by elections, namely the vote share. Fifth, the proposed pension system is robust vis-à-vis various variations in the importance of pensions. Typically, the importance of pensions varies with the specific situation of the officeholder (e.g. type of executive position, wealth and outside career options, expected retirement duration). It may be very difficult to estimate these factors beforehand, so robustness is a desirable feature.

Model and Results

In a simple political agency model we introduce the pension scheme described above and explain its functioning. We assume that there are two types of politicians: populists and statesmen. Populists are interested in holding office and receiving a high income upon retirement. Statesmen share those interests but are also inclined to pursue long-term policies.

Our main insights are as follows: The pension system with choice simultaneously induces populists to work hard in their last term and preserves the willingness of statesmen to choose socially desirable long-term policies that may be unpopular at the moment. This improves welfare. In the extension of the model to non-last-term situations, we outline a pension system with choice that insures officeholders who have chosen a flexible scheme against low pensions if they lose their reelection bid. Even in cases where there is high probability that officeholders will run for office in the next term this pension scheme is welfare-improving in the current term.

We further show that voters will unambiguously favor the introduction of the system, whereas current officeholders may oppose it. However, it is always possible to adjust the level of pensions in a system with choice such that current officeholders are not worse off. In their last term, all types of officeholder will favor the implementation of the pension system with choice for subsequent terms. Finally, we consider several consequences the introduction of such a pension system may have on the functioning of elections in particular, and on democracy in general. For instance, using the vote share as our indicator may increase the willingness of both parties and voters to sanction bad performance, which in turn may increase the effectiveness of a pension system with choice. Moreover, the proposed pension system allows officeholders to signal their type and may help increase the pool of farsighted agents running for public office.

Relation to Literature

Our proposal and analysis are motivated by the following strands in the literature: First, during their last term in office some incumbents may not exert high effort, or may choose policies that deviate from what is socially optimal during the last term in office, as described by Alesina and Speak (1988), Becker and Stigler (1974), Barro (1973), Carey (1994), Smart and Sturm (2004). Second, precisely because they are not subject to reelection in their last term some incumbents may initiate efficient long-term policies that are unpopular in the short term. Smart and Sturm (2004) show that the prospect of staying in office can make even public-spirited politicians unwilling to embark on policies that are in the interests of voters. Those politicians can be viewed as statesmen, as they strive to maximize long term well-being.[1] Third, an incumbent proposing unpopular policies or associated with bad economic performance in his last term can damage his party in the next election, even if the incumbent is not running for reelection. Empirical evidence of

[1] Such politicians could also be interpreted as having character, a theme that has been developed by Gersbach (1999), Callender (2005), and Kartik and McAfee (2006).

this has been provided e.g. by Fair (1996), Hibbs (2000) and more recently by Bechtel and Heinmueller (2011). There are also famous examples of this nexus. In the 2008 elections the Republican Party and the presidential candidate John McCain appeared to suffer from the low popularity of the incumbent, George W. Bush.

Gersbach and Müller (2010) consider a pure effort problem in the last period and examine a solution by introducing an information market predicting the incumbent's chances of being reelected. The fundamental difference to the present paper is that we additionally consider the implementation of unpopular projects that are beneficial in the long term. This makes the application of information markets problematic (as statesmen would then desist from embarking on such policies). Moreover, measuring performance by the vote share of the incumbent's party enables broader application of pension systems as incentive and selection devices.

Structure of the Article

In the next section we introduce the basic model. The results with fixed and pure flexible pension schemes are analyzed in section 3. Section 4 contains our main results. In section 6 we consider the impact of external career opportunities on the pension system with choice. Section 7 is concerned with implementation issues and underlying risks. In section 8 we introduce a generalization of the proposed pension system for application to non-last-term situations. Section 9 reflects on the indirect consequences that the proposed pension system may have on democracy. Appendix A contains selected proofs. In Appendix B we extend the model to non-last-term situations. Appendix C outlines the notation used in this paper.

2 The Basic Model

We consider a two-period political agency problem with asymmetric information regarding the type of incumbent. We assume that either a populist or a statesman has been elected into office and analyze the decisions the politician faces at the beginning of his last term in office.

There are two periods denoted by $t = 1, 2$. Period 1 is the last term for the officeholder. It is common knowledge that $t = 1$ is the last term, either because the officeholder has announced it or because there is a term limit.[2] In period 2 the (now former) officeholder receives a pension. The public consists of two generations. The current (i.e. older)

[2] In Appendix B we extend the model to situations in which the public is unsure whether the current term is the officeholder's last.

generation lives in periods 1 and 2. The voters in the older generation outnumber those in the younger generation. The members of the older generation have common interests regarding the policies that the officeholder should pursue in his last term. The officeholder may, however, select policies that hurt the current generation but benefit the younger and future generation. [3] The details of the model are set out in the next subsections.

2.1 Policy Choices

The incumbent in period 1 is risk neutral and takes two policy decisions.

First, he chooses how much effort to exert on a public project. The level of effort chosen is denoted by e. We use b to denote the benefits per capita from the public project and assume that they are proportional to the amount of effort, i.e.

$$b = k \cdot e, \tag{1}$$

with $k > 0$. Exerting effort is costly for the incumbent. Effort e in period 1 is associated with costs ce^2 for the incumbent. Parameter c can be interpreted in several ways. It might represent the disutility arising when an incumbent wants to pursue a public project with high benefits. Disutilities may be caused by reduced private benefits, exhausting or reducing glamorous activities when high effort is chosen. Factor c can also be interpreted as the competence of the incumbent. A small value for c is equivalent to high competence, i.e. undertaking a given project does not result in high effort costs for the politician.

Second, the politician can choose a policy that negatively affects the utility of the current generation but benefits the future generation. We use variable I to indicate whether this long-term policy is undertaken ($I = 1$) or not ($I = 0$). If $I = 1$, the current generation suffers a utility loss of d per capita ($d > 0$), while the discounted benefits per capita for the future generation are denoted by B, $B > d$. There are many examples featuring these characteristics. For instance, slowing down global warming or reducing excessive public debt typically hurt the current generation but improve utilitarian welfare for all later generations.

2.2 Utility of Politicians and Welfare

We assume that – just like every citizen – the politician receives per capita benefits $b = ke$ in period 1. In period 2 he receives a pension m ($m > 0$). There are two possible types

[3] We consider only one future generation, but the extension to other future generations is straightforward.

of officeholder. We use S to denote a statesman politician and P to denote a populist politician. The utility functions of each type of politician are given by

$$U(P) = ke - ce^2 + \delta m - dI \tag{2}$$

$$U(S) = ke - ce^2 + \delta(m + \beta I), \tag{3}$$

where β ($\beta \geq 0$) quantifies the net personal benefit the statesman derives from the long-term policy. Future benefits are discounted by δ ($1 \geq \delta > 0$). Although the statesman also suffers a loss when he chooses $I = 1$ – as he himself is a member of the current generation and has to exert effort to undertake a long-term policy – he takes into account the utility gains of future generations. We assume that the net personal utility gain is positive and is represented by βI.

The populist does not consider the well-being of future generations and like all other citizens suffers the utility loss d when he selects I. When the size of generations 1 and 2 is N_1 and N_2, respectively, utilitarian welfare is given by

$$\widehat{W} = N_1 b - N_1 dI + N_2 IB, \tag{4}$$

which we normalize by dividing by $\frac{1}{N_2 B - N_1 d + N_1}$ and rewrite as

$$W = \alpha b + (1 - \alpha)I, \tag{5}$$

where α is the weighting factor given by

$$\alpha = \frac{N_1}{N_2 B - N_1 d + N_1}. \tag{6}$$

We assume $N_2 B - N_1 d > 0$, which implies $0 < \alpha < 1$.

2.3 Elections

As discussed in the introduction, [4] the election replacing the current officeholder at the end of period 1 is assumed to be influenced by the past performance of the officeholder (retrospective voting). In a reduced form, we assume that the voting outcome in terms of the received vote share for the governing party can be summarized as follows: [5]

$$s = \widehat{\phi_I} b + \varepsilon = \phi_I e + \varepsilon, \tag{7}$$

[4] See Fair (1996), Hibbs (2000), and Bechtel and Heinmueller (2011) for empirical evidence on this matter.

[5] We note that we essentially consider a two-party race. Thus a candidate needs more than 50% of the votes to win the election.

where $\widehat{\phi_I} = \frac{\phi_I}{k}$; $\widehat{\phi_I}$ and ϕ_I are constants for each value of I; ε is a random variable uniformly distributed with support $[-\bar{\varepsilon}, \bar{\varepsilon}]$ and mean 0.[6] Equation (7) links together three factors that influence the voting prospects of the incumbent's party. First, higher effort and hence larger benefits for the current generation favorably affect voter support for the party in power. Second, we assume $\phi_1 < \phi_0$ as a long-term policy in this context hurts the current generation and is thus unpopular. As a consequence, the expected vote share declines when the incumbent chooses $I = 1$, as voters will punish the party. Third, from the perspective of the incumbent selecting his policies, the effects described above are uncertain. This is represented by the random variable ε.

Our formulation of the voting outcome is quite flexible. It allows voting behavior to be influenced by performance and other characteristics such as the type of politician.[7] The only essential assumption is that a statesman suffers a net loss of the share of votes if he adopts a long-term policy.

2.4 Pensions

As the officeholder is in his last term, deselection is not a threat, so pensions are one of the only devices the public has to influence his actions. We distinguish two pension schemes:

- *Standard (fixed) pension scheme*, which prescribes a fixed pension level denoted by m_{fix} ($m_{\text{fix}} > 0$). m_{fix} is independent of any action taken by the politician during his terms in office. This is the system currently implemented in practice.

- *Flexible pension scheme*, which contains a fixed pension payment m_0 combined with a flexible payment μs tied to the vote share s that the politician's party obtains in the next election (when the officeholder is replaced):

$$m_{\text{flex}} = m_0 + \mu s = m_0 + \mu(\phi_I e + \varepsilon), \tag{8}$$

  where $s = \phi_I e + \varepsilon$ is as described above, μ is a positive constant. It follows that the expected value of m_{flex} is

$$\mathbb{E}(m_{\text{flex}}) = m_0 + \mu\phi_I e. \tag{9}$$

  The vote share and hence the level of pension under a flexible scheme depends on the amount of effort invested by the politician and on whether he has implemented a

[6] An alternative formulation is to assume instead that the vote share is additively separable in effort and the long-term policy by setting: $s = \phi e - \phi' I + \varepsilon$. Our results would still hold qualitatively as long as β is not too small.

[7] One could express ϕ_I in dependence of the type of a politician by writing e.g. $s = \phi_{I,T} e + \varepsilon = (a' + b'T - c'I)e + \varepsilon$, where T is either P or S and $c' > 0$.

long-term policy. Higher effort raises the pension, implementing a long-term policy lowers it.

We are now ready to define the pension system with choice.

Definition 1 (Pension System with Choice)
A pension system with choice is a menu consisting of two options which politicians can choose between at the beginning of their last term in office. The options are a fixed pension scheme and a flexible pension scheme as defined above. The schemes are fully specified by the three parameters m_{fix}, m_0, μ, and this parameter combination is denoted by $PSC(m_{\text{fix}}, m_0, \mu)$. If the politician steps down early in his term, then he will be subject to a fixed scheme.

2.5 Utilities under Pension System With Choice

Under a pension system with choice, politicians simultaneously select their preferred pension scheme, their effort level e, and whether or not to implement a long-term policy. Suppose that a $PSC(m_{\text{fix}}, m_0, \mu)$ is offered. We use flex (flexible pension scheme) or fix (fixed pension scheme), to denote the pension choice. The expected utility for politicians depends on all the above-mentioned choices and on their type:

$$\mathbb{E}(U(P)|\text{fix} \;\&\; I=0) = ke - ce^2 + \delta m_{\text{fix}} \tag{10}$$

$$\mathbb{E}(U(P)|\text{flex} \;\&\; I=0) = ke - ce^2 + \delta(m_0 + \mu\phi_0 e) \tag{11}$$

$$\mathbb{E}(U(S)|\text{fix})_I = ke - ce^2 + \delta(m_{\text{fix}} + \beta I) \tag{12}$$

$$\mathbb{E}(U(S)|\text{flex})_I = ke - ce^2 + \delta(m_0 + \mu\phi_I e + \beta I) \tag{13}$$

Note that the populist has a strict incentive to choose $I = 0$ as he would otherwise suffer loss d as given in equation (2).[8] We assume that the value of the outside option – i.e. renouncing pensions – is zero, and thus the participation constraint is fulfilled for every feasible problem parameterization, i.e. officeholders never step down and renounce pensions. The assumption concerning the outside option does not restrict the generality of our analysis. If the outside option has a utility larger than zero, we can reformulate the model into an equivalent one where the outside option has zero utility.

[8] Assuming a net loss d for P if $I = 1$ is not necessary for the analysis. The assumption $d > 0$ highlights the fact that it is impossible to motivate P to choose $I = 1$.

2.6 Information Structure

We assume that voters are able to perfectly observe the value of I and b on election day at the end of period 1 and can perfectly infer e[9]. Neither I, e, nor the welfare change caused by these policies are contractable, so they cannot be used in pension schemes.[10] Politicians observe their types and are informed of the pension framework they are subject to. If they are subject to the pension system with choice, they are informed of parameter combination $PSC(m_0, \mu, m_{\text{fix}})$, which completely specifies the options from which they can choose.

2.7 Summary

If politicians are subject to the pension system with choice, then the timing of the game is summarized in the following figure:

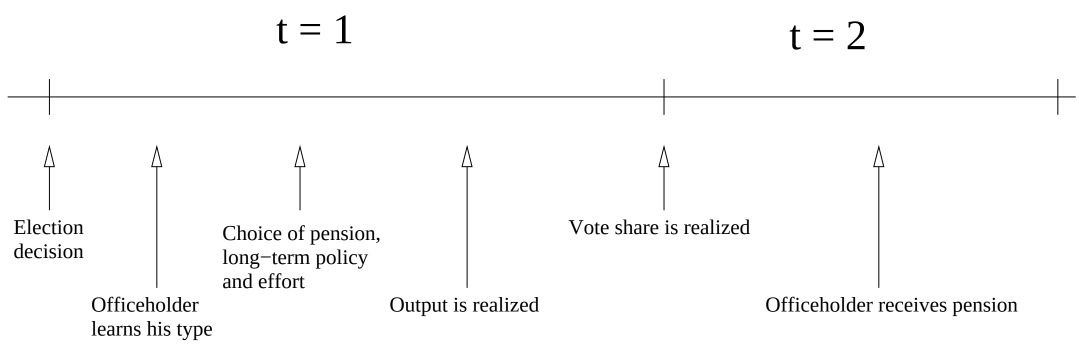

Figure 1

Under a fixed or flexible pension scheme, the time line of the game is the same except for the fact that the pension choice is omitted.

We now look for perfect Bayesian equilibria of this game. In general, we will obtain and focus on separating equilibria in which statesmen and populists make different choices regarding the long-term policy and thus reveal themselves as statesmen and populists to voters. We will construct the pension system with choice so that statesmen and populists choose different pension schemes and select different effort levels.

[9] The model could be extended by allowing that effort cannot be inferred precisely, e.g. by expressing b as $b = ke + \chi$, where χ is a random variable with $\mathbb{E}(\chi) = 0$

[10] If policy actions were contractable, monetary incentive schemes could in principle induce both politicians to exert high effort and to undertake unpopular long-term policies, following the logic of political contracts surveyed in Gersbach (2012). However, such contracts require more information, and they also require other performance measures than election results.

3 Standard and Flexible Pension Schemes

It is useful to start the analysis with the outcomes that would arise if only the fixed or the flexible scheme were available. The initial results follow immediately.

Proposition 1

If politicians are subject to a fixed pension scheme, then both populists and statesmen choose an effort level of $e = \frac{k}{2c}$*. Additionally, statesmen choose* $I = 1$*.*

Proposition 1 follows directly from the specifications of the utility functions of politicians, as given in equations (10) and (12). Optimal effort choice is obtained from maximizing $ke - ce^2$, which yields $e = \frac{k}{2c}$. A fixed scheme preserves the statesman's incentive to choose the socially desirable long-term policy, but the populist and the statesman chooses a comparatively low effort level. The latter can be remedied by a flexible pension scheme, which yields Proposition 2.

Proposition 2

If politicians are subject to a flexible pension scheme, then we distinguish two cases: If

$$\beta < \beta^{crit} := \frac{(k + \delta\mu\phi_0)^2 - (k + \delta\mu\phi_1)^2}{4\delta c}, \tag{14}$$

both populists and statesmen choose an effort level of $e = \frac{k+\delta\mu\phi_0}{2c}$ *and* $I = 0$*. If*

$$\beta \geq \beta^{crit},$$

then the populist exerts effort $e = \frac{k+\delta\mu\phi_0}{2c}$ *and choose* $I = 0$*, while the statesman chooses* $e = \frac{k+\delta\mu\phi_1}{2c}$ *and* $I = 1$*.*

Proposition 2 follows directly from the the maximization of the politicians' utility functions with respect to e and I. Proposition 2 shows how effort levels for all types of politician can be increased by such flexible schemes, which benefits the current electorate. Proposition 2 also reveals the problem of flexible pension schemes. On the one hand they increase the effort level of both types of officeholder, which benefits the public. On the other hand, if the long-term policy is quite unpopular and $\phi_0 - \phi_1$ is large, only statesmen with a pronounced interest in such policies choose them. Otherwise, the statesman desists from choosing $I = 1$ even if it is socially desirable. If $\phi_0 - \phi_1$ is sufficiently small, this inefficiency of flexible pension schemes does not arise. In such cases, the problem of motivating incumbents to choose $I = 1$ is small. The situations in which significant popularity losses deter incumbents from choosing socially desirable long-term policies is the drawback of the flexible system.

For the remainder of the paper, we assume $\beta < \beta^{crit}$ and that for society welfare is higher when the statesmen chooses $I = 1$ and $e = \frac{k}{2c}$ over and against $I = 0$ and $e = \frac{k+\delta\mu\phi_0}{2c}$ for all possible values of μ, i.e. $\mu \in [0, \widehat{\mu}]$, where $\widehat{\mu}$ is the upper bound for any feasible flexible scheme. Hence, formally we assume that

Assumption 1

$$\begin{aligned} \alpha k e^S_{flex,I=0} &< \alpha k e^S_{fix} + (1-\alpha) \\ \Leftrightarrow \alpha k \frac{k + \delta\widehat{\mu}\phi_0}{2c} &< \alpha \frac{k^2}{2c} + (1-\alpha). \end{aligned} \tag{15}$$

If assumption 1 does not hold, the flexible pension scheme is preferable to the fixed scheme and to the system with choice from the welfare perspective.

4 Properties of Pension System With Choice

We start by examining the behavior of the populist.

Proposition 3
Suppose a $PSC(m_{fix}, m_0, \mu)$ is offered.

(i) If

$$m_0 > m_{fix} - \frac{2k\mu\phi_0 + \delta(\mu\phi_0)^2}{4c},$$

the populist chooses the flexible pension scheme and exert an additional effort of $\frac{\delta\mu\phi_0}{2c}$ compared to the effort under the fixed pension scheme.

(ii) If

$$m_0 < m_{fix} - \frac{2k\mu\phi_0 + \delta(\mu\phi_0)^2}{4c},$$

the populist chooses the fixed scheme.

The proof of Proposition 3 is given in the appendix. Proposition 3 provides the condition under which a populist exerts higher effort under a pension system with choice than under a fixed scheme. The idea behind our next steps is to design a pension system with choice in which statesmen achieve higher benefits under a fixed pension scheme and choose $I = 1$, while populists find the flexible scheme more profitable *if this gives them an incentive to exert higher effort*. The next proposition establishes necessary and sufficient conditions.

Proposition 4

Suppose the $PSC(m_0, \mu, m_{fix})$ *is offered. The populist chooses the flexible scheme and the statesman chooses the fixed scheme and implements a long-term policy if and only if*

$$m_{fix} - \frac{2k\mu\phi_0 + \delta(\mu\phi_0)^2}{4c} < \quad m_0 \quad < m_{fix} - \frac{2k\mu\phi_1 + \delta(\mu\phi_1)^2}{4c}, \tag{16}$$

$$\beta \quad > \frac{\delta^2(\mu\phi_0)^2 + 2\delta k\mu\phi_0}{4\delta c} + (m_0 - m_{fix}). \tag{17}$$

The proof of Proposition 4 is given in the appendix. It is instructive to compare conditions for β in Propositions 2 and 4. While condition (14) in Proposition 2 depends on the voting behavior of the public when $I = 1$, the right-hand side of condition (17) does not depend on any assessment of how long-term policies will affect voting behavior.

Corollary 1

Suppose that m_0 *is equal to the lower bound given in Inequality* (16) *of Proposition 4. Then, for any value of* β *the statesman chooses the fixed scheme and implements a long-term policy. Hence, there exists a separating equilibrium for the political agency game.*

Corollary 1 arises by substituting into condition (17) the lower bound for m_0 given in Inequality (16). We could hence choose a value of m_0 that is only minimally higher than the lower bound for m_0 and be sure that only statesmen with β very close to zero will select a flexible pension scheme. We next show that there exists a pension system with choice that is welfare-increasing compared to the current fixed pension system even under the requirement that expected pension costs be equal under both systems, i.e. expected budget neutrality holds.

Theorem 1

For every feasible problem parameterization $(k, c, \delta, \phi_0, \phi_1, \beta)$*, there exists a* $PSC(m_{fix}, m_0, \mu)$ *such that*

(i) S chooses the fixed scheme, $I = 1$ *(implementation of long-term policy), and effort level* $\widehat{e} = \frac{k}{2c}$.

(ii) P chooses the flexible scheme; $I = 0$*, and effort level* $e = \frac{k+\delta\mu\phi_0}{2c} > \widehat{e}$*;*

(iii) expected expenditures under the pension system with choice and under the fixed pension system are equal (expected budget neutrality).

The proof is given in the appendix. Theorem 1 shows that with a suitably chosen pension system with choice, officeholders self-select into those activities that, given their types, are most beneficial for society. The characterization in Theorem 1 and budget neutrality allow us to make welfare comparisons.

Corollary 2

The pension system with choice is welfare-enhancing

- *with respect to the fixed pension scheme (as populists work harder) and*
- *with respect to the flexible pension scheme (as all statesmen implement a long-term policy).*

We next establish that the pension system with choice as characterized in Theorem 1 exhausts all possible welfare improvements that can be achieved by pension systems under the following conditions: first, only election results can be used to provide incentives; second, the system has to be budget-neutral in expected terms; third, the weight of the long-term policy is not too low (i.e. assumption 1 holds on page 11). We formalize this insight in the next section.

5 Optimal Systems

In addition to considering arbitrary pension systems with choice, we work in this section with weaker conditions on the vote-outcome function (7) in order to establish the optimality in more general terms. In particular we allow for an arbitrary function s defined as

$$s(e,I,\varepsilon) : [0,\infty] \times \{0,1\} \times \{-\bar{\varepsilon},\bar{\varepsilon}\} \rightarrow [0,1], \tag{18}$$

ε being the random variable introduced in subsection 2.3. The only assumptions we make are

(i) $\frac{d\mathbb{E}[s(e,I,\varepsilon)]}{de} > 0$, for $e \in [0,\infty]$, $I \in \{0,1\}$ and $\varepsilon \in \{-\bar{\varepsilon},\bar{\varepsilon}\}$, i.e. the expected vote share is increasing in effort;

(ii) $\frac{d\mathbb{E}s(e,I,\varepsilon|I=1)}{de} < \frac{d\mathbb{E}s(e,I,\varepsilon|I=0)}{de}$, for $e \in [0,\infty]$, $I \in \{0,1\}$ and $\varepsilon \in \{-\bar{\varepsilon},\bar{\varepsilon}\}$, i.e. the exertion of effort causes a smaller increase in the vote share when $I = 1$ compared to $I = 0$.

We next define the **General Pension System with Choice**, which features two pension schemes, both containing a fixed and flexible part:

$$m = m_0 + \mu s(e,I,\varepsilon) \tag{19}$$

$$m' = m'_0 + \mu' s(e,I,\varepsilon). \tag{20}$$

Without loss of generality, we assume that scheme (19) possesses a higher degree of flexibility and features greater returns from popularity and the exertion of effort, but has a smaller fixed pay, i.e. we assume $m'_0 > m_0$ and $\mu' < \mu$. [11]

We examine whether the general pension system with choice achieves higher welfare than the system with choice we considered in the preceding sections. As long as pursuing long-term policies is sufficiently important for society, the next proposition shows that this is not the case.

Proposition 5
Suppose that choosing $I = 1$ is sufficiently important for society[12] *and that the vote share function satisfies assumptions (i) and (ii). Then, the system with choice characterized in section 4 achieves the highest possible welfare for voters.*

The proof of Proposition 5 is given in Appendix A. Proposition 5 shows that it is sufficient to offer the politician a choice between a fixed and a flexible scheme. Such a system exhausts all possible welfare gains that can be achieved by allowing choices among schemes in which pensions increase with the vote share of the party in power in future elections. We therefore return to the pension system with choice introduced in section 2.4.

6 Career Opportunities

In this section we extend our findings to encompass situations where politicians may have access to alternative career opportunities once they leave office. If the career opportunities are unrelated to the effort choice in the last period, our results continue to hold. These opportunities may, however, also depend to a certain extent on the popularity politicians have achieved upon leaving office. This may further deter politicians from undertaking an unpopular policy, even if it can be expected to yield large social benefits in the future. Such career opportunities could be integrated into our model by adding an additional popularity factor gs in the utility function of the politicians, where s is again the vote share of the incumbent's party in the next election. We consider two cases: career opportunities that only affect the populists and career opportunities that affect both types of politician.

Career Opportunities for Populists only

[11] As tie-breaking rule, we assume that the populist chooses (19) over (20) if he is indifferent between the schemes.

[12] In terms of exogenous parameters this means that α has to be above some critical value.

In this case, the utility of the populist becomes

$$U(P) = ke - ce^2 + \delta(m + gs) - dI. \tag{21}$$

Assuming this modification applies to the populist only (meaning that the statesman's utility function is unchanged), the additional feature of the model does not impair the mechanism under the pension system with choice given in Theorem 1 and can even improve it. In this case, the parameters m_0 or μ specifying the flexible scheme might be chosen at a lower level than before, as the populist has generally an overall higher incentive to work hard. Alternatively, m_{fix} might be chosen at a higher level than before. This simple intuition can be readily translated into formal terms. The interval of values for m_0 for which P chooses a flexible scheme and S chooses a fixed scheme as given in Proposition 3 becomes

$$m_{\text{fix}} - \frac{2k\mu\phi_0 + \delta(\mu\phi_0)^2 + 2\delta\mu g\phi_0^2}{4c} < m_0 < m_{\text{fix}} - \frac{2k\mu\phi_1 + \delta(\mu\phi_1)^2}{4c}. \tag{22}$$

The upper bound for m_0 is unchanged, as the statesman's utility has not changed, while the lower bound is smaller and can be obtained from the lower bound given in Proposition 3 by subtracting the positive term $\frac{2\delta\mu g\phi_0^2}{4c}$.

Career Opportunities for all Politicians

Imagine now that both types of politician have access to future career opportunities if their popularity remains high upon retirement from office. The statesman's utility is hence transformed analogously:

$$U(S) = ke - ce^2 + \delta(m + gs + \beta I). \tag{23}$$

Solving the model with the new utility functions under the pension system with choice leads to an analogous version of Proposition 4:

Proposition 6

Assume politicians are subject to the pension system with choice. Let

$$m_{fix} - \frac{2k\mu\phi_0 + \delta(\mu\phi_0)^2 + 2\delta\mu g\phi_0^2}{4c} < m_0 < m_{fix} - \frac{2k\mu\phi_1 + \delta(\mu\phi_1)^2 + 2\delta\mu g\phi_1^2}{4c}$$

and

$$\beta > \frac{\delta^2(\mu\phi_0)^2 + 2\delta k\mu\phi_0 + 2\delta^2\mu g\phi_0^2}{4\delta c} + (m_0 - m_{fix}).$$

Then the populist chooses the flexible scheme and the statesman chooses the fixed scheme and implements a long-term policy. P chooses effort $e = \frac{k+\delta(\mu+g)\phi_0}{2c}$ and $I = 0$ and S chooses $e = \frac{k+\delta g\phi_0}{2c}$ and $I = 1$. Hence, under the above conditions, there exists a separating equilibrium for the political agency game.

Proposition 6 follows the same logic as Proposition 4 and leads to analogous versions of Corollary 1 and Theorem 1. In this case as well, the pension system with choice can be shown to be budget-neutral with respect to the standard fixed pension scheme. The interval of values for m_0 in Proposition 6 is larger compared to the one obtained in Proposition 4. Both the upper and lower bounds for m_0 are smaller than the bounds obtained in Proposition 4. If we replace m_0 by its lower bound given in Proposition 6, the lower bound for β is again zero.

We conclude that the introduction of popularity-dependent career opportunities for both types of politician induces both of them to invest higher effort and enables the designer to construct a pension system with choice where the pension amount under the flexible scheme can be chosen to be lower than it would have to be without career opportunities.

7 Implementation and Practical Considerations

In this section we discuss how the pension system with choice might be implemented. Moreover, we assess potential risks and identify practical issues connected with the introduction of a pension system with choice.

7.1 Possibility of Implementation

We approach the possibility of implementing the scheme (a) from the perspective of voters and (b) from the perspective of politicians.

Interest of Voters

We observe that in comparison with the fixed pension scheme both generations profit from the new system. Populists exert higher effort and statesmen behave in the same way as under the standard fixed scheme by choosing $I = 1$ and $e = \frac{k}{2c}$. Note that pensions with choice do not influence the behavior of statesmen (with respect to status quo). The new system does not give any additional incentive to statesmen to implement long-term projects, which may or may not be high-risk and welfare-increasing. Therefore, voters would unanimously support the introduction of a pension system with choice.

Interest of Politicians

In contrast to voters, both types of politician have lower utility under the pension system with choice as summarized in the next proposition.

Proposition 7

Both types of politician have lower utility under a pension system with choice if budget neutrality is required with respect to the standard fixed pension scheme.

The proof of Proposition 7 is given in the appendix. We conclude that officeholders have no incentive to introduce the pension system with choice, so a campaign promise in favor of the new pension system is not credible. The resistance of officeholders can be overcome in several ways. For instance, officeholders have incentives to introduce the pension system with choice with some delay as set out in Gersbach and Kleinschmidt (2009). Officeholders in their last term have strict incentives to introduce the pension scheme with choice that becomes effective in subsequent terms as they will benefit from it as citizens. Another way of easing the introduction of the system with choice is to increase pension levels by allowing more money to be spent on pensions than under the fixed scheme.

7.2 Risks of Implementation

Power of Pensions as Incentive Devices

Pensions may be more or less relevant for politicians depending on the type of executive office (president, chancellor, minister, mayor of a city), their wealth and outside options, and the expected retirement duration. Such differences do not pose a problem for the pension system with choice. To see this, we modify the utility functions for a politician to

$$U(P) = ke - ce^2 + \delta\gamma m - dI \quad (24)$$

$$U(S) = ke - ce^2 + \delta(\gamma m + \beta I), \quad (25)$$

where γ is a random variable with $\mathbb{E}[\gamma] = 1$, measuring the importance of the pension, i.e. the power of the pension as an incentive device. Assume γ is not known in advance and that the *PSC* was chosen for the case $\gamma = 1$. If γ turns out to be lower than 1, all politicians choose the fixed scheme. In this case the pension system with choice has no effect. If γ is higher than 1, it might be the case that statesmen choose the flexible scheme. Then the effort levels of both populists and statesmen are very high, which tends to compensate for the loss of not choosing $I = 1$.

Choice of Pension Parameters

Could the pension system with choice perform worse than the standard fixed pension scheme, when either the parameters in $PSC(m_{\text{fix}}, m_0, \mu)$ are chosen erroneously or the assumptions about the politicians' parameters have been too pessimistic or too optimistic?

There are two fundamental causes for potential downside risk. Suppose first that for populists the fixed scheme is more attractive than the flexible scheme. This may occur if the expected pension gains do not outweigh the higher effort costs. Then, both types of officeholder would choose the fixed scheme, and the introduction of the flexible scheme has no effect.

Suppose next that for statesmen the flexible scheme promises higher utility than the fixed scheme. This may occur if the interest of the statesman in pursuing long-term policies is small or if the expected rise in pensions with the flexible scheme is large. In the first case, the risk for society is small, but it may be higher in the second case as the flexible scheme may crowd out intrinsically motivated policy choices. So if society is interested in avoiding the downside risk from the pension system with choice, the expected pension gains in the flexible system should be kept moderate. This can be achieved by choosing pension parameters in such a way that the statesman's expected gains with $\beta = 0$ are equal under the flexible and fixed schemes (Theorem 1).

Risk Aversion of Politicians

If politicians tend to be risk-averse, the populists in particular need some insurance to keep them disposed to choosing the flexible scheme. This could be achieved by increasing the parameter m_0 (withstanding the fact that some statesmen with small β may now choose the flexible scheme) or by designing the flexible scheme so that it switches to a fixed scheme after a specific number of years.[13]

Overall, the risks of implementing a pension system with choice appear to be relatively small.

7.3 Public Disclosure of Pension Choice

According to Theorem 1, there exists a pension system with choice, fully specified by the 3-tuple $PSC(m_{\text{fix}}, m_0, \mu)$, under which all statesmen choose a fixed scheme and implement a long-term policy, while populists choose a flexible scheme. If the pension decision is announced publicly, the type of politician in office is revealed at the beginning of the term. However, even if voters do not know the pension choice made by officeholders, voters are able to observe the choice regarding I at the time of elections at the end of period 1 and can hence infer the type of incumbent. Accordingly, transparency requirements for pension decisions are redundant in this setting. In section 9 we take up this topic again in

[13]Such a system would at the same time have the positive effect of ensuring the government against very high realizations of the vote share s. In general, the potential higher volatility in expenditures in the context of the pension system with choice can be controlled by the government through a range of insurance options.

connection with the eventuality of imperfect knowledge of e and I.

8 Reelections and Pension System with Choice

So far, we have focused on pension choices in the last term in office. In this section we extend the pension system to situations in which it is not clear a priori how many terms the officeholder will stay in office. The term may be the last one (because of term limits or personal reasons) or the officeholder may be successfully reelected. The formal treatment of this extension of the model, which we refer to as the *model with reelection*, is given in Appendix B.

8.1 Complication

A straightforward application of the pension system with choice to non-last-term situations is not feasible. Two potential problems arise.

- Populists choosing the flexible scheme may have low pensions if they are deselected as in such cases the vote share is necessarily low. This makes it more difficult to motivate populists to choose the flexible scheme in the first place. As a consequence the flexible scheme has to made more attractive to populists relative to the fixed scheme.

- Statesmen angling for reelection with only little interest in the long-term policy cannot be motivated to choose this policy with a pension system with choice as the popularity loss is too costly in comparative terms.

The above insights are formalized in Appendix B, in particular in Proposition 9. The bottom line is that when the officeholder may be reelected, the model the existence of a welfare enhancing *PCS* is not guaranteed for all feasible problem parameterizations.

Concerning the first of the above two points, we note that under a flexible scheme the expected pension level *conditional on losing the election* is lower than the level conditional on *not running* for reelection:

$$\mathbb{E}[m_{\text{flex}}|\text{“Politician has lost reelection”}] \leq \mathbb{E}[m_{\text{flex}}|\text{“Politician has stepped down”}]. \quad (26)$$

The reason is that the vote share is necessarily low if the politician is deselected (even if he has chosen a high level of effort). Indeed, in Appendix B, page 30, we show that

$$\mathbb{E}\left[m_{\text{flex}}|\text{“Politician has lost reelection”}\right] = m_0 + \frac{1}{2}\mu\phi_I e, \quad (27)$$

while the unconditional expected value from equation 9 is

$$\mathbb{E}\left[m_{\text{flex}}\right] = m_0 + \mu\phi_I e.$$

This makes it particularly difficult to motivate populists to select the flexible scheme. To circumvent this problem, we could add an additional parameter μ' to the *PCS* and use it to define a different flexible pension scheme when the politician loses reelection. In other words, if the politician chooses a flexible scheme, either

$$m_{\text{flex}}(s|\text{“Politician has lost reelection”}) = m_0 + \mu' s,$$

or

$$m_{\text{flex}}(s|\text{“Politician has stepped down”}) = m_0 + \mu s,$$

will be applied with $\mu \neq \mu'$. We could choose μ' so that Inequality (26) holds as an equality. Then, from Equation (27) it follows

$$\mu' = 2\mu.$$

Continuing along these lines does not solve all problems, though. Even if the expected pension level is set to be independent from the decision on running for reelection, it is still not possible to ensure the existence of a welfare-increasing system in all cases.[14]

In the following, we adhere to a three parameters pension system with choice. However, we develop a modified pension system that is universally welfare-improving.

8.2 Extending the Pension System with Choice

In this section we introduce a modified version of the pension system with choice that insures an agent against a low pension if he receives a low vote share in his reelection bid. This scheme also prescribes the pension rules for all conceivable contingencies that may occur in an arbitrary term.

Definition 2 (Extended Pension System with Choice)
The extended pension system with choice works as follows:

(i) In each period he is in office, the officeholder decides between a fixed pension and a flexible pension according to $PSC(m_{\text{fix}}, m_0, \mu)$.

(ii) If, at a later stage, the politician decides to run for reelection and is rejected, he will be subject to the fixed pension scheme.

[14] Details are available upon request.

(iii) If the politician does not to run for reelection or is in his last possible term, he will be subject to the chosen scheme.

(iv) If the politician steps down early in his term, he will be subject to a fixed scheme.

Officeholders have the right to choose (or to change) their preferred scheme at the beginning of each term they are in office.

8.2.1 Results

The formal analysis of the extended pension system with choice is given in subsection 10.3 of Appendix B. Here we summarize the main results. If the probability of running for reelection is low – in the extreme case zero – the extended pension system with choice replicates the main results from section 4. If the probability of running for reelection is high, the choices of e and I are driven by the reelection concern and the fixed pension scheme. In the case of a reelection chance equal to 1, the extended system is in fact equivalent to the current fixed scheme. Beyond these two polar cases we find that the extended system with choice can be designed to be welfare-improving for any $0 \leq q < 1$ (Theorem 2). Additionally the system can be universally applied in all terms and under all problem specifications.

9 Discussion

A pension system with choice is expected to have a variety of further consequences on the way elections impact on democracy. Here are some examples.

Vote Share as an Indicator

The use of the vote share to determine the size of the pension in the flexible scheme might trigger further behavioral changes. For instance, politicians may have a stronger interest in the functioning of their party and hence in the performance of other members of their party, and also in their public perception as representatives of the party. Voting behavior might also be affected. Casting votes simultaneously selects the officeholder for the next term but it may also determine the level of the pension for the past officeholder if he has chosen a flexible scheme. This might increase the willingness to sanction performance that would increase the effectiveness of the pension system with choice.

Signaling Character

In section 7.3 we argued that public disclosure of the choice of pension by the office-holder is redundant. However, if voters do not observe e and I separately but only joint performance, transparency regarding pension choices might have an impact on voting behavior if voters value the type (or character) of officeholder independently. In this case, the voters observe only the general state of the economy, which can either be high or low. A low state could be connected with the implementation of a long-term policy or with low effort. Then the choice of a fixed pension scheme will signal "statesman" and could potentially reduce the popularity loss the politician incurs by choosing $I = 1$ if voters value his character independently.

Selection of Candidates for Office

Allowing officeholders to choose their pension and signal their type may affect the willingness of agents to run as candidates for office. In particular, higher expected pay might attract candidates with higher abilities. [15] In our context, there might be a concern that imposing budget neutrality – and a decline of fixed pensions – would undermine the interest of citizens and in particular of statesmen in running for public office. This could be remedied by increasing the level of pensions for statesmen and the expected pension for populists in the same way (i.e. giving up budget neutrality).

10 Conclusion

We have proposed a pension system with choice for politicians. Such a system only requires information generated in the normal course of elections. Pensions with choice could be applied more generally. Managers in the private sector can be offered the choice between a fixed and a flexible pension scheme, the latter depending on the performance of the company. To avoid manipulation by the managers, performance would be measured some time after the manager has stepped down, and the pension with choice would also only become effective after this time lag. These and similar applications of the pension system with choice deserve further scrutiny in future research.

[15] A recent empirical study supporting this view is Gagliarducci and Nannicini (2009).

Appendix A: Proofs

Proof of Proposition 3

By Proposition 1 and 2 we know that the populist chooses $e = \frac{k}{2c}$ under a fixed pension scheme and $e = \frac{k+\delta\mu\phi_0}{2c}$ under a flexible pension scheme. In both cases, he does not implement a long-term policy as he would suffer loss d. Hence, if given the choice, P opts for a flexible scheme if and only if

$$\mathbb{E}(U^{\max}(P|\text{flex} \,\&\, I=0)) > \mathbb{E}(U^{\max}(P|\text{fix} \,\&\, I=0)).$$

Using equation (10) and (11) and inserting optimally chosen effort levels yields

$$\begin{aligned} k\left(\frac{k+\delta\mu\phi_0}{2c}\right) - c\left(\frac{k+\delta\mu\phi_0}{2c}\right)^2 + \delta m_0 + \delta\mu\phi_0\left(\frac{k+\delta\mu\phi_0}{2c}\right) \quad &> \quad k\left(\frac{k}{2c}\right) - c\left(\frac{k^2}{4c^2}\right) + \delta m_{\text{fix}} \\ \Leftrightarrow \left(\frac{k^2+k\delta\mu\phi_0}{2c}\right) - \frac{(k+\delta\mu\phi_0)^2}{4c} + \delta m_0 + \frac{\delta k\mu\phi_0 + \delta^2(\mu\phi_0)^2}{2c} \quad &> \quad \frac{k^2}{2c} - \frac{k^2}{4c} + \delta m_{\text{fix}} \\ \Leftrightarrow m_0 \quad &> \quad \frac{4m_{\text{fix}}c - 2k\mu\phi_0 - \delta(\mu\phi_0)^2}{4c}. \end{aligned}$$

■

Proof of Proposition 4

If the statesman decides not to implement a long-term policy, his utility function is identical to that of the populist, and he chooses the same effort level. Hence, by Proposition 3, if

$$m_0 > \frac{4m_{\text{fix}}c - 2k\mu\phi_0 - \delta(\mu\phi_0)^2}{4c},$$

the statesman chooses $I = 1$ if and only if one of the following inequalities holds:

$$\begin{aligned} \mathbb{E}(U^{\max}(S|\text{flex} \,\&\, I=0)) = \mathbb{E}(U^{\max}(P|\text{flex} \,\&\, I=0)) < \mathbb{E}(U^{\max}(S|\text{flex} \,\&\, I=1)) \\ \Leftrightarrow \frac{(k+\delta\mu\phi_0)^2}{4c} + \delta m_0 < \frac{(k+\delta\mu\phi_1)^2}{4c} + \delta(m_0+\beta) \end{aligned} \tag{28}$$

or

$$\begin{aligned} \mathbb{E}(U^{\max}(S|\text{flex} \,\&\, I=0)) = \mathbb{E}(U^{\max}(P|\text{flex} \,\&\, I=0)) \quad &< \quad \mathbb{E}(U^{\max}(S|\text{fix} \,\&\, I=1)) \\ \Leftrightarrow \frac{(k+\delta\mu\phi_0)^2}{4c} + \delta m_0 \quad &< \quad \frac{k^2}{4c} + \delta(m_{\text{fix}}+\beta). \end{aligned} \tag{29}$$

Inequality (28) is satisfied if

$$\beta > \frac{(k+\delta\mu\phi_0)^2-(k+\delta\mu\phi_1)^2}{4\delta c}. \tag{30}$$

Inequality (29) is satisfied if

$$\beta > \frac{(k+\delta\mu\phi_0)^2-k^2}{4\delta c}+(m_0-m_{\text{fix}}) = \frac{\delta^2(\mu\phi_0)^2+2\delta k\mu\phi_0}{4\delta c}+(m_0-m_{\text{fix}}). \tag{31}$$

The lower bound for β in (30) depends on the difference $\phi_0-\phi_1$ and is zero if and only if μ is zero, which would mean that the flexible scheme reduces to a fixed scheme. We see here that a flexible scheme can never motivate *every* statesman to implement a long-term policy. On the contrary, as outlined in Corollary 1, the lower bound for β in (31) can be brought down to zero if we replace m_0 by its lower bound $m_{\text{fix}} - \frac{2k\mu\phi_0+\delta(\mu\phi_0)^2}{4c}$ in Proposition 3 (i), which we denote here by m_0^{low}.
Let β satisfy equation (31). Then the statesman chooses the fixed pension scheme if

$$m_0 < \frac{4m_{\text{fix}}c-2k\mu\phi_1-\delta(\mu\phi_1)^2}{4c} := m_0^{\text{high}}.$$

This results from comparing the right-hand sides of Inequalities (28) and (29) and proceeding as in Proposition 3. Since $\phi_0 > \phi_1$, it holds that

$$m_0^{\text{low}} < m_0^{\text{high}}.$$

Hence, the interval

$$\left(m_0^{\text{low}}, m_0^{\text{high}}\right) \tag{32}$$

is not empty, and each value of m_0 contained in this interval incentivizes the populist to choose a flexible scheme and the statesman to choose a fixed scheme, provided β fulfills equation (31). It remains to be shown that interval (32) contains at least one feasible, i.e. positive value to be assigned to m_0. This follows by noting that $m_0^{\text{low}}(\mu=0)=m_{\text{fix}}$ and $\frac{dm_0^{\text{low}}}{d\mu}<0$. Hence, we can choose the parameter μ in such a way that the lower bound of interval (32) is positive and each value contained in interval (32) is feasible.

■

Proof of Theorem 1

Part (i) and (ii)

Let m_0 be equal to its lower bound m_0^{low} given in Proposition 4, Inequality (16). At this level of m_0, the populist is indifferent between the flexible and the fixed scheme, so we can assume that the populist chooses the flexible scheme and exerts higher effort. On the other hand, $m_0 = m_0^{\text{low}}$ gives the statesman an incentive to choose the fixed scheme and implement the long-term policy for every $\beta > 0$. This results from substituting $m_0 = m_0^{\text{low}}$ in the lower bound for β given in Proposition 4, as stated in Corollary 1.

Part (iii)

We want the pension system with choice to be budget-neutral with respect to the fixed pension scheme, which is the one currently implemented in practice. Hence, it must hold that

$$\widehat{m} = wm_{\text{fix}} + (1-w)m_{\text{flex}},$$

where w is the probability that the officeholder is a statesman and $\widehat{m}$ is the government budget for pensions under the current scheme. Substituting for the separating equilibrium value

$$m_{\text{flex}}^{\text{EQ}} = m_0^{\text{low}} + \mu\phi_0 e^{\text{opt}} = m_{\text{fix}} - \frac{2k\mu\phi_0 + \delta(\mu\phi_0)^2}{4c} + \mu\phi_0 \frac{k + \delta\mu\phi_0}{2c}$$

yields

$$\widehat{m} = wm_{\text{fix}} + (1-w)\left(m_{\text{fix}} - \frac{2k\mu\phi_0 + \delta(\mu\phi_0)^2}{4c} + \mu\phi_0 \frac{k + \delta\mu\phi_0}{2c}\right).$$

Solving for m_{fix} yields

$$m_{\text{fix}}^{\text{EQ}} = \widehat{m} - \frac{(1-w)\delta(\mu\phi_0)^2}{4c}. \tag{33}$$

As both $\frac{dm_0^{\text{low}}}{d\mu}$ and $\frac{dm_{\text{fix}}^{\text{EQ}}}{d\mu}$ are negative and $m_0^{\text{low}}(\mu = 0) = m_{\text{fix}}$ and $m_{\text{fix}}^{\text{EQ}}(\mu = 0) = \widehat{m}$, we deduce that for each feasible parameter combination $(k, c, \delta, \phi_0, \phi_1, \widehat{m})$ we can find a $PSC(m_{\text{fix}}, m_0, \mu)$ that fulfills the budget constraint.

Maximizing welfare means maximizing μ, as the increase in effort for the populists is expressed by $\frac{\delta\mu\phi_0}{2c}$ and does not depend on m_0. In a separating equilibrium, a high value of μ requires a low value of m_0. If $m_0 \geq 0$, feasible values for μ are

$$0 < \mu \leq \frac{-k + \sqrt{k^2 + 4\delta m_{\text{fix}} c}}{\delta\phi_0}.$$

Hence we can choose a value of μ that is as close as possible to its upper bound, provided that the right-hand side of equation (33) is positive and the vote share $s \leq 1$.

■

Proof of Proposition 5

Step 1

Given the assumptions of Proposition 5 and the impossibility to motivate the populist to undertake $I = 1$, a welfare-optimal system provides the highest possible effort incentive for P, and induces S to choose $I = 1$. Thus, we first establish conditions on parameters of the system defined in (19) and (20) such that P chooses the most flexible scheme (which induces the highest possible effort level if $I = 0$) and S implements $I = 1$.

The populist prefers scheme (19) over (20) if

$$\begin{aligned} \mathbb{E}(U^{\max}(P|(19)\ \&\ I=0)) &\geq \mathbb{E}(U^{\max}(P|(20)\ \&\ I=0)) \\ \Leftrightarrow \frac{\left(k+\delta\mu\frac{d\mathbb{E}s(e,I,\varepsilon|I=0)}{de}\right)^2}{4c}+\delta m_0 &\geq \frac{\left(k+\delta\mu'\frac{d\mathbb{E}s(e,I,\varepsilon|I=0)}{de}\right)^2}{4c}+\delta m_0' \\ \Leftrightarrow m_0'-m_0 &\leq \frac{(\mu-\mu')\left(\delta\left(\frac{d\mathbb{E}s(e,I,\varepsilon|I=0)}{de}\right)^2(\mu+\mu')+2k\frac{d\mathbb{E}s(e,I,\varepsilon|I=0)}{de}\right)}{4\delta c}. \end{aligned} \tag{34}$$

To establish the condition that S chooses $I = 1$, we assume that (34) holds. As

$$\mathbb{E}(U^{\max}(S|(19)\ \&\ I=0)) = \mathbb{E}(U^{\max}(P|(19)\ \&\ I=0)),$$

the statesman will choose $I = 1$ if and only if one of the inequalities below holds:

$$\begin{aligned} \mathbb{E}(U^{\max}(S|(19)\ \&\ I=0)) &\leq \mathbb{E}(U^{\max}(S|(19)\ \&\ I=1)) \\ \Leftrightarrow \frac{\left(k+\delta\mu\frac{d\mathbb{E}s(e,I,\varepsilon|I=0)}{de}\right)^2}{4c}+\delta m_0 &\leq \frac{\left(k+\delta\mu\frac{d\mathbb{E}s(e,I,\varepsilon|I=1)}{de}\right)^2}{4c}+\delta(m_0+\beta) \end{aligned} \tag{35}$$

or

$$\begin{aligned} \mathbb{E}(U^{\max}(S|(19)\ \&\ I=0)) &\leq \mathbb{E}(U^{\max}(S|(20)\ \&\ I=1)) \\ \Leftrightarrow \frac{(k+\delta\mu\frac{d\mathbb{E}s(e,I,\varepsilon|I=0)}{de})^2}{4c}+\delta m_0 &\leq \frac{(k+\delta\mu'\frac{d\mathbb{E}s(e,I,\varepsilon|I=1)}{de})^2}{4c}+\delta(m_0'+\beta). \end{aligned} \tag{36}$$

Inequality (35) is satisfied if

$$\beta \geq \hat{\beta} := \frac{(k+\delta\mu\frac{d\mathbb{E}s(e,I,\varepsilon|I=0)}{de})^2-(k+\delta\mu\frac{d\mathbb{E}s(e,I,\varepsilon|I=1)}{de})^2}{4\delta c}. \tag{37}$$

Inequality (36) is satisfied if

$$\begin{aligned} \beta \geq \hat{\hat{\beta}} \ &:= \ \frac{\left(\mu\frac{d\mathbb{E}s(e,I,\varepsilon|I=0)}{de}-\mu'\frac{d\mathbb{E}s(e,I,\varepsilon|I=1)}{de}\right)\left(\delta\left(\mu\frac{d\mathbb{E}s(e,I,\varepsilon|I=0)}{de}+\mu'\frac{d\mathbb{E}s(e,I,\varepsilon|I=1)}{de}\right)+2k\right)}{4\delta c}+ \\ &- \ (m_0'-m_0). \end{aligned} \tag{38}$$

Hence, all statesmen with $\beta \geq \min\{\hat{\beta}, \hat{\hat{\beta}}\}$ will choose I.

Step 2

We next determine the parameters (m_0, m_0', μ, μ'), such that S chooses $I = 1$ for all $\beta \geq 0$, i.e. either $\hat{\beta}$ or $\hat{\hat{\beta}}$ has to be equal to zero. This ensures that every statesman will implement a long-term policy and hence maximize welfare.

We start by examining the lower bound for β in (37). In this case, $\hat{\beta}$ depends on the difference $\frac{d\mathbb{E}s(e,I,\varepsilon|I=0)}{de} - \frac{d\mathbb{E}s(e,I,\varepsilon|I=1)}{de}$ and is zero if and only if $I = 1$ causes no popularity loss, which is contrary to our assumptions. We thus turn to inequality (36) and look for conditions under which $\hat{\hat{\beta}}$ is zero. We can decrease the lower bound of β in (38) by increasing the difference $m_0' - m_0$. The maximal difference occurs when inequality (34) holds as an equality, i.e. the populist is indifferent between the schemes. As the populist continues to choose (19), such a procedure has no effect on the effort choice of P for given parameters m_0, μ of (19). It will turn out that this is indeed the only option to obtain feasible solutions for parameters which will ensure that S chooses I for all $\beta \geq 0$.

Substitution of (34) into the right-hand side of (38) and subsequent simplification lead to:

$$\begin{aligned} \hat{\hat{\beta}} &= \delta^2(\mu')^2 \left(\left(\frac{d\mathbb{E}s(e,I,\varepsilon|I=0)}{de} \right)^2 - \left(\frac{d\mathbb{E}s(e,I,\varepsilon|I=1)}{de} \right)^2 \right) + \\ &+ 2\delta k\mu' \left(\frac{d\mathbb{E}s(e,I,\varepsilon|I=0)}{de} - \frac{d\mathbb{E}s(e,I,\varepsilon|I=1)}{de} \right). \end{aligned} \tag{39}$$

The above expression is the lower bound for β and only depends on μ'. We now search for feasible values of μ' such that $\hat{\hat{\beta}} = 0$. Solving with respect to μ' yields

$$\mu' = 0 \quad \text{or} \quad \mu' = \frac{-2k}{\delta \left(\frac{d\mathbb{E}s(e,I,\varepsilon|I=0)}{de} + \frac{d\mathbb{E}s(e,I,\varepsilon|I=1)}{de} \right)}. \tag{40}$$

The nonzero solution is not feasible, as it is negative. Trivially, the same holds for all values in the interval

$$\left(\frac{-2k}{\delta \left(\frac{d\mathbb{E}s(e,I,\varepsilon|I=0)}{de} + \frac{d\mathbb{E}s(e,I,\varepsilon|I=1)}{de} \right)}, 0 \right).$$

We infer that $\mu' = 0$ is the only feasible solution. By using the same procedure, one can verify that no feasible solution for μ' exists if condition (34) is a strict inequality. The reason is that for low values of β (and $\beta = 0$ in the extreme case), the statesman has a negligible direct utility loss (zero if $\beta = 0$) if he chooses $I = 0$. If $\mu' > 0$, a statesman with a very low value of β could benefit from higher pensions by choosing $I = 0$.

As the solution $\mu' = 0$ implies that the pension scheme (20) reduces to a fixed scheme, we conclude that it is not possible to achieve higher welfare under the general pension system with choice if assumptions (i) and (ii) hold. The welfare-optimal choice of the remaining parameters (m_0, m_0', μ) follows the same considerations as in Theorem 1.

■

Proof of Proposition 7

As in the proof of Theorem 1, the budget neutrality requirement is expressed as

$$\widehat{m} = w m_{\text{fix}} + (1-w) m_{\text{flex}},$$

where w is the probability that the officeholder is a statesman and $\widehat{m}$ is the government budget for pensions under the current scheme. Substituting for the equilibrium value

$$m_{\text{flex}}^{\text{EQ}} = m_0^{\text{low}} + \mu\phi_0 e^{\text{opt}} = m_{\text{fix}} - \frac{2k\mu\phi_0 + \delta(\mu\phi_0)^2}{4c} + \mu\phi_0 \frac{k + \delta\mu\phi_0}{2c}$$

(as determined by the value of $m_0 = m_0^{\text{low}}$ in Theorem 1) in the budget neutrality equation yields

$$\widehat{m} = w m_{\text{fix}} + (1-w)\left(m_{\text{fix}} - \frac{2k\mu\phi_0 + \delta(\mu\phi_0)^2}{4c} + \mu\phi_0 \frac{k + \delta\mu\phi_0}{2c}\right).$$

Solving for m_{fix} yields

$$m_{\text{fix}}^{\text{EQ}} = \widehat{m} - \frac{(1-w)\delta(\mu\phi_0)^2}{4c}.$$

Thus, it holds that $m_{\text{fix}}^{\text{EQ}} < \widehat{m}$. The effort that the statesman exerts under the current fixed scheme and under the fixed scheme *within the pension system with choice* is equal. Hence, it follows that for the statesman the utility is lower under the pension system with choice. As in the equilibrium values $m_{\text{fix}}^{\text{EQ}}$ and $m_{\text{flex}}^{\text{EQ}}$, the populist is indifferent between the two schemes, i.e. he achieves the same utility. The populist is also worse off under the pension system with choice than under the current pension scheme. Note that $m_{\text{flex}}^{\text{EQ}}$ is larger than $\widehat{m}$, but the resulting utility under the flexible scheme within the pension system with choice is lower than the utility under the fixed scheme. This is because $m_{\text{flex}}^{\text{EQ}}$ has to compensate for the loss of utility brought about by the cost of higher effort.

■

Appendix B: Reelections and Pensions with Choice

In this section we generalize the model described in section 2 and assume that at the end of period 1 the officeholder can run for reelection. We start by characterizing the reelection probability.

10.1 The Set-Up

10.1.1 Reelection Probability

The officeholder is reelected if his vote share is larger than, or equal to, $\frac{1}{2}$. As in the basic version of the model the vote share is modeled by $s = \phi_I e + \varepsilon$, where ε is a random variable uniformly distributed with support $[-\bar{\varepsilon}, \bar{\varepsilon}]$ and mean 0. We use r_I to denote the probability that the officeholder will be reelected (conditional on a specific level of effort), which depends on whether the incumbent chooses $I = 1$ or $I = 0$. We thus obtain

$$\begin{aligned} r_I &= \mathbb{P}\left[s \geq \frac{1}{2} \,\middle|\, e\right] = \mathbb{P}\left[\phi_I e + \varepsilon \geq \frac{1}{2} \,\middle|\, e\right] = \mathbb{P}\left[\varepsilon \geq \frac{1}{2} - \phi_I e \,\middle|\, e\right] \\ &= \int_{\frac{1}{2}-\phi_I e}^{\bar{\varepsilon}} \frac{1}{\bar{\varepsilon} - (-\bar{\varepsilon})} \, d\varepsilon = \frac{\bar{\varepsilon}}{2\bar{\varepsilon}} - \frac{\frac{1}{2} - \phi_I e}{2\bar{\varepsilon}} = \frac{\bar{\varepsilon} - \frac{1}{2}}{2\bar{\varepsilon}} + \frac{\phi_I e}{2\bar{\varepsilon}} \\ &= v + a_I e, \end{aligned} \tag{41}$$

for $v = \frac{\bar{\varepsilon} - \frac{1}{2}}{2\bar{\varepsilon}}$ and $a_I = \frac{\phi_I}{2\bar{\varepsilon}}$. We focus on constellations where interior solutions can be used and formula (41) can be applied, which requires

$$\bar{\varepsilon} > \frac{1}{2} - \phi_I e > -\bar{\varepsilon}. \tag{42}$$

This condition can be expressed in exogenous parameters and holds in particular if the ratio of k to the effort cost parameter c is sufficiently small. Moreover, to simplify the analysis we set $\bar{\varepsilon} = \frac{1}{2}$, which yields $v = 0$ and $a_I = \phi_I$. Hence, under these assumptions and parameter choices, it holds that $r_I = \phi_I e$.

10.1.2 Sequence of Events

We study the following sequence of events:

- At the beginning of the term, the incumbent decides on his pension scheme, his effort level e, and whether or not to undertake a long-term policy, i.e. he chooses $I \in \{0, 1\}$.

- With probability q the incumbent observes that his benefit from having another term is high and equal to $\widehat{W}_2$.[16] With probability $1-q$ he observes that the benefit from being in office in the next term is negative and thus will not run for reelection.

We assume that $\widehat{W}_2$ is sufficiently high for the incumbent to always prefer to run for reelection in all circumstances we will consider. Hence, at the beginning of his term, the incumbent expects to run for reelection with probability q ($0 < q < 1$).

10.1.3 Expected Pensions

Under a pension system with choice, politicians simultaneously select their preferred pension scheme, their effort level e and whether or not to implement a long-term policy at the beginning of their term in period 1. In the model with reelection presented here politicians make these choices *under the uncertainty of running for office* and *under the uncertainty of reelection*. The pension scheme politicians choose in period 1 will be applied to them in period 2 if they do not run for office or *if they lose elections*. In the latter case, their pension with a flexible scheme will be based on the vote share they themselves received in the election and not on the vote share of their party after they have stepped down. This entails that – if $q = 1$ – the expected pension level with a flexible scheme is conditional on the vote share being less than $\frac{1}{2}$:

$$\begin{aligned}
\mathbb{E}\left[m_{\text{flex}}|q=1\right] &= \mathbb{E}\left[m_0 + \mu s \,\middle|\, s < \frac{1}{2}\right] \\
&= \mathbb{E}\left[m_0 + \mu\left(\phi_I e + \varepsilon\right) \,\middle|\, s < \frac{1}{2}\right] \\
&= m_0 + \mathbb{E}\left[\mu\phi_I e \,\middle|\, s < \frac{1}{2}\right] + \mathbb{E}\left[\mu\varepsilon \,\middle|\, s < \frac{1}{2}\right] \\
&= m_0 + \mu\phi_I e + \mu\mathbb{E}\left[\varepsilon \,\middle|\, \varepsilon < \frac{1}{2} - \phi_I e\right]. \qquad (43)
\end{aligned}$$

[16] $\widehat{W}_2$ is assumed to be sufficiently higher than $\hat{m}$.

For the indicator function Φ, it holds that[17]

$$\mathbb{E}\left[\varepsilon \,\middle|\, \varepsilon < \frac{1}{2} - \phi_I e\right] = \frac{\mathbb{E}\left[\Phi_{\varepsilon < \frac{1}{2} - \phi_I e} \cdot \varepsilon\right]}{\mathbb{P}\left[\varepsilon < \frac{1}{2} - \phi_I e\right]}$$
$$= \frac{\int_{-\bar{\varepsilon}}^{\frac{1}{2} - \phi_I e} \varepsilon \cdot \frac{1}{2\bar{\varepsilon}} \, d\varepsilon}{1 - \phi_I e}$$
$$= \frac{\frac{1}{2\bar{\varepsilon}} \left[\frac{1}{2}\varepsilon^2\right]_{-\bar{\varepsilon}}^{\frac{1}{2} - \phi_I e}}{1 - \phi_I e}$$
$$= \frac{\frac{1}{2\bar{\varepsilon}} \left(\frac{1}{2}\left(\frac{1}{2} - \phi_I e\right)^2 - \frac{1}{2}\bar{\varepsilon}^2\right)}{1 - \phi_I e}$$
$$= \frac{\frac{1}{4\bar{\varepsilon}} \left(\frac{1}{2} - \phi_I e\right)^2 - \frac{1}{4}\bar{\varepsilon}}{1 - \phi_I e} := A \tag{44}$$

The probability of not being reelected, i.e. $\mathbb{P}\left[s < \frac{1}{2}\right] = \mathbb{P}\left[\varepsilon < \frac{1}{2} - \phi_I e\right] = 1 - \phi_I e$, follows from the result on reelection probability given in subsection 10.1.1. We assume that $1 - \phi_I e$ is strictly larger than zero (i.e. there is always a chance of not being reelected). We note that

$$A < 0 \;\Leftrightarrow\; \frac{1}{4}\bar{\varepsilon} > \frac{1}{4\bar{\varepsilon}}\left(\frac{1}{2} - \phi_I e\right)^2$$
$$\Leftrightarrow\; \bar{\varepsilon}^2 > \left(\frac{1}{2} - \phi_I e\right)^2$$
$$\Leftarrow\; \bar{\varepsilon} > \left|\frac{1}{2} - \phi_I e\right|, \tag{45}$$

which holds by definition, as set out in subsection 10.1.2. For $\bar{\varepsilon} = \frac{1}{2}$ (as chosen in subsection 10.1.2) it follows that:

$$A = \frac{\frac{1}{2}\left(\frac{1}{4} + \phi_I^2 e^2 - \phi_I e\right) - \frac{1}{8}}{1 - \phi_I e}$$
$$= \frac{\frac{1}{8} + \frac{1}{2}\phi_I^2 e^2 - \frac{1}{2}\phi_I e - \frac{1}{8}}{1 - \phi_I e}$$
$$= \frac{\frac{1}{2}\phi_I^2 e^2 - \frac{1}{2}\phi_I e}{1 - \phi_I e}$$
$$= \frac{-\frac{1}{2}\phi_I e\,(1 - \phi_I e)}{1 - \phi_I e}$$
$$= -\frac{1}{2}\phi_I e \tag{46}$$

Summarizing,

$$\mathbb{E}\left[m_{\text{flex}} | q = 1\right] = m_0 + \frac{1}{2}\mu\phi_I e < m_0 + \mu\phi_I e = \mathbb{E}\left[m_{\text{flex}} | q = 0\right], \tag{47}$$

[17] The general rule for solving the particular type of conditional expectation arising in the following calculation is given by $\mathbb{E}\left[X|B_i\right] = \int X \; d\mathbb{P}\left[\,\cdot\,|B_i\right] = \frac{1}{\mathbb{P}[B_i]} \cdot \mathbb{E}\left[\Phi_{B_i} \cdot X\right]$, where X is a random variable, $B_i \in \sigma(\omega)$, and Φ is the indicator function.

as $\mathbb{E}[\varepsilon|q=0] = \mathbb{E}[\varepsilon] = 0$.

10.1.4 Utilities of Politicians

In the following we list the modified expected utility functions of the politicians, taking into account the possibility of reelection. To simplify the subsequent analysis, we set both the discount factor δ and the effort cost parameter c equal to 1.

$$\begin{aligned}
&\mathbb{E}(U(P)|\text{fix} \;\&\; I=0)\\
&= (1-q)(ke-e^2+m_{\text{fix}}) + q(ke-e^2+\phi_0 e\widehat{W}_2 + (1-\phi_0 e)m_{\text{fix}})\\
&= ke-e^2+m_{\text{fix}}+q\phi_0 e(\widehat{W}_2-m_{\text{fix}})\\
&= -e^2+(k+q\phi_0(\widehat{W}_2-m_{\text{fix}}))e+m_{\text{fix}}
\end{aligned} \tag{48}$$

$$\begin{aligned}
&\mathbb{E}(U(P)|\text{flex} \;\&\; I=0)\\
&= (1-q)\left(ke-e^2+m_0+\mu\phi_0 e\right) + q\left(ke-e^2+\phi_0 e\widehat{W}_2+(1-\phi_0 e)\,\mathbb{E}[m_{\text{flex}}|q=1]\right)\\
&= (1-q)\left(ke-e^2+m_0+\mu\phi_0 e\right) + q\left(ke-e^2+\phi_0 e\widehat{W}_2+(1-\phi_0 e)\left(m_0+\frac{1}{2}\mu\phi_0 e\right)\right)\\
&= ke-e^2+m_0+\mu\phi_0 e-q\mu\phi_0 e+q\phi_0 e\left(\widehat{W}_2-m_0\right)+\frac{1}{2}q\mu\phi_0 e-\frac{1}{2}q\mu\phi_0^2 e^2\\
&= -\left(1+\frac{1}{2}q\mu\phi_0^2\right)e^2+\left(k+\mu\phi_0+q\phi_0\left(\widehat{W}_2-m_0\right)-\frac{1}{2}q\mu\phi_0\right)e+m_0
\end{aligned} \tag{49}$$

$$\begin{aligned}
&\mathbb{E}(U(S)|\text{fix})_I\\
&= (1-q)(ke-e^2+m_{\text{fix}}+\beta I)+q(ke-e^2+\phi_I e(\widehat{W}_2+\beta I)+(1-\phi_I e)(m_{\text{fix}}+\beta I))\\
&= ke-e^2+m_{\text{fix}}+\beta I+q\phi_I e(\widehat{W}_2-m_{\text{fix}})\\
&= -e^2+(k+q\phi_I(\widehat{W}_2-m_{\text{fix}}))e+m_{\text{fix}}+\beta I
\end{aligned} \tag{50}$$

$$\begin{aligned}
&\mathbb{E}(U(S)|\text{flex})_I\\
&= (1-q)(ke-e^2+m_0+\mu\phi_I e+\beta I)+q(ke-e^2+\phi_I e(\widehat{W}_2+\beta I)+(1-\phi_I e)(\mathbb{E}[m_{\text{flex}}|q=1]+\beta I))\\
&= (1-q)(ke-e^2+m_0+\mu\phi_I e+\beta I)+q\left(ke-e^2+\phi_I e(\widehat{W}_2+\beta I)+(1-\phi_I e)\left(m_0+\frac{1}{2}\mu\phi_I e+\beta I\right)\right)\\
&= ke-e^2+m_0+\mu\phi_I e-q\mu\phi_I e+\beta I+q\phi_I e(\widehat{W}_2-m_0)+\frac{1}{2}q\mu\phi_I e-\frac{1}{2}q\mu\phi_I^2 e^2\\
&= -\left(1+\frac{1}{2}q\mu\phi_I^2\right)e^2+\left(k+\mu\phi_I+q\phi_I(\widehat{W}_2-m_0)-\frac{1}{2}q\mu\phi_I\right)e+m_0+\beta I
\end{aligned} \tag{51}$$

Maximizing utility with respect to effort leads to:

$$\left(e_{\text{fix}}^{\text{opt},P}, \mathbb{E}(U^{\max}(P_{\text{fix}}))\right) = \left(\frac{k+q\phi_0(\widehat{W}_2 - m_{\text{fix}})}{2}, \frac{(k+q\phi_0(\widehat{W}_2 - m_{\text{fix}}))^2}{4} + m_{\text{fix}}\right)$$

$$\left(e_{\text{flex}}^{\text{opt},P}, \mathbb{E}(U^{\max}(P_{\text{flex}}))\right) = \left(\frac{k+\mu\phi_0(1-\frac{1}{2}q)+q\phi_0(\widehat{W}_2 - m_0)}{2+q\mu\phi_0^2}, \frac{(k+\mu\phi_0(1-\frac{1}{2}q)+q\phi_0(\widehat{W}_2 - m_0))^2}{2(2+q\mu\phi_0^2)} + m_0\right)$$

$$\left(e_{\text{fix},I}^{\text{opt},S}, \mathbb{E}(U^{\max}(S_{\text{fix}})_I)\right) = \left(\frac{k+q\phi_I(\widehat{W}_2 - m_{\text{fix}})}{2}, \frac{(k+q\phi_I(\widehat{W}_2 - m_{\text{fix}}))^2}{4} + m_{\text{fix}} + \beta I\right)$$

$$\left(e_{\text{flex},I}^{\text{opt},S}, \mathbb{E}(U^{\max}(S_{\text{flex}})_I)\right) = \left(\frac{k+\mu\phi_I(1-\frac{1}{2}q)+q\phi_I(\widehat{W}_2 - m_0)}{2+q\mu\phi_I^2}, \frac{(k+\mu\phi_I(1-\frac{1}{2}q)+q\phi_I(\widehat{W}_2 - m_0))^2}{2(2+q\mu\phi_I^2)} + m_0 + \beta I\right)$$

10.2 Pension System with Choice

In the model with reelection, it is no longer trivial that the populist exerts higher effort under a flexible pension scheme. The critical condition is given in the following Proposition.

Proposition 8

If the incumbent is a populist, effort is higher under a flexible scheme if and only if

$$m_0 < m_0^{critical} := \frac{2\mu - q\mu + 2qm_{fix} - qk\mu\phi_0 - q^2\mu\phi_0^2(\widehat{W}_2 - m_{fix})}{2q}. \tag{52}$$

Proof of Proposition 8

The effort exerted by the populist under a flexible pension scheme is higher than the effort exerted under a fixed scheme if and only if

$$e_{\text{flex}}^{\text{opt},P} > e_{\text{fix}}^{\text{opt},P}$$

$$\Leftrightarrow \frac{k+\mu\phi_0 - \frac{1}{2}q\mu\phi_0 + q\phi_0(\widehat{W}_2 - m_0)}{2+q\mu\phi_0^2} > \frac{k+q\phi_0(\widehat{W}_2 - m_{\text{fix}})}{2}$$

$$\Leftrightarrow m_0 < \frac{2\mu - q\mu + 2qm_{\text{fix}} - qk\mu\phi_0 - q^2\mu\phi_0^2(\widehat{W}_2 - m_{\text{fix}})}{2q} := m_0^{\text{critical}}.$$

■

Next we look for a welfare improving *PSC* for which the populist is indifferent between the flexible and fixed scheme, as this generates the weakest condition on β under which the statesman implements a long-term policy. The next proposition shows that such a *PSC* does not always exist.

Proposition 9

A PSC(m_{fix}, m_0, μ) *with the following properties:*

(i) *PSC*(m_{fix}, m_0, μ) *is feasible;*

(ii) *the populist is indifferent between the flexible and fixed scheme;*

(iii) *PSC*(m_{fix}, m_0, μ) *is welfare-enhancing with respect to the fixed scheme if the incumbent is a populist;*

can be constructed in a neighborhood of $q = 0$ *but does not always exist in a neighborhood of* $q = 1$.

Proof of Proposition 9

Step 1

W.l.o.g. we assume $0 < q < 1$. The populist is indifferent between the fixed and flexible schemes if and only if

$$\begin{aligned}&\mathbb{E}(U^{\max}(P^{\text{flex}})) - \mathbb{E}(U^{\max}(P^{\text{fix}})) = 0\\ \Leftrightarrow\ &\frac{(k + \mu\phi_0 - \frac{1}{2}q\mu\phi_0 + q\phi_0(\widehat{W}_2 - m_0))^2}{2(2 + q\mu\phi_0^2)} + m_0 - \left(\frac{(k + q\phi_0(\widehat{W}_2 - m_{\text{fix}}))^2}{4} + m_{\text{fix}}\right) = 0\end{aligned}$$

Solving the above equality w.r.t. m_0 yields two solutions $m_0^{\text{low}} < m_0^{\text{high}}$:

$$m_0^{\text{low}} = \frac{q^2\phi_0^2(2\widehat{W}_2 - \mu) + 2qk\phi_0 - 4 - \sqrt{2(2 + q\mu\phi_0^2)}\sqrt{(q^2\phi_0^2(\widehat{W}_2 - m_{\text{fix}}) + qk\phi_0 - 2)^2 - 2q\mu\phi_0^2(1 - q)}}{2q^2\phi_0^2},$$

and

$$m_0^{\text{high}} = \frac{q^2\phi_0^2(2\widehat{W}_2 - \mu) + 2qk\phi_0 - 4 + \sqrt{2(2 + q\mu\phi_0^2)}\sqrt{(q^2\phi_0^2(\widehat{W}_2 - m_{\text{fix}}) + qk\phi_0 - 2)^2 - 2q\mu\phi_0^2(1 - q)}}{2q^2\phi_0^2}.$$

For a given m_{fix} and μ, the populist only chooses the flexible scheme if m_0 is either lower than or equal to m_0^{low} or if m_0 is larger than or equal to m_0^{high}. This property can be explained as follows: As the effort exerted by the politician decreases if m_0 increases, there are small values of m_0 that induce high effort resulting in higher utility under the flexible scheme than under a fixed scheme, as reelection chances are high. On the other hand, low effort is connected with high values of m_0 (when the indifference requirement holds for a fixed m_{fix}). This flexible scheme is attractive for the populist as the fixed part is high. In the intermediate range of values for m_0, the optimal effort choice of the populist does not provide sufficient benefits for the populist either in terms of higher reelection chance or higher pension benefits.

Step 2

The above values are well defined if

$$-\frac{2}{q\phi_0^2} < \mu < \frac{(q^2\phi_0^2(\widehat{W}_2 - m_{\text{fix}}) + qk\phi_0 - 2))^2}{2q\phi_0^2(1-q)} := \mu^* \tag{53}$$

The functions defined by m_0^{low} and m_0^{high} are continuous for $q \in (0,1]$. It holds that

$$\lim_{q\to 0^+} m_0^{\text{low}} = -\infty,$$

which indicates that m_0^{low} is not a feasible choice for small q, as in such cases m_0^{low} will be negative. Taking the limit of m_0^{high} for q towards zero yields the solution for m_0 found in the basic model.

Step 3

Properties (ii) and (iii) hold together if and only if

$$\begin{aligned}
& m_0^{\text{critical}} - m_0^{\text{high}} > 0 \\
\Leftrightarrow\ & \frac{2q\phi_0^2\mu - q^2\phi_0^3 k\mu - 2q\phi_0 k + 4 - q^3\phi_0^4\mu(\widehat{W}_2 - m_{\text{fix}}) - 2q^2\phi_0^2(\widehat{W}_2 - m_{\text{fix}})}{2q^2\phi_0^2} + \\
& - \frac{\sqrt{2(2+q\mu\phi_0^2)}\sqrt{(q^2\phi_0^2(\widehat{W}_2 - m_{\text{fix}}) + qk\phi_0 - 2)^2 - 2q\mu\phi_0^2(1-q)}}{2q^2\phi_0^2} > 0,
\end{aligned}$$

where m_0^{critical} is as defined in Proposition 8. We study the function

$$f(\mu) := m_0^{\text{critical}}(\mu) - m_0^{\text{high}}(\mu)$$

w.r.t. μ. The function f is continuous in μ if (53) holds. The roots of f are

$$\mu = 0$$

and

$$\mu = -\frac{2}{q\phi_0^2}.$$

Consider the interval $C := (0, \mu^*)$. As the function f is continuous for $-\frac{2}{q\phi_0^2} < \mu < \mu^*$, for any given parameter combination $\left(k, \phi_0, q, \widehat{W}_2, m_{\text{fix}}\right)$ f will be either positive or negative on C.

Step 4

We examine the extreme cases $q = 0$ and $q = 1$. It holds that

$$\lim_{q\to 0^+} f = \infty. \tag{54}$$

As f is continuous in $q \in (0,1]$, we conclude that in a neighborhood of $q = 0$ we can find parameters that fulfill $m_0^{\text{critical}} - m_0^{\text{high}} > 0$.

We now turn to the case $q = 1$. Consider the derivative of f with respect to μ evaluated in $\mu = 0$. If for a given parameterization of the problem this value is positive, then f will be positive on C. This would mean that $m_0^{\text{critical}} - m_0^{\text{high}} > 0$ can be satisfied for a feasible value of μ. It holds that

$$\left.\frac{df}{d\mu}\right|_{\mu=0,q=1} = \frac{3}{2} - \frac{3}{4}k\phi_0 - \frac{3}{4}\phi_0^2\left(\widehat{W}_2 - m_{\text{fix}}\right) > 0$$

if

$$\widehat{W}_2 - m_{\text{fix}} < \frac{2 - k\phi_0}{\phi_0^2}. \tag{55}$$

Only in this case is it possible to fulfill $m_0^{\text{critical}} - m_0^{\text{low}} > 0$, otherwise not. If

$$\frac{2 - k\phi_0}{\phi_0^2} \leq 0,$$

then requirement (55) contradicts the assumption $\widehat{W}_2 > m_{\text{fix}}$.

■

The proof of Proposition 9 reveals that if the reelection mechanism is taken into account it is not always possible to design a welfare-increasing pension system with choice where the populist is indifferent between the schemes. Imposing the indifference requirement entails more than technical simplification. A *PSC* satisfying this condition enables statesmen with relatively low β to implement long-term policies, while ensuring that populists increase effort by choosing the flexible scheme. Hence the indifference condition offers the best opportunity for the *PSC* to increase welfare.

10.3 Extended System with Choice

Proposition 9 gives a formal account of the complication with the pension system with choice. In section 8 we introduced the extended pension system with choice. We proceed here by formalizing the observations listed there. The sequence of events is as described in subsection 10.1.2.

Theorem 2

If

$$\beta > \beta^{crit2} = \frac{q^2}{4}(\phi_0^2 - \phi_1^2)(\widehat{W}_2 - m_{fix})^2 + \frac{qk}{2}(\phi_0 - \phi_1)(\widehat{W}_2 - m_{fix}),$$

then there exists a $PSC^{ext}(m_{fix}, m_0, \mu)$ *for every feasible problem parameterization* $\left(k, c = 1, \delta = 1, \phi_0, \phi_1, q, \widehat{W}_2\right)$ *such that*

(i) S chooses the fixed scheme, $I = 1$ *and* $e = \dfrac{k + q\phi_1(\widehat{W}_2 - m_{fix})}{2} := e_{fix}^{opt,ext}$*;*

(ii) P chooses the flexible scheme, $I = 0$ and

$$e = \frac{k + \mu\phi_0(1-q) + q\phi_0(\widehat{W}_2 - m_{fix})}{2} := e_{flex}^{opt,ext};$$

(iii) effort exerted under a flexible scheme is higher than under a fixed scheme for all $0 \leq q < 1$;

(iv) expected expenditures under the extended pension system with choice and under the current standard fixed pension system are equal.

Proof of Theorem 2

Parts (i), (ii), and (iii)

W.l.o.g. we assume $q \neq 0$. The effort levels exerted by P and S solve the maximization problems of the respective utility functions w.r.t. e given the pension schemes within the extended pension system with choice. The expected utilities for the populist are given as

$$\begin{aligned}
&(U(P)|\text{fix}^{\text{ext}} \ \& \ I = 0) \\
&= (1-q)(ke - e^2 + m_{\text{fix}}) + q(ke - e^2 + \phi_0 e\widehat{W}_2 + (1-\phi_0 e)m_{\text{fix}}),
\end{aligned}$$

and

$$\begin{aligned}
&\mathbb{E}(U(P)|\text{flex}^{\text{ext}} \ \& \ I = 0) \\
&= (1-q)(ke - e^2 + m_0 + \mu\phi_0 e) + q(ke - e^2 + \phi_0 e\widehat{W}_2 + (1-\phi_0 e)m_{\text{fix}}).
\end{aligned}$$

The expected utilities for the statesman are given analogously as

$$\begin{aligned}
&\mathbb{E}(U(S)|\text{fix}^{\text{ext}})_I \\
&= (1-q)(ke - e^2 + m_{\text{fix}} + \beta I) + q(ke - e^2 + \phi_I e(\widehat{W}_2 + \beta I) + (1-\phi_I e)(m_{\text{fix}} + \beta I))
\end{aligned}$$

and

$$\begin{aligned}
&\mathbb{E}(U(S)|\text{flex}^{\text{ext}})_I \\
&= (1-q)(ke - e^2 + m_0 + \mu\phi_I e + \beta I) + q(ke - e^2 + \phi_I e(\widehat{W}_2 + \beta I) + (1-\phi_I e)(m_{\text{fix}} + \beta I))
\end{aligned}$$

Note that the populist always exerts higher effort under the flexible scheme than under the fixed scheme. Effort levels are equal between the schemes only when $q = 1$, i.e. when the officeholder will stand for reelection with certainty.

The populist chooses the flexible scheme only if the resulting expected utility is higher than with the fixed scheme. This holds when

$$m_0 > m_{\text{fix}} - \frac{2q\mu\phi_0^2(\widehat{W}_2 - m_{\text{fix}}) + (1-q)\mu^2\phi_0^2 + 2k\mu\phi_0}{4}. \tag{56}$$

which follows from comparing the expected utilities in both cases. Analogously, the statesman chooses the fixed scheme if

$$m_0 < m_{\text{fix}} - \frac{2q\mu\phi_1^2(\widehat{W}_2 - m_{\text{fix}}) + (1-q)\mu^2\phi_1^2 + 2k\mu\phi_1}{4}, \tag{57}$$

where we have assumed that β is so large that he chooses $I = 1$. As $\phi_0 > \phi_1$ there exists a non-empty interval of m_0 values such that the two types of officeholders choose different schemes, provided β is sufficiently high. By setting m_0 equal to its lower bound in Inequality (56), we make the populist indifferent between the two pension schemes. In this setting, the lower bound on β ensuring that the statesman implements a long-term policy has to satisfy

$$\begin{aligned}
&\mathbb{E}(U^{\max}(S_{\text{flex}}^{\text{ext}}))_{I=0} = \mathbb{E}(U^{\max}(P_{\text{flex}}^{\text{ext}})) = \mathbb{E}(U^{\max}(P_{\text{fix}}^{\text{ext}})) < \mathbb{E}(U^{\max}(S_{\text{fix}}^{\text{ext}}))_{I=1} \\
&\Leftrightarrow \frac{(k + q\phi_0(\widehat{W}_2 - m_{\text{fix}}))^2}{4} + m_{\text{fix}} < \frac{(k + q\phi_1(\widehat{W}_2 - m_{\text{fix}}))^2}{4} + m_{\text{fix}} + \beta \\
&\Leftrightarrow \beta > \frac{q^2}{4}(\phi_0^2 - \phi_1^2)(\widehat{W}_2 - m_{\text{fix}})^2 + \frac{qk}{2}(\phi_0 - \phi_1)(\widehat{W}_2 - m_{\text{fix}}) := \beta^{\text{crit2}}.
\end{aligned}$$

Part (iv)

Budget neutrality can be shown in the same way as in Theorem 1.

■

We note that if a reelection mechanism is taken into account, it is no longer possible in this setting to motivate *every* statesman to implement a long-term policy, but only those that have a sufficiently high value of β or a sufficiently low value of q, meaning that they do not wish to stand for reelection. This occurs because choice $I = 1$ impairs their reelection chances and this loss can only be compensated by β. Once again, the indifference requirement for the populist ensures that condition $\beta < \beta^{\text{crit2}}$ is the weakest possible condition. It arises under a pure fixed scheme (current standard scheme) as well. Hence the extended pension system with choice does not deter any more statesmen from choosing $I = 1$ than the pure fixed scheme and gives populists an incentive for higher effort.

The characterization in Theorem 2 and the budget requirements enable us to make welfare comparisons.

Corollary 3

The extended pension system with choice is welfare-enhancing

- *with respect to the fixed pension scheme, as populists work harder in their last term,*

- *with respect to the flexible pension scheme, as all statesmen implement a long-term policy if* $q = 0$*,*

- *with respect to the pension system with choice, as the system can be applied to all problem parameterizations.*

Restricted to last-term situations, the extended pension system with choice is equivalent to the pension system with choice, which is welfare-increasing by Corollary 2. If $q = 1$, the impact of the extended system with choice is equivalent to that of a fixed scheme. The effort exerted in this case is

$$e = \frac{k + \phi_I(\widehat{W}_2 - m_{\text{fix}})}{2}, \tag{58}$$

which is larger than the effort

$$e = \frac{k + \mu\phi_I}{2}$$

exerted in a last term under the flexible scheme within the pension system with choice if and only if $\widehat{W}_2 - m_{\text{fix}} > \mu$.

Note that if the incumbent is rejected in the elections, his pension level is equal to m_{fix}. Even in the case of $q = 1$, an extended pension system with choice creates higher effort incentives, as the fixed pension level under the system with choice is lower than the pension amount in the current fixed scheme because of budget neutrality as in Proposition 7. We note that for $q = 1$ the incumbent is indifferent between the fixed and flexible scheme, as he will never be subject to the flexible scheme.

Appendix C: Notation

e	politician's level of effort
$\bar{e}$	maximum level of effort
$\hat{e}$	level of effort under the fixed pension system
b	utility of a representative voter
k	constant coefficient in the per-capita benefit equation $b = ke$
c	constant coefficient defining the cost of exerting effort
m	pension level
I	indicator variable, $I = 1$ stands for the implementation of the long-term policy
β	future benefit for the statesman if he implements the long-term policy
fix	fixed scheme under the pension system with choice
flex	flexible scheme under the pension system with choice
$\hat{m}$	pension amount under current scheme
m_{fix}	pension level under the fixed pension scheme
m_{flex}	pension level under the flexible pension scheme
W	welfare function
α	weight of the level of effort in the welfare function
m_0	fixed pension payment under the flexible pension scheme
s	vote share: $s = \phi_I e + \varepsilon$
μ	coefficient determining the level of flexible payment within the flexible scheme
ϕ_I	coefficient in the vote share depending on I, it holds $\phi_0 > \phi_1$
ε	random factor in the vote share
$\bar{\varepsilon}$	upper boundary of the support interval for the random variable ε
m_0^{low}	value of m_0 for which P is indifferent between fix and flex
m_0^{high}	value of m_0 for which S is indifferent between fix and flex
g	coefficient giving the benefit deriving from future career opportunities
w	probability that the incumbent is a statesman
q	probability that the politician wishes to stand for reelection
$\widehat{W}_2$	benefit for the politician of holding office in period 2
r_I	probability of reelection in period 2 in dependence of I
T	type of officeholder (S or P)
Φ	indicator function

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