

Contents lists available at [ScienceDirect](#)

Journal of Public Economics

journal homepage: www.elsevier.com/locate/econbasePolicymakers' horizon and the sustainability of international cooperation[☆]Paola Conconi^{a,b,*}, Nicolas Sahuguet^{b,c,d}^a *Université Libre de Bruxelles (ECARES), Belgium*^b *CEPR*^c *HEC Montréal, Canada*^d *CIRPEE, Canada*

ARTICLE INFO

Article history:

Received 23 June 2008

Received in revised form 19 November 2008

Accepted 30 November 2008

Available online 6 January 2009

JEL classification:

C72

D72

F00

Keywords:

Self-enforcing cooperation

Re-election incentives

Term limits

ABSTRACT

This paper examines the impact of policymakers' horizon on the sustainability of international cooperation. We describe a prisoners' dilemma game between two infinitely-lived countries run by policymakers. We show that re-election incentives can act as a discipline device, making it easier to sustain cooperation between policymakers with finite but potentially renewable mandates than between infinitely-lived policymakers. We also show that, when voting suffers from a recency bias, policymakers may have incentives to "collude" to get re-elected and term limits may help international cooperation.

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1. Introduction

In the absence of a supranational authority with direct powers to punish violations, governments can only be expected to comply with international agreements if doing so is in their self interest. Even when a country can gain in the short term by cheating on its partners, it will behave honestly for fear of future punishments. The increasingly vast literature on self-enforcing international agreements shows how cooperation among countries can be sustained by credible threats among the parties involved as long as they engage in long-term relationships.¹

Achieving international cooperation through repeated interaction may, however, be difficult given that, although countries may live on indefinitely, they are run by policymakers who have a shorter tenure. This issue has been completely disregarded by the existing literature that assumes that policymakers share the same infinite horizon as their countries. This paper examines how international cooperation can be sustained between policymakers with finite but potentially renewable mandates.

[☆] Paola Conconi acknowledges support from the FNRS. Nicolas Sahuguet acknowledges support from FQRSC. Earlier versions of this paper were presented at the Mid-West International Economics Group Spring Meeting at Vanderbilt University, at the 2006 Annual Meeting of the European Economic Association in Vienna, at the 2006 Annual Meeting of the Public Choice Society in New Orleans, at the 2006 Annual Meeting of the Canadian Economic Association in Montréal and at seminars at the Tinbergen Institute, Warwick University, Princeton University, Boston University, Tilburg University, and HEC Montréal. We wish to thank the participants for their comments. We are also grateful to Mathias Dewatripont, Gene Grossman, Georg Kirchsteiger, Patrick Legros, Giovanni Maggi, Abhinay Muthoo, Andy Newman, Carlo Perroni, and Ray Riezman, for their valuable suggestions. We thank the associate editor, Antonio Merlo and an anonymous referee for their comments. The usual disclaimer applies.

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¹ See, for example, Bagwell and Staiger (1997), Maggi (1999), and Bond and Park (2004) on trade agreements and Conconi and Perroni (2006) on environmental agreements.

Putnam (1988) was the first to stress that domestic and international politics are fundamentally intertwined. Subsequent studies have investigated the impact of domestic electoral considerations on international cooperation in various policy areas, including fiscal (Tabellini, 1990), monetary (Lohmann, 1993) and trade policy (Grossman and Helpman, 2005; Ornelas, 2005). However, somewhat surprisingly given the importance of enforcement problems in international relations, none of the existing studies has examined how policymakers' horizon affects the sustainability of international cooperation.

We describe international relations by means of a repeated prisoners' dilemma game² between two countries run by policymakers with finite but potentially renewable mandates. We examine under what conditions the efficient cooperative equilibrium is sustainable – if at all – under the three scenarios in which an agent's life span is infinite, endogenously determined or finite, depending on whether the renewal of her mandate is certain, possible or impossible.

We consider first a scenario in which policymakers share the same *infinite* horizon as their countries. This is the benchmark case of the existing literature on self-enforcing international agreements and is equivalent to a situation in which policymakers' mandates are automatically renewed. In this framework, we derive the minimum degree of patience which guarantees that the efficient cooperative equilibrium is sustainable.

We then examine the case in which re-election is possible but not certain. In particular, we assume that voters behave retrospectively, deciding whether or not to re-elect their leader on the basis of her performance during the previous mandate. In this case, the horizon of an agent is *endogenously determined* by her actions. The choice of the particular voting rule needs to be discussed. We assume that voters vote retrospectively and they tend to re-elect a leader who brought a high payoff to her country during her mandate. The first way to defend these assumptions comes from the ample empirical evidence showing that the likelihood that a policymaker is re-elected at the end of her mandate depends of the economic benefits she managed to bring to her constituency during her previous term in office (e.g., Fiorina, 1981; Besley and Case, 1995; Lohmann et al., 1997; Lewis-Beck and Stegmaier, 2000). The second reason is that this is somehow the worst-case scenario for cooperation. In particular, if voters prefer policymakers who maintain international agreements, it is then easier to discipline policymakers and electoral incentives have only advantages. We discuss alternative voting rules in Section 4.3.

When re-election depends on past performance, cheating on a foreign partner generates two effects: a short-term “re-election boost”, which tends to decrease the severity of the punishment for defecting from cooperation; and a long-run “re-election penalty”, which works in the opposite direction. If the latter effect dominates, the minimum discount factor which allows to sustain cooperation over time will be lower when policymakers have finite but renewable mandates than in the case of policymakers who stay in power forever. Therefore re-election incentives can discipline policymakers and make international cooperation easier to sustain.³

The threat of losing office can help cooperation: country leaders subject to the renewal of their mandate have shorter expected life spans than automatically re-elected leaders and are thus less prone to cooperate; but the fear of losing the benefits from holding office can make them less likely to defect from agreed-upon policies.

We finally look at the case in which politicians' life span is *exogenously fixed*. This happens when policymakers face term limits. We build on the existing literature on the sustainability of cooperation between organizations run by agents with finite tenures (e.g., Crémer, 1986; Salant, 1991; Kandori, 1992; Smith, 1992). The novelty is to allow for agents' re-election, considering not only the case of exogenously-fixed mandates but also the case of endogenously-determined life spans. Conventional economic wisdom would lead to the conclusion that term limits impede policymakers to engage in long-term relationships and thus hinder the degree of international cooperation that they can sustain. We show that term limits can indeed be detrimental to international cooperation, since they eliminate the discipline effect of electoral incentives. However, term limits may actually be desirable if voting exhibits a recency bias, i.e., if voters attach more importance to recent events when deciding whether or not to re-elect a politician.

The paper also contributes to the relatively small literature that has tried to explain the existence of term limits. This literature has mainly been concerned with legislative term limits rather than with term limits imposed on countries' executives. Dick and Lott (1993) argue that voters have incentives to re-elect their representative given that seniority brings bargaining power in Congress. This leads to a bias toward re-electing inefficient incumbents and also gives bad incentives to politicians. Term limits, by reducing the seniority effect, can be beneficial. Glazer and Wattenberg (1996) argue that term limits shift politicians' incentives toward more efficient policies and away from pork barrel legislation that brings electoral success. Glaeser (1997) describes a model in which a right-wing and a left-wing party have an equal probability of winning the first election. However, an exogenous incumbency advantage ensures that the party which wins the first election is also re-elected for further terms in office. In this setting, term limits may be self-imposed by risk-averse voters, who prefer cycling between left and right wing candidates to a once-and-for-all election that imposes a candidate on the entire electorate.

We provide a new rationale for executive term limits: we argue that, if country leaders have staggered mandates and their re-election chances depend significantly on their recent performance, they will have incentives to “collude” to get re-elected, at the expense of efficient cooperation between their countries. In particular, a policymaker who is not facing an election in the short run (whose current performance has little effect on her future chances of re-election) can accommodate a defection by a policymaker

² Many problems linked to the provision of international public goods such as a clean environment or international security are characterized by the basic incentive structure of a prisoner's dilemma: although every country prefers the provision of the public good, it has an incentive to free-ride on the efforts of other countries.

³ The literature on electoral business cycles has emphasized the electoral boost effect (see for instance Nordhaus, 1975; Rogoff, 1990; and Rogoff and Siebert, 1988). However, in these models, there are no long-term negative consequences of politicians' strategic behavior.

Table 1
Prisoner's dilemma–countries' payoffs

		A	
		C	D
B	C	(Π^C, Π^C)	(Π^P, Π^D)
	D	(Π^D, Π^P)	(Π^N, Π^N)

in the other country who is up for re-election (whose current performance has a crucial impact on her immediate chances of re-election), expecting to receive a similar concession later in her mandate. In this case, we show that the introduction of term limits may actually help to achieve more international cooperation.

The remaining of the paper is organized as follows. In Section 2, we describe a prisoners' dilemma game between two infinitely-lived countries. Section 3 considers the case of automatically renewed mandates. Section 4 looks at the case of renewable mandates and examines the impact of re-election incentives on the sustainability of international cooperation. Section 5 examines the case of term limits. Finally, Section 6 concludes.

2. A model of international cooperation

We describe international relations by means of a repeated prisoners' dilemma (PD) game between two countries, *A* and *B*, each represented by a policymaker with a finite but potentially renewable tenure. This general set-up can be used to model international relations in areas such as trade, environment or security.

As in any standard prisoners' dilemma, each country chooses one of two strategies, either “cooperate” or “defect”. Failure to cooperate reduces the welfare of the two countries. Countries' payoffs are given in Table 1.

Each country gains when both cooperate, but if only one of them cooperates, the defecting country gains more. If both defect, both lose (or gain very little), but not as much as the “cheated” country whose cooperation is not returned. The following inequalities thus hold: $\Pi^D > \Pi^C > \Pi^N > \Pi^P$. We also assume that international relations are a pure prisoner's dilemma: cooperation is jointly efficient; players do better by cooperating on every round than they would do by “taking turns” – you cooperate while I defect and then I cooperate while you defect – i.e., $2\Pi^C > \Pi^D > \Pi^P$.

The model is thus a standard two-person repeated PD game with the exception that the actual players are the country leaders. Our objective is to examine the sustainability of international cooperation, when policymakers' life spans are endogenously determined by their actions. We want to compare our analysis with the two existing theoretical approaches: that of the literature on self-enforcing international agreements (e.g., Bagwell and Staiger, 1997; Maggi, 1999), which assumes that policymakers share the same payoff and the same horizon as their countries; and that of the literature on repeated games with overlapping generations of players (e.g., Kandori, 1992; Smith, 1992), which focuses on agents who share the same payoff as their organizations while in power, but have exogenously fixed life spans. For this purpose, we define the payoff of policymaker *k* in country *i* as the sum of the payoffs of her country while she is in office:

$$W_i^k = \sum_{t=0}^{\infty} \delta^t I_t^k \Pi_{i,t} \tag{1}$$

where $\delta \in (0,1)$ is the factor by which the policymaker discounts future payoffs, $\Pi_{i,t}$ is the country's payoff at time *t*, and I_t^k is an indicator variable which takes the value 1 if the incumbent policymaker is in office at time *t* and zero otherwise. Eq. (1) can be interpreted as implying that policymakers derive some rents from being in office, which are proportional to their countries' welfare. Policymakers are thus driven by their self-interest, and only care about their countries' payoffs when they are in office.⁴

The above formulation of policymakers' objectives allows us to focus on the impact of their horizon on the sustainability of cooperation. Notice that these payoffs capture policymakers' incentives in the three scenarios of interest: the case of infinitely-lived policymakers considered by the literature on self-enforcing international agreements (I_t^k is equal to unity for all *t*); the case of policymakers who cannot be re-elected considered by the OLG literature in repeated games (I_t^k is equal to one for the periods of the mandate of the policymaker and is equal to zero otherwise); and the case of re-electable policymakers, which is the focus of our analysis (I_t^k equals one for policymakers in power and zero for policymakers who fail to get re-elected, which happens with positive probability and depends on the past history of the game).

⁴ We normalize the payoff of a policymaker who is not in power to be equal to zero. The thrust of the analysis would not be affected if we allowed for some fixed office rents (see Conconi and Sahuguet, 2005) or assumed that policymakers care about their countries after they leave office (see Conconi et al., 2008).

Each mandate lasts T periods. At the end of his mandate in office, a policymaker may face “contract renewal”. To focus on the role of policymakers' horizon, we assume that all politicians have the same preferences and abilities; therefore, if a policymaker is not re-elected at the end of her mandate, she is replaced by an identical new one.

In what follows, we investigate the conditions under which cooperation in every period can be supported as a subgame-perfect equilibrium in Nash-reversion punishment strategies, whereby any deviation from C is followed by permanent reversion to the Nash equilibrium of the stage game, in which both policymakers act non-cooperatively.

3. Cooperation with no elections

This is the benchmark case of the literature on self-enforcing international agreements and is equivalent to a situation in which policymakers hold office forever, i.e., their mandates are automatically renewed.

The value of sustaining cooperation for a policymaker who stays in power forever is:

$$V_I^C = \frac{\Pi^C}{1-\delta}, \tag{2}$$

where the subscript I refers to the infinite horizon. The value of reverting to non cooperation is instead given by:

$$V_I^N = \frac{\Pi^N}{1-\delta}. \tag{3}$$

To defect from cooperation at any point in time yields one-period gains equal to $\Pi^D - \Pi^C$ but leads to reversion to the non-cooperative payoffs equilibrium Π^N forever after. The punishment associated with Nash reversion is thus:

$$\Omega_I = V_I^C - V_I^N. \tag{4}$$

Therefore a common choice of C can be supported by Nash-reversion punishment strategies as long as the following incentive constraint is satisfied:

$$\Pi^D - \Pi^C \leq \delta \Omega_I. \tag{5}$$

It follows that when policymakers are in power forever, cooperation is sustainable as long as the discount factor exceeds the following critical value:

$$\delta_I = \frac{\Pi^D - \Pi^C}{\Pi^D - \Pi^N}. \tag{6}$$

This critical discount factor is a measure of how difficult it is to sustain international cooperation: the lower is δ_I , the less weight policymakers need to attach to future periods for the efficient cooperative equilibrium to be sustainable by threat of Nash reversion.

4. Cooperation with renewable mandates

We now examine how elections affect the sustainability of international cooperation. In particular, we will compare with the benchmark case considered in Section 3. In general, the ability of voters to hold an incumbent accountable for her policy choices should act as a powerful incentive instrument for politicians to conduct policies that voters reward with re-election. However, re-electable policymakers have shorter expected life spans than policymakers whose mandate are automatically renewed; in turn, this tends to make it harder to engage in long-term relationships and hence to hinder the degree of international cooperation that can be sustained. For simplicity, we focus on a scenario in which each player's term lasts two periods, though our analysis can be readily generalized to terms lasting N periods.

4.1. When re-election does not depend on past actions

Consider first the case in which policymakers face an exogenous re-election probability \bar{p} . Compared to the case considered in Section 3, allowing for re-election has a similar effect as adding an additional discount factor that is applied every T periods. Punishment after a deviation is always more severe in the case of infinitely-lived policymakers (equivalent to $\bar{p}=1$) than in a scenario in which policymakers can be re-elected with some given probability $\bar{p}<1$, implying that the minimum discount factor $\delta_{\bar{p}}$ necessary for cooperation is larger than δ_I . It follows that

Result 1. The efficient cooperative equilibrium is more difficult to sustain when policymakers face exogenous re-election probabilities than when they are automatically re-elected.

Proof. The punishment for deviation when policymakers face an exogenous re-election probability \bar{p} can be written as

$$\Omega_{\bar{p}} = \frac{(1+\delta)\bar{p}(\Pi^C - \Pi^N)}{1-\delta^2\bar{p}}. \tag{7}$$

It is straightforward to verify that the above expression increases with \bar{p} , so the maximum punishment for a defection is achieved under automatic re-election ($\bar{p}=1$). \square

Therefore, when policymakers face an exogenous probability of re-election $\bar{p} < 1$, sustaining cooperation over time is harder than in the case in which re-election is certain. This result is in line with the presumption that, in a repeated game between two long-lasting organizations, cooperation should be easier to achieve the longer the horizon of the agents running these organizations. A direct corollary of this result is that increasing the length of the mandates is good for cooperation, everything else equal. In the next subsection, we will see that this very intuitive result does not hold anymore when the probability of re-election depends on past actions.

4.2. When re-election depends on past actions

Let us now consider the more interesting and realistic scenario in which the life span of an agent is endogenously determined. Following a vast political science literature dating back to Fair (1978) and Fiorina (1981) (see Lewis-Beck and Stegmaier, 2000 for a review), we assume retrospective voting: voters base their decision on whether or not to keep their leader in office upon her past performance.

In particular, we shall assume that an incumbent's chances of re-election depend on the benefits she managed to bring to her country during her previous term in office. The re-election probability at period j , $p(\Pi_{j-1}, \Pi_j)$, is strictly increasing in its two arguments and is differentiable. We also assume that voters attach equal importance to the performance in each of the periods, implying $p(\Pi_{j-1}, \Pi_j) = p(\Pi_j, \Pi_{j-1})$.⁵

For a policymaker facing re-election, the value of sustaining cooperation over time is:

$$V_R^C = \frac{(1 + \delta)\Pi^C}{1 - \delta^2 p^C}, \tag{8}$$

where $p^C \equiv p(\Pi^C, \Pi^C)$ is the probability of being re-elected when both policymakers have cooperated in the two previous periods. Reversion to non-cooperation yields a continuation payoff:

$$V_R^N = \frac{(1 + \delta)\Pi^N}{1 - \delta^2 p^N}, \tag{9}$$

where $p^N \equiv p(\Pi^N, \Pi^N)$ is the probability of being re-elected during the Nash-reversion punishment phase.

Comparing Eqs. (8) and (9) with Eqs. (2) and (3), we see that elections decrease the continuation payoffs of the agents: the value of sustaining cooperation falls from $\frac{\Pi^C}{1-\delta}$ with automatic re-election to $\frac{(1+\delta)\Pi^C}{1-\delta^2 p^C}$ with endogenous re-election; similarly, the value of remaining in the non-cooperative equilibrium decreases from $\frac{\Pi^N}{1-\delta}$ to $\frac{(1+\delta)\Pi^N}{1-\delta^2 p^N}$. Thus, agents whose re-election depends on past performance discount more the future and have shorter expected life spans than agents who are re-elected with certainty. The presumption is that “more myopic” policymakers will be more likely to cheat on a foreign partner. In what follows, we shall show that this might not be the case. The intuition is that endogenous re-election leads to relative changes in the continuation payoffs of cooperation and noncooperation.

Notice that a deviation in the second period leads both to a higher per-term payoff for the country ($\Pi^C + \Pi^D > \Pi^D + \Pi^N$) as well as a higher probability of re-election for the policymaker ($p(\Pi^C, \Pi^D) > p(\Pi^D, \Pi^N)$). We can thus ignore the first-period incentive constraint and focus on the second-period constraint.⁶

The punishment associated with a second-period deviation from cooperation can be written as:

$$\Omega_R = p^C V_R^C - p^D V_R^N, \tag{10}$$

where $p^D \equiv p(\Pi^C, \Pi^D)$ is the probability of being re-elected when defecting in the last period of the mandate when the other country is cooperating. Notice that the severity of the punishment decreases with p^D and p^N and increases with p^C . A common choice of C can be supported by Nash-reversion punishment strategies as long as the following incentive constraint is satisfied:

$$\Pi^D - \Pi^C \leq \delta \Omega_R, \tag{11}$$

which identifies a critical discount factor δ_R above which the efficient cooperative equilibrium can be sustained.

The assumption of retrospective voting implies that, by defecting at the end of her mandate, a policymaker can increase the payoff of his country during the current mandate; in turn, this entails a better performance and thus higher chances of immediate re-election ($p^D > p^C$). However, cheating on the foreign partner today implies that there will be no cooperation forever after, leading to lower future payoffs and thus lower chances of being re-elected again ($p^C > p^N$).

⁵ Other voting rules are discussed in Section 4.3. The case of a “recency bias”, in which voters put more weight on (Π_j) than on (Π_{j-1}) is considered in Section 5.

⁶ The purpose of this section is to show that re-election incentives can allow to sustain the efficient cooperative equilibrium even when the discount factor is below δ_i . It can easily be shown that for that critical value of the discount factor the value of a defection in the first period is smaller than the value of deviation in the second period since $\Pi^C + \delta_i \Pi^D > \Pi^D + \delta_i \Pi^N$ and $p(\Pi^C, \Pi^D) > p(\Pi^D, \Pi^N)$. Our analysis is thus valid for values of the parameters for which the first-period incentive constraint is not binding. Notice, however, that when the discount factor is low enough, a defection might still occur in the first period.

Since re-election probabilities have no effect on the short-run deviation gains – which are equal to $\Pi^D - \Pi^C$ as in the previous scenarios – we can focus our analysis on the comparison of the punishments (Ω_R in Eq. (10)) under endogenous re-election and (Ω_I in Eq. (4) above) under automatic re-election.

When the likelihood of policymakers' re-election depends on their past performance, a deviation from cooperation generates two new effects.

Introducing re-election incentives gives rise to a short-term “re-election boost”, since a deviation in the last period of a policymaker's mandate increases not only her flow payoff, but also her probability of immediate re-election. This effect decreases the punishment following the defection and makes cooperation less appealing. However, endogenous re-election lowers the probability of holding office in the future, decreasing the expected life span of politicians. This can generate a “re-election penalty” effect, which increases the punishment for cheating on a foreign partner, thus helping to sustain international cooperation.

To see whether re-election increases or decreases the long-term punishment of defecting, we must compare the relative changes in the continuation payoffs. We can show that, if p^N is low enough compared to p^C , the long-term consequences of a deviation will be worse for policymakers whose renewal depends on their past performance than for policymakers who are automatically re-elected. In particular, we can solve for the critical re-election probability \tilde{p}^N below which retrospective voting creates a long-run re-election penalty effect:

$$\tilde{p}^N = \frac{\Pi^N - \Pi^C(1 - p^C) - \delta^2 \Pi^N p^C}{\Pi^N - \delta^2(\Pi^C(1 - p^C) + \Pi^N p^C)} \quad (12)$$

It follows that re-election incentives can enhance international cooperation if the long-run re-election penalty effect is positive (i.e., $p^N < \tilde{p}^N$) and more than offsets the short-term re-election boost effect.

Proposition 1. *Re-election incentives can make it easier to sustain the efficient cooperative equilibrium between policymakers with finite but renewable mandates than between infinitely-lived policymakers.*

Proof. A sufficient condition for this result to hold is to have $p^D = 1$, p^C approaching p^D and p^N approaching zero. Notice that this is the scenario which maximizes the punishment under retrospective voting, where the chances of an agent's re-election increase in the payoff obtained by her organization during the previous two periods mandate. In this limit case, there is no re-election boost effect and the re-election penalty effect is maximized, implying that the punishment from defecting from cooperation is more severe than in the case of automatic re-election:

$$\Omega_R - \Omega_I = \frac{\delta^2(\Pi^N(1 - p^N))}{(1 - \delta)(1 - \delta^2 p^N)} > 0. \quad (13)$$

More generally, we can look at the relative size of the re-election boost and re-election penalty effects for which Proposition 1 is satisfied. To do so, let us set $p^D = 1$ and $\delta = \delta_I$ as in the infinitely-lived case; by applying the implicit function theorem to (11), we can then find the extent to which p^N must decrease (i.e., the re-election punishment must increase) when p^C decreases (i.e., the re-election boost increases) so as to keep the incentives constraint satisfied:

$$\frac{dp^N}{dp^C} = \frac{\Pi^C(\delta_I^2 p^N - 1)^2}{\delta_I^2 \Pi^N (\delta_I p^C - 1)^2} > 0. \quad (14)$$

Expression (14) implicitly defines the locus of points \tilde{p}^N for which the re-election boost and the re-election penalty effects exactly offset each other and thus the critical discount factor is the same as in the case of infinitely-lived policymakers. This implies that electoral incentives can play a disciplining role on policymakers and thus foster international cooperation whenever $p^N < \tilde{p}^N$. □

Notice that re-election can only discipline policymakers if they have something to loose from being fired compared to remaining in office in the non-cooperative equilibrium. Therefore, given that we have normalized the payoff of not being on office to zero, for Proposition 1 to hold, we must have $\Pi^N > 0$.

4.3. Alternative voting rules

Our analysis above shows that electoral incentives can discipline policymakers and improve the sustainability of cooperation. This result has been obtained under a specific assumption on voters' behavior. The voting rule that we have considered has two main characteristics: voters behave retrospectively, looking at what a policymaker did during her previous mandate to evaluate her performance and decide whether or not to re-elect her; the evaluation of the policymaker's performance is based on the payoff obtained by the country. This has two consequences: voters prefer periods of mutual cooperation to periods of mutual defection ($p^C > p^N$), but they tend to re-elect policymakers who have just defected while the other country cooperated ($p^D > p^C$). Of course, this means that they are somehow myopic in their behavior, since they reward a short-term increase in

their welfare even if this leads to lower welfare in the future. Notice that, for elections to help international cooperation, only the first assumption is really needed. This gives rise to the long-term penalty effect discussed above. The fact that voters tend to reward defecting policymakers is not necessary for Proposition 1 to hold. On the contrary, this assumption makes it more difficult for elections to discipline policymakers, since breaking cooperation boosts the short-run chances of remaining in office.

Consider an alternative voting rule, according to which voters behave retrospectively, but prefer politicians who act cooperatively vis-à-vis the foreign country.⁷ This voting rule still implies a higher chances of re-election in periods of mutual cooperation than in periods of mutual defection ($p^C > p^N$), and hence a long-term punishment effect; however, defecting from cooperation does not give rise to a short-run electoral boost, but rather lowers the chances of immediate re-election ($p^D > p^C$). Thus the punishment for reneging on international agreements is always more severe for policymakers who are subject to periodic elections ($\Omega_R > \Omega_I$); in turn, this implies that $\delta_R < \delta_I$, i.e., the critical discount factor above which international cooperation can be sustained is lower for leaders who can lose office than for leaders who have no re-election incentives.

5. The impact of term limits

In the previous sections we have focused on the sustainability of international cooperation when policymakers's re-election is either certain or possible. We now consider a third scenario, in which re-election is ruled out by term limits. Indeed, many countries impose term limits on the executive power. For example, the United States and many Latin American countries rule out re-election after one or two terms.

Common intuition about economic transactions suggests that term limits, although justifiable from a domestic point of view,⁸ by reducing policymakers' horizons, will impede them from entering into long-term relationships and may thus hinder the degree of international cooperation that they can sustain. We show that this presumption may actually be wrong: if voters attach more importance to recent events, term limits may actually lead to more cooperation.

5.1. The last-period effect of term limits

Since her payoff is equal to the sum of her country payoffs while in office, a politician facing term limits would have incentives to defect in the last period of her mandate, given that she cannot be punished for doing so. It follows that *the efficient cooperative equilibrium is not sustainable when policymakers face term limits*.

Notice that, if the beginning and the end of the agents' mandates coincide, the only equilibrium is the repetition of the Nash equilibrium of the stage game: cooperative behavior is not possible. In this case, term limits always hinder cooperation. However, when electoral mandates overlap, some degree of cooperation between countries can be achieved.

5.2. Cooperation with staggered mandates

We now consider situations in which policymakers' of different countries have *staggered* mandates.⁹ Indeed, there is usually no single common date at which there is a complete turnover of the leadership in all countries, and each policymaker normally overlaps with different generations of policymakers from other countries.

Consider in particular a setting in which politicians' mandates last two periods and do not coincide; this is the simplest possible OLG structure: there is one period of overlap between the leaders of the two countries. Policymakers belong to two different generations: at any point in time, one policymaker is “young” and the other is “old”.

In this setting, there is no equilibrium in which a policymaker in her last period chooses to cooperate. The efficient equilibrium along which the two countries cooperate over time cannot be sustained. However, there exists a subgame-perfect equilibrium in which policymakers play *C* in the first period and *D* in the second period, and any deviation from equilibrium is punished by reversion to the static Nash equilibrium. Along this equilibrium path, countries attain a higher payoff than under no cooperation. Along the equilibrium path, a policymaker is rewarded with a “bonus” or punished when “old”, depending on her performance when “young”.¹⁰

If a policymaker in country *A* deviates when young, she is punished by the next leader of country *B*. Under this strategy profile, a policymaker has no incentives not to punish a defector, since playing *D* is better when equilibrium strategies have reverted to the static Nash equilibrium.

For a policymaker not to deviate from *C* to *D* when young, the following condition must hold:

$$\Pi^N + \delta \Pi^N \leq \Pi^P + \delta \Pi^D. \tag{15}$$

⁷ A preference for policymakers who maintain international agreements would also be consistent with forward-looking voters who anticipate the long-term consequences of a defection.

⁸ Historically, term limits arose to avoid the excessive power of the executive. In the U.S., constitutional limits were only put into place in 1951, after Franklin Roosevelt occupied the presidency for four consecutive terms. See Conconi et al. (2008) for a discussion of different types of executive term limits.

⁹ This is the type of setup considered in the literature of OLG repeated games (e.g., Crémer, 1986; Salant, 1991; Kandori, 1992; Smith, 1992).

¹⁰ This is in line with results obtained by the literature cited in footnote 9.

A necessary and sufficient condition is that the discount factor exceeds the following critical value:

$$\delta_F = \frac{\Pi^N - \Pi^P}{\Pi^D - \Pi^N}. \tag{16}$$

We can thus state the following result:

Result 2. In the presence of term limits, the best sustainable equilibrium is one in which policymakers cooperate when “young” and defect when “old”.

Interestingly, in our repeated prisoner’s dilemma setup, it is the very existence of term limits that gives rise to policy cycles. Notice that this is exactly the opposite of what is predicted by the literature on political business cycles, according to which term limits should eliminate policy cycles (e.g., Rogoff, 1990). It should also be stressed that the cyclical nature of the patterns of international relations in the presence of term limits would be attenuated if we were to extend the length of the agents’ mandate and of their overlaps.¹¹

5.3. Can term limits improve cooperation?

We now consider the possibility that term limits increase cooperation between policymakers. This can indeed be the case if voters suffer from a recency bias. As stressed for instance by Ferejohn (1986) and Sarafidis (2007), voters often attach more importance to recent events. Many studies have found evidence of this voting distortion in national elections in the United States (e.g., Lewis-Beck and Stegmaier, 2000; Eisenberg and Ketcham, 2004) and in other countries (e.g., Lohmann et al., 1997). For example, Eisenberg and Ketcham (2004), using data for national US elections from 1932 to 2000, find that only the economic performance of the last year significantly determines the incumbent’s party’s vote share.

We show that recency bias gives policymakers incentives to collude to improve their electoral prospects. In particular, they can take turn defecting just before elections when voters pay the most attention to the results. This can lead to inefficiencies that term limits can help eliminate.

5.3.1. An example of collusive behavior

Consider again the simple setup with mandates that last two periods and assume an extreme case of recency bias, in which re-election chances depend only on the second-period’s performance, i.e., $p(\Pi_{j-1}, \Pi_j) = p(\Pi_j)$. Then, if policymakers cooperate during both the first and second period of their mandates, they obtain the following continuation payoff:

$$V^C = \frac{\Pi^C(1 + \delta)}{1 - \delta^2 p_{RB}^C}. \tag{17}$$

where p_{RB}^C corresponds to the probability of getting re-elected when the country’s payoff in the last period of the mandate is Π^C . However, under recency bias, sustaining international cooperation over time – the efficient equilibrium from the perspective of the countries – might not be the best equilibrium from the point of view of policymakers. To verify this, consider an alternative equilibrium in which the two policymakers collude to increase their chances of re-election, by playing C in the first period and D just before re-election. This yields them

$$V^D = \frac{\Pi^P + \delta \Pi^D}{1 - \delta^2 p_{RB}^D}, \tag{18}$$

where p_{RB}^D is the probability of getting re-elected when the country’s payoff in the last period of the mandate is Π^D . Notice that the presence of a strong recency bias reinforces the short-term re-election boost effect, when the difference $p_{RB}^D - p_{RB}^C$ is larger than the difference $p(\Pi^C, \Pi^D) - p(\Pi^C, \Pi^C)$.

Result 3. In the presence of a recency bias in voting, policymakers of different countries may have incentives to help each other to get re-elected, at the expense of cooperation between their countries.

Proof. Whenever $V^D > V^C$ policymakers will have incentives to collude to get re-elected. It is straightforward to verify that this condition will be satisfied if and only if

$$p_{RB}^D > \frac{(1 + \delta)\Pi^C + (\Pi^P + \delta \Pi^D)(\delta^2 p_{RB}^C - 1)}{\delta^2(1 + \delta)\Pi^C}. \quad \square \tag{19}$$

¹¹ Indeed, if the stage game is repeatedly played by overlapping generations of finitely-lived players, any payoff stream that exceeds individually rational payoffs is sustainable as a subgame-perfect equilibrium as long as individuals are patient enough, and the length of the overlaps between individuals is long enough. Folk-theorem results for OLG repeated games have been proved by Salant (1991), Kandori (1992) and Smith (1992). See Benoit and Krishna (1999) for a review.

Condition (19) describes situations in which policymakers are willing to accommodate a defection in the first period – since being cheated upon and obtaining a payoff of Π_P when young does not affect their re-election probability when old – in exchange for being able to attain a defection payoff Π^D in the second period – since this maximizes their re-election chances. Therefore, if voting is strongly biased in favor of recent performance, re-election incentives are less effective in disciplining policymakers. This distortion in the voting behavior allows policymakers to trade political concessions.

Our analysis of this simple case shows that elections in the presence of a recency bias can be as bad for international cooperation as term limits. However, with longer mandates the introduction of term limits may actually lead to more cooperation.

5.3.2. An example of the benefits of term limits

Consider the following example, in which mandates last for four periods, with two-period overlaps. Let us assume that the re-election probability depends only on the performance of a policymaker over the last two periods of her mandate. In this scenario, we can show that, if policymakers are patient enough (i.e., δ approaching unity), they might have incentives to collude by playing *C* during the first two periods and *D* over the last two periods. Along this equilibrium, they will obtain a per-term payoff equal to

$$V^{DD} = \frac{2(\Pi^D + \Pi^P)}{1 - p^{DD}}, \quad (20)$$

where p^{DD} is the probability of getting re-elected when the country's payoffs in the last two periods of the policymaker's mandate are equal to Π^D . This must be compared with what policymakers could achieve by sustaining cooperation over time, i.e., by playing *C* in all four periods of their mandates:

$$V^{CC} = \frac{4\Pi^C}{1 - p^{CC}}, \quad (21)$$

where p^{CC} is the probability of getting re-elected when the payoffs of the country in the last two periods of the mandate are given by Π^C . This must also be compared with what they could attain by deviating in the last period only:

$$V^{CD} = \frac{2\Pi^C + \Pi^D + \Pi^P}{1 - p^{CD}}, \quad (22)$$

where p^{CD} is the probability of getting re-elected when the country's payoffs in the last two periods in which the policymaker is in office are Π^C and Π^D . It is straightforward to verify that, if the chances of re-election when obtaining a payoff of Π^D in the last two periods are much higher than those associated with obtaining $2\Pi^C$ or $\Pi^C + \Pi^D$, then policymakers will gain by colluding.

From the point of view of the countries, the collusive equilibrium yields a per-term payoff of $2(\Pi^D + \Pi^C)$. Notice that is not only lower than the payoff in the case with no recency bias ($4\Pi^C$), but also than the payoff they could achieve with term limits ($2\Pi^C + \Pi^D + \Pi^P$). We summarize this discussion in the following proposition:

Proposition 2. *In the presence of a recency bias in voting, the introduction of term limits may lead to more international cooperation.*

The analysis presented in this section suggests that, if voters display a strong recency bias in their appraisal of politicians' performance, we should expect policymakers of different countries to collude, trading political concessions across different time periods. In this case, re-election incentives can hinder international cooperation and the introduction of term limits may actually be beneficial. This could be a way to explain, for example, why Prime Minister Tony Blair was accused of using British troops in Iraq to assist President Bush' re-election campaign: "So many people believe that the request for a redeployment of British troops has little or nothing to do with operational needs, and everything to do with political ones. Nothing to do with Iraqi re-elections, and everything to do with American re-elections... Ahead of a British re-election next May, Blair is hoping President Bush will return the favor by helping him in his second term" (BBC News, 22 October, 2004).

6. Conclusion

We have examined the impact of electoral incentives on the sustainability of cooperation between two infinitely-lived organizations (countries) that are run by agents (policymakers) with finite but potentially renewable mandates.

In general, making the contract of the agents endogenously renewable can help cooperation between their organizations. On one hand, "mortal" agents have shorter expected life spans than "immortal" agents and this makes them less prone to cooperate; on the other hand, the "fear of dying" and loosing the benefits associated with holding office can have a disciplining effect, making "mortal" agents less likely to defect from agreed-upon policies.

Our results suggest that both the degree of international cooperation sustainable between countries and the nature of the policy patterns – stationary or cyclical – should depend crucially on the following domestic political features: the type of political regime of the countries involved (democratic or autocratic); whether or not country leaders face term limits; and the way voters evaluate the past performance of incumbents when deciding on their re-election.

Our analysis also contributes to the debate over the desirability of term limits. The presumption is that term limits will impede policymakers to engage in long-term relationships and thus hinder the degree of international cooperation that they can sustain.

The analysis carried out in this paper shows that this presumption may be wrong if the chances that incumbent policymakers get re-elected depend on the recent economic performance of their countries; in this case, the introduction of term limits may actually allow to sustain more cooperation between countries, by eliminating policymakers' incentives to "collude" to get re-elected.

The theoretical model presented in this paper can be applied to study differences in the patterns of international cooperation between dictatorships – in which leaders are not subject to re-election – and democracies – in which incumbent leaders are subject to re-election. It would be interesting to consider various aspects of international relations, such as negotiations between heads of state on trade, transboundary pollution or arm controls, though some policy areas may be more responsive to electoral incentives than others. Our analysis could also be applied to the study different types of ongoing organizations managed by individuals with shorter tenures. For example, one could examine the sustainability of collusion between oligopolistic firms run by managers, under alternative assumptions about the renewal of the managers' contracts.

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