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Economics of Constitutional Games

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Prohlášení

Prohlašuji, že jsem diplomovou práci vypracoval samostatně a použil pouze uvedené prameny a literaturu.

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Abstract

Economics of Constitutional Games

This study inquiries into the possibility of emergence of a constitutional arrangement. It concentrates both on bilateral and multilateral games resulting into a constitutional contract. For 2-person and n-person setting, the author specifies conditions under which a contract, either complete or incomplete, can be agreed upon.

A simple version of a constitution is proved to arise in Section One, however this has been possible under specified conditions of credibility; therefore, two models of credibility are constructed. The solution holds but for a complete bilateral constitution. In multilateral setting, a perfectly specified constitution is unavailable unless external incentives are introduced.

In Section Two, uncertainty of upcoming collective dilemmas along with homogenisation of players behind the “veil of uncertainty” are assumed to allow for an incomplete constitution to emerge. This section might explain why a constitutionally approved entity, for example the reconstituted European Union, might be in the long term a welfare-enhancing device for all parties.

Any incomplete contract necessarily sets limits to misuse of rights created. In Section Three the author chose division of power as an instrument improving efficiency of decision-making. In spite of additional costs imposed on decision-makers (constrained discretion, neglected in author’s model), expected benefits of division of power may override expected costs, and thus be approved by a constitutional convention.

The paper takes perspective of game theory, public choice, and specifically constitutional economics in attempts to demonstrate that constitutions solving collective dilemmas (public goods, externalities etc.) have a chance to be adopted in the course of a constitutional game. By means of discretion-restraining tools, like separation of powers, constitutions also lower costs of the government operation.

JEL Classification: C7, D7, H1

Keywords: constitutional economics, non-cooperative game theory, separation of powers

Abstrakt

Ekonomie konstitučních her

V této práci se autor zabývá podmínkami, za jakých může vzniknout ústavní kontrakt. Mohou ekonomicky uvažující aktéři schválit neúplný kontrakt? Jaká ustanovení budou v kontraktu obsažena, konkrétně budou obsahovat dělbu moci? Na tyto otázky odpovídá ekonomie konstitučních her.

V první kapitole jsou identifikovány podmínky, za nichž ústavní kontrakt může zvrátit nekooperativní výsledky kolektivních dilemat. Na bilaterální úrovni vznikne ústava pouze tehdy, pokud strany disponují možností vzájemné kredibilní hrozby. Pomocí dvou modelů jsou uvedeny minimální hodnoty kredibility.

Problémem pro konstituční hry je multilaterální jednání, v nichž mají ekonomicky uvažující strany podnět stát se “černým pasažérem” kooperace a nebýt posléze postiženy. V podmínkách jistoty o podobě sdílených politik k ústavnímu kontraktu nemůže dojít, nejsou-li přítomny jiné podněty: koalice, hierarchizace zemí, případně selektivní postihy a odměny pro konkrétní rozhodovatele.

Druhá kapitola nastiňuje řešení multilaterálního patu pomocí neúplného ústavního kontraktu. Zavádí se nejistota ohledně pozice hráče. Racionální hráč s averzí k riziku přijme ústavní pravidla, která zajistí kooperaci v případě budoucích dilemat.

Ústavou musí být stanoveny jednoznačné rozhodovací procedury. Jejich problémem je, že postihují minority a že rozhodovací orgány trpí problémem principála a agenta. Obsahem třetí kapitoly je proto jedno z možných řešení, a to dělba moci. Modelově je prozkoumána funkce horizontální dělby moci a konstatuje se zvýšení efektivity, pokud je zavedena skrze systém dvoustupňového společného rozhodování.

Práce ukazuje, že ústavy (např. pro Evropskou Unii) mohou vzniknout smluvně z ekonomických úvah smluvních stran a mohou být teoreticky krokem k blahobytu všech stran. Aby byly efektivní, musí zároveň obsahovat jisté pojistné mechanismy, z nichž se autor soustředí na dělbu moci.

JEL klasifikace: C7, D7, H1

Klíčová slova: konstituční ekonomie, nekooperativní teorie her, dělba moci

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Introduction

Economic science defines constitutions as incomplete multilateral contracts adopted under the rule of unanimity. Unlike political theory that is concerned with normative properties of so-defined complex contracts (i.e. unanimous acceptance, thus justification), economics tackles their efficiency. Constitutional economics, in particular, inquires into the possibility of emergence of a constitutional arrangement as such. Can self-interested rational decision-makers pass approval to an incomplete multilateral contract? In what way do the economising players calculate benefits and costs arising with collective decision-making? Specifically, of available decision-making rules, will they opt for the division of power as an insurance mechanism? These topics are subjects of my primary concern.

Put simply, can – for example – a constitutionally defined European Union be *ex ante* welfare-enhancing for all parties? Is constitution inevitable for arriving at more effective decision-making procedures? I incline to an affirmative answer.

At the outset, I allow the results of non-cooperative game theory to illustrate deadlocks of collective dilemmas. Next I will be searching for a constitutional treatment to the Pareto-inferior equilibria.

As early as in Section One, the simplest version of a constitution will arise. This will only be possible under specified conditions of credibility, however, and the solution will hold merely for a complete bilateral constitution. In multilateral setting, a perfectly specified constitution is likely to be unavailable unless external incentives are introduced.

In Section Two, a more complicated way to escape the free-riding incentives is to be introduced. The hint is in assumption of uncertainty of upcoming collective dilemmas (uncertain parameters of public good production, or uncertain payoffs in games etc.) along with homogenisation of players behind the “veil of uncertainty”. This section might explain why a constitutionally approved entity, for example the reconstitutionalised European Union, be *ex ante* welfare-enhancing for all parties.

An incomplete contract must set clear decision-making procedures for an inherently unclear environment. Because of implausibility of benevolent despot assumption, granting discretionary power to a superior body is risky. That is why a constitution

necessarily sets limits to decision-making. Numerous decision making rules regarding both horizontal and vertical division of power, voting rules, and constitutional safeguards are available.

Therefore, in Section Three I choose division of power to elaborate as an instrument improving efficiency of decision-making. In spite of additional costs imposed on decision-makers (constrained discretion), expected benefits may override expected costs, and thus be approved by a constitutional convention.

To sum up, the paper takes perspective of constitutional economics and attempts to demonstrate that a constitution solving collective dilemmas (public goods, externalities etc.) has a chance of adoption in the course of a constitutional game. However, any solution is costly because of publicly induced dilemmas and government failures. That is why an efficient constitution, that aims at the highest likelihood of enactment, is bound to search for improvements in efficacy – by division of powers or any other means.

1 Complete contracts

1.1.1 Introduction

Social dilemmas are those situations when activities independently pursued by individuals in self-interest lead to sub-efficient outcomes, i.e. outcomes that are Pareto-inferior to another feasible outcome. In order to improve welfare of the individuals, their choices must be paradoxically constrained, and often a collective decision-making must take place. The act of creating rules and/or giving discretion to a collective body shall be called a *constitutional act*. If this act is done unanimously, it is a *constitutional contract*.

There is a question whether such welfare-enhancing measures can be adopted by the individuals who are not only aware of the *suboptimality of the status quo*, but also consider the *opportunity to free ride* in the collective arrangement. Although they appreciate potential of cooperation, they are tempted not to pledge to cooperate in expectation of sharing non-excludable gains.

In this section, I show that under full certainty, there are sufficient incentives for two economic men to overcome a bilateral dilemma by a welfare-enhancing constitutional contract. In n-person setting, the picture gets more blurred, however; an opportunity for constitutional contract arises again in a further section after uncertainty is incorporated in the analysis.

1.1.2 Economists about constitutional contracts

The question raised here is not new. *Game theory*, as developed in late 1940ies, has been studying individual decision-making with external effects. Game theorists defined games whose outcomes depend not only on individual activity, but also on choices of other individuals (for a summary, see Ordeshook 1984). Accordingly, they have discovered so-called social (collective) dilemmas for which happens that self-enforceable agreements are not always Pareto optimal, and Pareto optimum is not necessarily an equilibrium (for detailed definition, see Section 1.2.1).

From the perspective of orthodox public economics in 1950ies, the dilemmas should be solved by an exogenous agent, i.e. the government. As a collective dilemma had not a

self-enforceable cooperative solution, a contractual (market-like) arrangement solving collective dilemmas was found impossible. This normative standpoint has been questioned by constitutional economics, anyway.

It is not an exaggeration to claim the seeds of constitutional economics, or constitutional political economy, were planted by already in the 19th century. Knut Wicksell (1896) then declared a tax should ideally be approved unanimously in order to make all participants benefit from the budget, i.e. from collective tax-and-transfer action. Yet Wicksell somehow overlooked the main problem with collective action – strategic behaviour, or free riding. Its consequences have been largely elaborated by Olson (1962), with implications to the economic growth in Olson (1982).

Buchanan and Tullock (1962) found a "solution" (or quasi-solution) to the problem by their definition of veil of ignorance. Incomplete contracts have been introduced to abandon the problem of strategic behaviour in groups with more than two people. By doing so, they virtually re-launched the contractual approach within economics. Even more importantly, Buchanan and Tullock (1962) put the institution of government into consistency with paradigm of *homo oeconomicus*, both in role as politicians, and voters. So, it is not far-fetched to say that created a masterpiece.

Their notion of constitutional contract has had huge impact on economics, political science, and political philosophy. As I mentioned, they stressed incomplete contracts adopted under veil of uncertainty. Moreover, they discussed social contracts, and their findings are to be related to implicit contracts in general.

Nevertheless, pondering upon implicit constitutions (including broadly understood social contracts) and explicit constitutions at the same time may lead to a lot of misunderstandings. That is why I have rather concentrated upon explicit constitutional contracts only, which makes my work distinct from theirs. My approach suits, for instance, problems existing between states or between groups in developing countries. It is not directed toward the problem of efficiency of national government in developed democracies which was the central issue of Buchanan and Tullock.

Besides this constitutional stream of the public choice, some research has been done concerning procedures bringing about different constitutional rules. Elster (1991) studied constitutional conventions, particularly what consequences had time limits, super-majorities and election rules. I must not omit classic study by Charles Beard

(1913/1986) explaining the rules of the U. S. Constitution via the interests of the members of Philadelphia Convention. McGuire and Ohsfeldt (1996) conceptualise the behaviour of the representatives to the conventions within the realm of the principal-agent model and find differences between their interests and constituents' interests. Voigt (1999) provides with a theory of constitutional change, but implicit and explicit; the study is also currently the most representative survey of positive approach of constitutional economics.

Since I have not encountered a systematic exploration comparing emergence of complete and incomplete contracts, I decided to make my own survey, review the topics, and suggest my own solutions. One explanation why no comprehensive treatment of constitutional games exists so far is that too many restrictions must be made to make the models viable. Partial findings have been established, but there might be large unexplored areas with plenty of blind alleys to survey.

Mueller (1984, p. 417) point out to the necessity of studying constitutional games: "[D]espite its obvious importance in the theory of public choice, the constitutional stage itself has been essentially neglected." In addition, Elster (1993, p. 174) deplores that there is not a single paper describing the process of constitution-making from a general perspective. Besides these urges, I have been attracted to the topic also for non-theoretical reasons. In specific, I have been largely motivated by the contemporary discourse on the virtues and vices of the European constitution. Within the realm of political economy, I have been missing a systematic exploration of whether such a multilateral contract can ever be welfare enhancing for all parties. I attempted at demonstrating a different perspective comparing to those who first assess goals, and then define optimal political architecture. Simply, if economics has been able to describe how massive gains from trading come into being, it should also be able to demonstrate if gains from collective action can emerge via multilateral political exchanges.

Hence, my study can be applied to e.g. non-existence of superior enforcement mechanism relates to international law cases (Non-Proliferation Treaty, for instance), civil wars in Africa, and the creation of the Constitution for the European Union.

As regards the division of power tackled in Section 3, I have at first perceived it as an instrument pushing majoritarian procedures towards unanimous procedures. Having

had read Persson, Roland and Tabellini (1997) I came to grasp that the separation of powers, with two-stage decision-making of separated political agents, can also limit the abuse of power.¹ This is important for an incomplete constitutional contract which includes a variety of insurance clauses.

The logic of reasoning of economics of politics

Constitutional contracts seem quite unfamiliar to scholars educated in mainstream economics. Yet there is a simple four-step logical path towards recognition of their relevance. The path sketches a very simplified development towards constitutional contracts:

1. Public economics (or, normative public finance)

First, the functions of political sphere is subjected to economic reasoning. Here the economics of politics virtually starts. Political provision of public goods, regulation of externalities, and redistribution as social insurance are introduced both as descriptive and prescriptive economic concepts.

2. Social choice (or, public choice in a narrow sense)

In second step, it is possible to study political procedures and their outcomes. As their outcomes have identifiable allocation and distributive properties, they can be subject to economic interest. In normative branch of this argument, there are attempts to improve procedures so as to provide more desirable allocation and/or redistribution.

3. Public choice (or, new political economy)

Economist's paradigms of optimisation and market exchange allow for studies of political behaviour of any sort. Economics of bureaucracy, credibility of central banks, political rent-seeking, incentives of politicians when supplying public goods and creating regulation, political economy of economic reforms, and non-democratic politics can all be studied by the same methodology.

4. Constitutional economics (or, constitutional political economy)

¹ There are, anyway, other justifications of divided power. One of them can be found in Alesina and Rosenthal (1995).

Further, there is an attempt to explain even *origin* and continuation of political authority by economic terms – i.e. by self-interest, and exchange. It became a question for an economist whether a democratic arrangement is rational from economic point of view.

Postulating economising behaviour only, several economic theories of the state have been developed (Holcombe 1994, Olson 1993, Rothbard 1973). By using an exchange paradigm as the additional input, Buchanan and Tullock founded constitutional economics. The exchange paradigm is especially relevant in democratic regimes where legitimacy is derived mainly by explicit (or tacit) consent with the basic rules. Constitutional economics can explain emergence of any political authority, anyhow, not only a national state.

However, in my work I am not interested in the complex issue of the constitutions of polities, and merely focus on logic of explicit constitutional contracts. This makes the study purely descriptive.

1.1.3 Institutions for voluntary exchanges

Of economic profession, there are but a handful of economists who see no economic role for constraining institutions. The "anarcho-capitalist" idea can mostly be identified in the Rothbardian stream of Austrian Economics (Rothbard 1973). In mainstream public economics, the need of governmental intervention has been identified as regards externalities, public goods, and market imperfections, and the political authority is divided into ideally three branches – Allocation, Redistribution, and Stabilisation branch (Musgrave, 1959).

Since rapid growth of neoinstitutional economics and rebirth of the institutional stream of Austrian Economics (e.g. Hayek 1978), it has been aptly recognised that also "law matters" (Drobak 1998). This means that the need for institution deals not only with "market failures", but with enforcement of property rights and voluntary exchanges.

An introductory case reveals the relevance of basic institutions. Recall the first fundamental theorem of welfare economics implies that via exchanges of initial endowments, a competitive equilibrium is attained, and the outcome of trading is

Pareto-optimal.² Only such improvements of situation of one party are possible that simultaneously worsen a situation of another party. This is an important finding when evaluating efficiency of competitive economies. Yet, are the exchanges as swiftly realised as supposed by a model of competitive economy? Is there a certainty about the behaviour of the party with which one is dealing? In real economies, we must discuss at least three aspects of the institutional context to be able to answer the question.

Enforceable exchange

First, the competitive model depends on its *implicit notion of enforceable exchange*. Obviously, exchanges are carried out only insofar as they are enforceable and defection is unfeasible. In contrast, when an element of defection is possible, the set of available exchanges needs not be comprehensively exploited. A significant risk premium r is imposed on the price p_x . Citizens will refrain from engaging in marginal exchanges of value v in-between p_x and $p_x + v$ ($p_x < v \leq p_x + v$) since they are in risk of loss due to defection of the exchange party. Ultimately, the situation can be modelled by the well-known Prisoner's Dilemma (see below in 1.2).

It is evident that most exchanges in ordinary life are realised swiftly on the spot. This traditional institution comes to operation whenever one offers something to exchange "from hand to hand", so it seems enforceability might be secured by adopting the institution of simultaneous exchange. However, even here arrives a small element of cooperation, since both parties must agree on this institution. The cooperation is given by the fact that it is difficult to defect (or steal) face to face right on the spot.

Cooperation does not occur because the above institution-ignorant microeconomic specification would be the best approximation to the real world, but due to presence of numerous institutions, enhancing cooperation (the habit of simultaneous exchange, difficulty to steal overtly, exchanges in public that can prevent escape, morals etc.). In the age of virtual transactions on the Internet, we can imagine how far from the competitive equilibrium the markets can be situated because of the lack of these "sentinels of cooperation" that are needed to secure transactions.

² For an entire proof consult Turnovec (2003, p. 21).

Enforceable sequential exchange

An exchange that is realised in more than one period introduces a special incentive to renege on a commitment. Prudential parties need a formal contract dictating penalties in case the obligations are not carried out. The contract needs an independent party enforcing its terms.

In ordinary language, we use term “contract” mainly for these market transactions which involve time. But note the final reason for the necessity of contract is not the temporal structure of the problem, but uncertainty involved.

Enforceable possession

The outcomes of exchanges have to be secured in possession as well. If there is an exchange whose outcome can be unilaterally reverted, the possibly affected party will not initiate it since the exchange activity of the possibly intervening party is not credible. Buchanan (1975, p. 24) shows that *unless the expected gains from intervention into other party's possessions will be dominated by expected losses, the players will not enter such exchanges*. This sounds clear for all traders in the above example.

Until Buchanan's status quo condition (called "natural distribution") has not been achieved, the stronger agent can employ his force up to the point of the balance of power, and establish a new status quo. Not all initial endowments of wealth are thus sustainable, and before we consider competitive equilibria in institution-free settings, we must redefine the sets of possessions.

We can conclude that in an institution-free environment (without specified and protected property rights) at least some mutually-benefiting exchanges are not materialised.

This introductory exposé serves the goal to show overwhelming need for institutions. For an advanced reader, it illustrates that not only goods with specific technical qualities of non-exclusion and non-rivalry imply a collective dilemma.

1.2 *Bilateral Prisoner's Dilemma*

1.2.1 Collective dilemmas abstracted

Normally in public economics, the case for government is given by the necessity to resolve market failures (Musgrave 1959). This definition permits technical analysis right at the outset, in particular modelling public goods provision. However, it depends on technical assumptions defining public goods, externalities, and market imperfections.

Similarly to Hardin (1982) I suggest that collective dilemmas be dealt within a general Prisoner's Dilemma (PD) framework. This abstraction requires net payoffs only, and incorporates a wide scope of dilemmas. Most importantly, it describes pure public goods provision, exploitation of common property resources, and handling externalities.³ In summary, PD deals with enforcement of private contracts (see previous section 1.1.3) as much as with collective provision of additional goods ("additional" means where private inducements to produce are insufficient).

The trouble is that for advanced technical discussion, we need more assumptions anyhow. Sandler (1992, p. 44) warns of studying exclusively PD for this reason of non-specificity: "[S]ince there are so many different combinations for joining cost structures, the technology of public supply, and tastes, it is really not possible to state general propositions concerning the feasibility for collective action, even in the case of only two people, unless constraints limit these considerations."

Moreover, PD apparently do not explain all collective action problems, as Hardin (1982, p. 25) erroneously asserts. Although it is the most universal framework, collective dilemmas can have a form of Assurance games and Coordination games (see Section 1.4).

³ A great deal of similarities can be found between these concepts. Specifically for externalities and public goods, the Pareto-optimality condition for an externality is identical to that for a pure public good (Buchanan and Stubblebine, 1962). The difference between a pure public good and an externality is that in the case of a public good all members of the community consume the same good, whereas for an externality what is consumed by other parties differs from that is consumed by direct purchaser.

1.2.2 Prisoner's Dilemma

Assume two players (A, B) with two strategies – to cooperate (+) or defect (-). They play a simultaneous game with payoff matrix given in Table 1.1. We can see that defection (-) is dominant for both players (a dominant strategy gives a player a greater payoff regardless of the other player's actions).

Table 1.1

Prisoner's Dilemma with ordinal payoffs

B/A	A+	A-
B+	c, c	d, a
B-	a, d	b, b

Note: $a < b < c < d$

The pair of dominant strategies (A-, B-) is a Nash-equilibrium as well, i.e. given the same strategy of the other player, it is disadvantageous for each to unilaterally change the strategy. The cooperative-strategy equilibrium (A+, B+), in contrast, is not a Nash-equilibrium. Why does economics call it a dilemma?

The final outcome is Pareto-inferior in that both persons can find some other outcomes that they *jointly and unanimously* prefer (i.e. $b < c$). Why is there not a simultaneous cooperation, then? For Player A, the reason is that even if he had established cooperation with Player B, Player B would have no reason to cooperate. The reverse holds for Player B. Even if the players can communicate beforehand and agree to avoid the Pareto-inferior outcome, each person ultimately will defect from the agreement unless a the agreement is binding.

Ordeshook (1994, p. 207) therefore defines PD in the following manner:

1. Each person has a dominant strategy.
2. If each person uses his dominant strategy, then the final outcome is Pareto-inferior.

For further exploration, I would stress three other points:

- a) Any commitment to cooperate is non-binding.
- b) Both players have acquired perfect knowledge of the dilemma structure.
- c) Certainty about the future (time-invariant knowledge) holds for both players.

1.2.3 Analytic solutions

Exogenous enforcement

The real world is abundant with third-party enforcers – an agent maintaining commitments can be any social or ethical institution, family, morals, and communities. It is sociology that shows the way social institutions promote cooperation and sanction defection. Enforcement by exogenous actor thus will not be endogenous here, in economic analysis.

Metastrategies

In repeated interactions, the set of Nash equilibrium strategies may be very large. While some are defective, some of them may be cooperative. Mueller (1989, p. 12) states that a cooperative solution can arise if each player chooses a supergame strategy that effectively links his choice of the cooperative strategy in a single game to the other player's choice of this strategy.

Taylor (1976, pp. 28-97) provides with an exhaustive discussion of cooperative solutions emerging as an equilibrium in a prisoners' dilemma supergames.

Two successful metastrategies⁴ have been identified:

- a) *Tit-for-Tat* – in period t , one repeats what his/her counterpart did play in $t-1$. Sandler (1992, p. 80) points out that the game must be played an infinite number of times⁵ and the discount rate must be sufficiently small. Also knowledge about

⁴ A successful performance of Tit-for-Tat was evident in experimental tournaments where computers were competing with each other applying various metastrategies – see famous study by Axelrod (1984).

⁵ The finite games are solved backwards, and the Nash equilibrium is to defect in each round. Given the defection is advantageous in the last period, it is also dominant in the period preceding it. Recursively, defection is dominant in all periods.

the players' types (tough or weak, high or low demander of cooperation) plays role.⁶

b) *Cooperate-Defect* – one cooperates as long as the counterpart cooperates, then punishes by defection in a series of plays following any defection before returning to the cooperative strategy (Taylor 1976, pp. 28-68)

Many authors have explored metagames both theoretically and in experimental games. Ostrom (1990) has investigated the emergence of institutional structures that elicit cooperative outcomes in commons with limited-access. Libecap (1989) studied cooperation in commons where a small number of players repeatedly interact, and concluded the bargaining can be efficient.

For our purpose, cooperative metastrategies are but a precursor to a "constitutional metagame".

1.2.4 Contract

Before we open constitutional games, we shall define contracts since they are the outcomes of constitutional bargains.

A contract is a mutual unanimous agreement among contracting parties about the provisions specified in the contract. Despite richness of available contractual provisions, they basically include exchanges of rights and redefinition of obligations, i.e. specific action by each individual to be carried out sometime in the future. Usually they also specify rewards and penalties associated with either compliance or disobedience with the terms of the contract.

In this study, we are concerned with *constitutional contracts*. Only by this sort of agreement a third-party entity (authority) is established and equipped with means to enforce its decision against will of contracting parties.

The constitutional contract is a version of contract because:

- a) Parties agree to a (re-)definition of rights and obligations.

⁶ When uncertainty is present, finite length games may finish in cooperation and collective action (Sandler, p. 84).

- b) Parties expect total benefits of a new arrangement exceed total costs. (In uncertainty, expected total utility must exceed zero.)

What is idiosyncratic for a constitutional contract comparing to other contracts?

1. It *establishes* a powerful *authority*. (Normally the authority is presumed, by relying on the rule of law.)
2. It *provides* the authority with a degree of *discretion*.

The problem lies in incentives of parties to establish a third party given power in some aspects and in giving the power to find solutions unspecified in the contract. The former problem (see Point 1 above) can be explained as the problem of the establishment of a *complete constitutional contract*. In fact, it is nothing very different from ordinary economic exchanges, which tacitly suppose the outcomes of exchange cannot be violated. Point 2 is far trickier, and I understand it as a problem of making an *incomplete constitutional contract*.

1.2.5 Rules (constitution): Simple binding commitment

Besides employing long-term metastrategies, suppose the parties A, B are able to establish a third party C that would enforce any rule they agree upon. (For our purpose, assume enforcement is technically flawless, i.e. automatic). This is a necessary precondition of a working constitutional contract.

One party may initiate negotiation about adopting a rule (call it "constitutional game"). We shall denote the initiator A. Now, the parties do not choose between strategies that are valid for one period, but negotiate upon *a rule valid for (ideally) infinite number of periods*.

For A is rational, he is aware of collective dilemma both players face. Out of pure self-interest, he wants to grasp profits from mutually cooperative game, especially when they are significantly higher than its opportunity costs, given by discounted long-term outcomes of Tit-for-Tat strategy. Which rules will the initiator A propose?

With time-invariant knowledge and time-invariant preferences, I claim the optimal collective rule is *simple mutual cooperation enforced by a third party*. All alternative

metastrategies will be inferior as regards long-term discounted benefits. Providing all information is available, A will propose this rule.

Let me call the rule a *simple binding commitment* (s_1). An alternative strategy will be zero commitment, thus status quo (s_2). To make status quo unattractive, A declares that if s_1 fails to pass, he will consistently follow metastrategy of consistent defection (this shall be called *consistent threat*). Then, s_2 is not an ordinary status quo, but a status quo plus a threat at certain level of credibility.

Now, B faces a choice between s_1 and s_2 , when expected payoffs from the latter depend on credibility of A's threat. The problem of its adoption is still pending. B knows well about the dilemma, and suboptimality of other metastrategies, but needs to be persuaded that opportunities of free riding are costly. This happens only when A's declaration about defection metastrategy as the alternative s_2 is strong enough (to be elaborated in upcoming sections).

Let us elaborate the case in all its intricacies.

Credible threat

Rationality assumption implies that constitutional game must be regarded as a game as much as situations within given institutional framework. To find a cooperative solution in a constitutional game, we again have to overcome the incentive of keeping the free-riding option. The intuition set out in the paragraphs above was that it suffices to put players into genuine one-time constitutional game where defection has "serious" consequences and the contract adopted will be both stable and welfare-enhancing. Also the decision-making adopted will have attractive normative properties.

Let us now denote one player as active (A, the initiator) and one passive (B). We begin in status quo with zero commitments (A-, B-; the payoffs are b for both). As the first step, A offers a rule of type s_1 to B. B has to make another move. What are his expected payoffs?

They depend on credibility of threat of A not to cooperate unless commitment is adopted (consistency of threat). If A is able to hold his promise not to unilaterally cooperate in future rounds ($p=1$), thus keep a consistent attitude, the payoff matrix is modified as follows:

Table 1.2:

Constitutional game with $p=1$

A/B	s_1	s_2
s_1	c, c	b, b
s_2	b, b	b, b

Clearly, as $b < c$, the dominant strategy will be s_1 . It will cause one of the Nash-equilibria occur and as a Pareto-improvement it will dominate over the status quo. Under *full* certainty over the PD, and possibility of *consistent threat*, a constitutional contract may emerge between two persons. It will be set as a *simple binding commitment*.

How high the credibility threshold must be?

Credibility cannot remain exogenous, namely set at $p=1$; the model cannot be short of explanation of responses of B to different values of p . Now, remind of Table 1.1.

Let us denote the level of credibility of A's commitment not to cooperate as p . (For $p=1$, A is expected always to defect, while for $p=0$ A is certainly to cooperate.) I assume that p is given for B (the extension is to be described below).

Furthermore, assume B can follow only random strategies, i.e. he defects in rate r . That is, r shall denote the likelihood of his participation. Both variables, p and r , are to be independent stochastic variables, i.e. $\text{cov}(p, r) = 0$.

B has to consider the constitutional alternatives:

a) s_1 : payoff X is stable

$$X_1 = c$$

b) s_2 : expected payoff $E(X)$ depends on r and p (r can be chosen)

$$E(X_2) = f(p, r)$$

What is $E(X)$?

Since p and r are independent, we have 4 events occurring with the probabilities $pr, p(1-r), (1-p)r$, and $(1-p)(1-r)$, resulting in payoffs b, a, d , and c .

The sum of conditioned probabilities is as follows:

$$E(X) = bpr + ap(1-r) + d(1-p)r + c(1-p)(1-r)$$

$$E(X) = ap + c(1-p) + r [bp - ap + d(1-p) - c(1-p)]$$

From the standpoint of B, the strategy s_2 is attractive as long as $E(X) > X$ (we assume risk neutrality).

For which r it holds? Moreover, will the maximising r be specified as a function of p , i.e. $r = g(p)$?

$$ap + c(1-p) + r [bp - ap + d(1-p) - c(1-p)] > c$$

$$p(a-c) + r [p(b+c-a-d) - c+d] > 0$$

$$r [p(b+c-a-d) - c+d] > p(c-a)$$

The below specified condition upon r is necessary to make strategy s_2 superior to strategy s_1 .

$$r > \frac{p(c-a)}{p(b+c-a-d) - c+d} \tag{1.1}$$

However, because of condition (1.2) the set of available values of r may be nil set.

For example, let us consider the ordinal payoffs from the Table 1.1:

$$r > \frac{p(3-1)}{p(5-5) - 3+4} \quad r \in < 0,1 > \tag{1.2}$$

$$r > 2p$$

In this example, for $p > 0.5$ there is no r sufficient to counter the attractiveness of constitutional offer of A. We shall term this specific value of p a *credibility threshold*.

Now, let us think about which r is optimal for s_2 adoption, besides condition (1.1). The following are a couple of subsidiary equations proving that the value in condition (1.1) is positive.

$$1. \quad p \geq 0 \wedge c > a \Rightarrow p(c-a) > 0$$

$$2. \quad p(b+c-a-d) - c+d = (1-p)(d-c) + p(b-a)$$

$$a < b < c < d \wedge 1 \geq p \geq 0 \Rightarrow (1-p)(d-c) + p(b-a) > 0$$

In order to make s_2 most likely to adopt, r shall be maximised. Since an upper bound is set only in condition (1.2), we can say that either:

- a) r is not defined to be able to satisfy (1.1) and (1.2) simultaneously
- b) or $r = 1$

For $r=1$, the situation gets more clarified. It will not be that $r = g(p)$, but that possibility of existence of r is dependant upon p . Let us look for credibility threshold. It will be specified as a value at which $E(X) = X$.

$$r [p(b+c-a-d) - c+d] = p(c-a)$$

$$p = \frac{d-c}{d-b} \tag{1.3}$$

Credibility of A must satisfy the following conditions in order to persuade B to adopt strategy s_1 :

$$p > \frac{d-c}{d-b}$$

$$p \in \langle 0, 1 \rangle \tag{1.4}$$

Note A needs not to put high effort into reputation-building provided the "tempting" defection gain is not too high.

This simple model should be extended by a game explaining under what conditions it is feasible for A to engage into costly building of reputation. I merely suggest the following points for this discussion:

1. Reputation is built gradually, with likely high fixed costs, but the reputation-production function may change at a threshold point where marginal costs can decline. It is because reputation is a binary variable in part, rather than a discrete variable (to trust or not to trust).
2. We can assume several specifications of expectations of B. There can be *adaptive expectations*, based upon former empirical experience. With *rational expectations*, B will try to assess A's costs, and thereby make attempts to reveal intrinsic preferences. The long-lasting non-cooperative signals of A might indicate that there is a lot to be gained in the future, so the longer the reputation game, the lower image "credibility". But it is reasonable to assume that there is a slump point from which it increases.
3. One-sidedness is embedded in reputation game. At certain value of credibility, one non-consistent step costs A more (in terms of marginal decrease of reputation) than gain of additional consistent action.
4. In nested (tied) games, B must be consider that any of his defections (or refusals to accept the commitment) will be "punished" by a decrease of credibility in another game since A can explain defection it as a strong tendency to defect in future games and will not engage in unilateral unsecured cooperation. So, non-constitutional games can signal something for constitutional games with reputation.

In sum, it can be concluded that at a p -level of credibility of A's threat, the parties will agree on a constitutional rule for future situations. The rule will be fully (perfectly) specified, and this simple binding rule is the basic constitution. Here we can say that the constitution is perfectly specified and entails wholly and unequivocally welfare enhancing measures, i.e. positive net gains for all parties.

This result was achieved due to many complementary assumptions, to which I add that the scope of commitment must be costlessly specified (no communication problems,

and perfect legal commitments specification). By employing reputation, classical findings of experimental game theory that direct communication and possibility of informal agreement enhance cooperation (Ordeshook 1984; Mueller 1991, p. 408) are incorporated in the model.

With the above conclusion, a link between non-cooperative game theory and normative public economics has been revealed such that it may fill gaps in the theory of economical institutional arrangements.

Credibility in dual population

As has been discussed in the four points above, modelling credibility-building efforts is not a simple task. Still, there is a chance to make at least a very limited scheme explaining what it takes to achieve a certain level of credibility.

Let us divide the population of homogenous players into two groups, *Promise-keepers* (p denotes their share of the population; Promise-keepers thus randomly occur at probability p) and *Rationals* (representing $1-p$ share of population). As the label of the first group indicates, any threat of a representative of the first group is automatically credible. A constitutional proposal made by a Promise-keeper is thus unequivocal.

In comparison to Promise-keepers, the Rationals tend to cooperate occasionally (depending on many now not-outspoken circumstances). Their empirical rate of participation is q_e , and this value is considered to be the best prediction of their behaviour.

In a non-cooperative game, a Rational can change his q by behaving differently than q predicts. Specifically, he can cooperate above/below the empirical rate. It is done in the following way:

The rate q^i is counted with respect to the historical record of behaviour of person i . There are m observations of which k is a sum of cooperative steps. The empirical rate based on m -long chain of observations is:

$$q_i = \frac{k}{m}$$

If we have a representative of Rationals who has clean record of the past, we expect him to behave as the population mean (q_e).

A personal q^i can be changed step by step. For example, for the additional step q_t , we take q_0 and subtract one observation. Then we add 1 for cooperation (or 0 for defection, respectively), according to the way i has behaved, and divide it by $(m-1)+1$, that is by m .

$$q_1^i = \frac{q_0^i(m-1) + x}{m}$$

$$x \in \{0,1\}$$

In general terms:

$$q_{t+1}^i = \frac{q_t^i(m-1) + x}{m} \tag{1.6}$$

Game

The credibility game is played between an initiator A and the passive player P. The initiator is Promise-keeper with probability p , or Rational with $1-p$. Thus, if we do not know who he is, we may expect him to cooperate at probability $(1-p)q_t$ (denote it z_t).

The passive player can be either Promise-keeper or Rational, but it makes no difference since he does not make any promise, so he behaves the same in both cases. A and P face the dilemma we encountered in Table 1.1, and will receive payoffs from matrix according to their cooperative/defective behaviour.

Suppose the initiator, A, offers a simple binding commitment in every period. P has the opportunity to agree and comply to the constitutional rules or disagree. If P disagrees to follow the commitment, the game will continue and he will choose defection since it is maximising expected utility. This is obvious from payoffs set out as follows:

Cooperation: $E(u_t) = cz_t + a(1-z_t)$

Defection: $E(u_t) = dz_t + b(1-z_t)$

From Table 1.1: $a < b \wedge c < d$

A will either cooperate or hold the promise. According to his behaviour, his q_t will change.

Reaction of Passive

Now, the expected long term average payoff of P is:

1. No commitment: $u^1 = dz + b(1-z)$

2. Constitution: $u^2 = c$

Note:

$$\frac{\partial u_1}{\partial z} = d - b > 0$$

There is a value of z when $u^1 = u^2$. This critical value of z shall be denoted z^* .

Accordingly, a critical q^* is given by $q^* = z^*/(1-p)$.

The critical z^* exists because $0 \leq z \leq 1$, both u^1 and u^2 are continuous functions, and:

For $z=0$: $u^1=b$ and $u^2=c$, i.e. $u^1 < u^2$

For $z=1$: $u^1=d$ and $u^2=c$, i.e. $u^2 < u^1$

For $z < z^*$, the threat is strong enough to persuade the Passive party to adopt the contract. The crucial assumption is that P perceives A's cooperation by observing q_t . This is close to what is called *adaptive expectations*. Certainly, also more complicated *rational expectations* could be introduced, but it is left for another study.

Building credibility

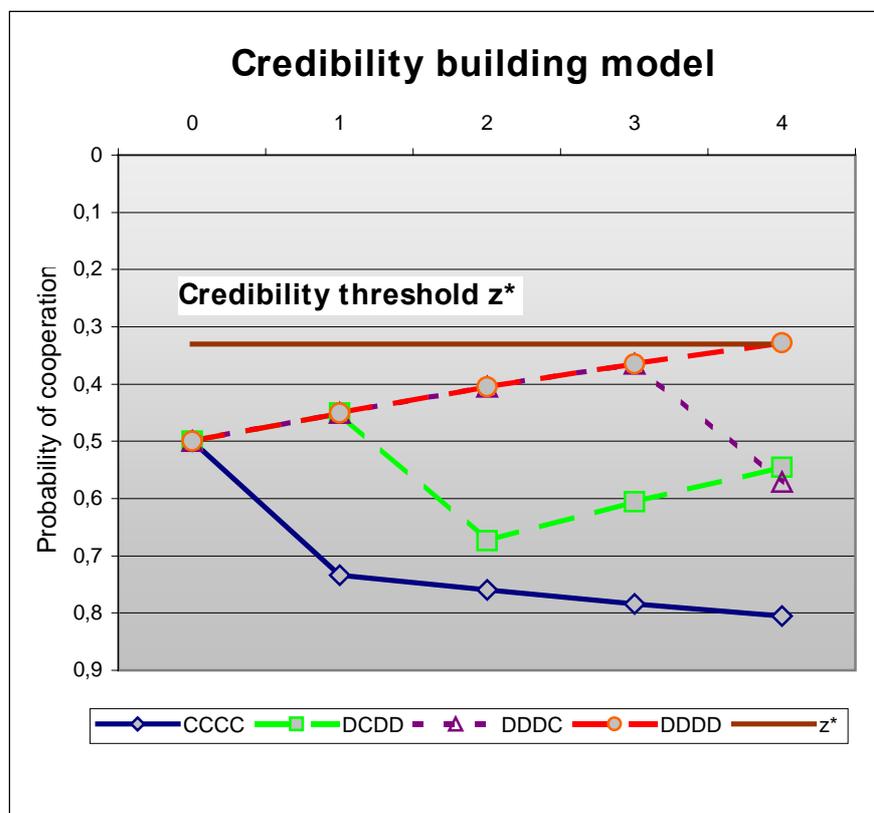
Whenever A breaks his promise, he is immediately convinced as the member of Rational group. Not only his q_t slightly increases, but also his z grows from $z_{t-1} = (1-p)q_{t-1}$ to $z_t = q_t$. This is because he is now revealed to be a member of Rationals, and their level of participation is higher than in all population.

A cooperative step thus seriously destroys chance to persuade the passive party to adopt a constitutional contract. In Figure 2 I illustrate how a gradually built credibility

(lowering z_t) can be drastically weakened by *single* cooperative step. For expositions, I chose four historical records (C denotes cooperation, D defection):

1. CCCC
2. DCDD
3. DDDC
4. DDDD

Figure 2. An example of credibility building



Note: $p=0.25$; $q_0=0.6666$; $m=10$; $z^*=0.3333$

The length of the game

Are we able to state precisely how many periods it takes A to persuade P that there is no chance to get more from defection than from constitutional agreement?

Let us remind of equation (1.5). The initiator A will be making only non-cooperative steps, thus:

$$q_{t+1} = q_t \frac{m-1}{m}$$

$$\frac{q_{t+1}}{q_t} = \frac{m-1}{m}$$

In general:

$$n = \frac{\log q_{t+n} - \log q_t}{\log(1 - \frac{1}{m})}$$

Hence, the number of steps necessary to achieve q^* is:

$$n^* = \frac{\log q^* - \log q_e}{\log(1 - \frac{1}{m})}$$

To see how many *additional* steps would be necessary to make if A were known as a Rational beforehand, we only multiply q_e by $1/(1-p)$ and obtain a new number of periods n' , and then find the difference $n' - n^*$.

$$n' - n^* = \frac{\log(1-p)}{\log(1 - \frac{1}{m})}$$

Tracing back to our example, where $p=0.5$ and $m=10$, the difference was 6.57. This means the game must be played over 7 additional periods.

Alternative emergence of the simple commitment

An empirical evidence of simple commitments is not sufficient to conclude a constitutional contract was agreed. In fact a couple of alternative paths toward the commitment are possible:

1. *Spontaneous origin*. As discussed in 1.2.3, the metagame equilibrium can include high inclination towards the commitment.
2. *Exogenous origin*. See section on social agents (within subsection 1.2.3). A major positive political economy explanation subscribes the external origin to Olson's theory of the "stationary bandit" (Olson 1993, p. 567). A

rule-enforcement authority conquers the area and prohibits the commitments in order to (elite-initiated or benevolent way – implicitly assumed in many normative suggestions). Sometimes it is legitimised as an "implicit contract". Either way, it is most likely the most frequent case in human history.

3. *Explicit contract* elaborated in this study. It deserves attention because of two features:

- a) It has a property of consent. As a normative property, it needs not concern us here, but it is an important value in modern political economies. Burden of proof rests on authors of any non-consensual rules.
- b) It allows for opening broad theoretical question, namely whether the differences between market exchanges and political exchanges are fundamentally different. To make this study meaningful, we must show it is possible to perceive constitutional politics in the same terms as private exchanges.

1.2.6 Naive contractualism

Remarkably in a journal solely devoted to constitutional economics, Müller (1998, p. 13) asserts that in PD framework "a unanimous and fair decision will always be made". He specifies no need of *consistent threat* for a binding rule to pass a constitutional test. So, is the above constructed reasoning of mine but a lesson in applied logic?

Let me put Müller's approach under thorough scrutiny. Müller (1998) offers not only one rule (simple binding cooperation commitment), but on account of completeness he discusses all combinations of cooperation and defection. Therefore, four rules (metastrategies) are generally available (denoted by Müller's notation):

Rule 1: $SQ = A-, P-$

Rule 2: $R_A = A-, P+$

Rule 3: $R_P = A+, P-$

Rule 4: $C = A+, P+$

Table 1.3

Prisoner's Dilemma payoff matrix

A/P	P+	P-
A+	C _A , C _P	C _A , D _P
A-	D _A , C _P	SQ _A , SQ _P

Source: Müller (1998)

Table 1.4

Constitutional game

A/P	C	R_A	R_P	SQ
C	C _A , C _P	SQ _A , SQ _P	SQ _A , SQ _P	SQ _A , SQ _P
R_A	SQ _A , SQ _P	D _A , C _P	SQ _A , SQ _P	SQ _A , SQ _P
R_P	SQ _A , SQ _P	SQ _A , SQ _P	C _A , D _P	SQ _A , SQ _P
SQ	SQ _A , SQ _P			

Source: Müller (1998)

His explanation goes as follows: For A, SQ is weakly dominated by R_A. For B, SQ is weakly dominated by R_B. Consequently, SQ will not be played ever. Now, the first best option for A is R_A in order to receive D_A. But it implies that P selects R_A, which is weakly dominated by C and R_P. The same holds for player P.

For A, strategy R_A is not rational to follow, since it will lead to the status quo. Equally, R_P can be pursued by only irrational P. As a result, we should have a 2x2 matrix in Table 1.5.

Table 1.5

Remaining options in constitutional game

A/P	C	R_A
C	C _A , C _P	SQ _A , SQ _P
R_P	SQ _A , SQ _P	SQ _A , SQ _P

Source: Müller (1998)

Table 1.5 is the same as Table 1.2 (constitutional game with $p=1$). Also results of “Credible threat” (in subsection 1.2.4) are of those implied by Table 1.5.

There is a caveat in Müller’s argument, however. Construction of the matrix hinges on implicit and unproven (!) assumption that in the status quo – when cooperation is not safeguarded – no-one will make any attempt to cooperate. But in real world the parties need not consistently follow defection, and have a variety of other metastrategies. By specifying more than 2 metastrategies (respectively, s_1 and s_2 as I did), Müller attempts at making a comprehensive model, but in fact his Table 1.4 is far more limited than a model with clearly specified s_1 on one side and s_2 , representing a set of alternatives according to p and r , on the other side.

In very short words, Müller presumes total credibility of both parties, but he omits that in spite of approval to a SQ-rule, a player can resort to occasional cooperation. Neither initiators nor free riders, when refuse to cooperate, agree on rule to defect.

Müller goes tautologically by making the bad outcome impossible by definition. Constrained by a hidden assumption, the good outcome is therefore the only realisable – so inevitable – solution of his. As a matter of fact, his result would be plausible only if there is a super-agent who says: You have to agree on a rule, whatever it is, and I will enforce it.⁷

1.2.7 Sequential open-agenda constitution

Simple binding commitment is not the only constitutional rule that can be proposed. In 2-person setting, there could be more possibilities – though imperfect (less specified) – producing the same effects.

Primarily, ”a sequential open-agenda constitution” can be stated as an example. It operates as well as simple binding rule as long as side-payments, bargaining and logrolling are impossible. It consists of the following constitutional rules:

- a) Each agent has a right to propose specific cooperation.

⁷ A mother can say to a couple of contentious children: You can share you toys or each of you can play only with yours. Stealing is forbidden. You should decide on your own what you rather do.

- b) The other agent can agree or refuse cooperation.
- c) If the proposal fails, the agents cannot engage in unilateral cooperation.

If approved, how shall this version of constitution work?

In each PD situation, the initiator (A) proposes to cooperate. Unlike classic PD, by doing so A prevents himself from being occasionally exploited. This is for by putting Cooperation on the table, he is bound not to cooperate if the proposal fails (sub-rule denoted c).

This sub-rule simply secures $p = 1$. The other party, B, when maximising utility, can only agree to that proposal, because alternative gain is smaller than gain of cooperation, c . Potential benefits from defection disappear as the initiator is perfectly credible. In specific, see opening part of credibility threat problem in Section 1.2.4:

$$E(X) = a + r(b - a)$$

Since $r \leq 1$, then $E(X) \leq b < c$.

Why shall the open-agenda constitution be approved at all?

As stated in 1.2.4, the initiator has an incentive to pass credibility threshold. Luckily this constitution is doing this automatically. Still, the threshold still must be achieved before the consent, or the possible defector prefers the status quo with a high likelihood of exploitation.

In the previous arrangement, the passive counter-player only responded to the credibility level; now it can choose whether the credibility will be fixed at $p = 1$. His only alternative is assumed to be the status quo, with the same payoff as before, so the condition (1.4) must be satisfied again.

There are not many differences between processes of unanimous agreement in the previous and current constitutions. The second only allows sequential

decision-making about future cooperation, which gets rid of all elements of PD whenever cooperation is proposed.

Sequential open-agenda constitution might be more theoretically interesting when players face each other in n PD games. Not every p_i ($i = 1..n$) has to satisfy condition (1.4) for the constitution to be adopted. In fact, the condition is:

$$\sum_{i=1}^n E_i(X) < \sum_{i=1}^n c_i \quad (1.6)$$

If we define t_i such as:

$$t_i = \frac{d_i - c_i}{d_i - b_i}$$

Then we can only state that at least one i exists such that:

$$p_i > t_i$$

In short, a single but crucial dilemma may bring this sequential constitution for n PD games to emerge.

Concluding remarks

The open-agenda constitution looks complicated in comparison with the simple commitment, but it is a step towards more realistic picture of decision-making under uncertainty. Under uncertainty, the content of a constitution is by definition incomplete, but the constitution very precisely specifies post-constitutional decision-making, which is exactly the case of the open-agenda constitution. Interestingly, here we can see an *incomplete constitution can be agreed even under certainty*.

The main drawback of the incomplete open agenda constitution (but also of simple binding commitments) is that usually more than yes-or-no dilemmas are present. Of a set of decisions, each has unique distributional implications, and the parties have an incentive to bargain for the most favourable one. Moreover, compensations, side-

payments, and logrolling can alter outcomes and make the constitution more attractive. Unless we exclude all this by assumptions, we must say it is very unclear what properties will an open-agenda constitution have. At least, we need a model of bargaining power.

Note that actual parliaments usually follow an informal rule that what has failed to pass, will not be proposed again. This shall prevent from strategic behaviour during constitutional game. So, if bargaining is permitted in constitutional setting, the following sub-rule can be added to rules a), b) and c): *The same proposal cannot be proposed more than once.*

However, this arrangement would be difficult to enforce due to conflicting definition of "failed agenda". The boundary between alternative proposal and an amendment to a proposal is very unclear. More to that, a pre-constitutional game would be played in any case.

1.2.8 "Quick and dirty" constitution?

This term is used in Nurmi (1998, p. 70) for an arrangement solving the PD. An agent is created in order to enforce commitment. It can by its discretion use rewards and penalties to change payoffs, which turns PD into another game. Yet we encounter a set of problems:

1. *Agency theory.* A lot of discretion is given to the authority without any insurance. What mechanism disciplines the agent to fulfil his task?
2. *Tax authority.* A tax necessarily has to emerge so as to accrue sources to provide rewards, so the authority not only prevents from certain behaviour, but also imposes tax. How is the tax to be distributed? Should it be imposed on future benefits only, with revenues paid off after? Or, should there be a possibility to be indebted? Do the players need to create a common pool of resources before the authority begins operating?
3. *Untrue preferences.* The game is overwhelmingly complicated, and the players have strategic preferences different from true preferences. The lack of information of the authority may be prohibitive.

In games under uncertainty, we shall see that an agent with discretion can emerge. Instead of benevolently changing payoffs, however, his role shall be to follow constitutionally considered decision-making.

1.3 Multilateral Games

In economic literature about interest groups, as pioneered by Olson (1962), it is taken for granted that the larger the group, the bigger departure from ideal cooperative behaviour. Olson (1982, p. 41) states that "members of 'small' groups have disproportionate organisational power for collective action". Accordingly, opportunities for improvements of results of unbounded behaviour are greater in great numbers of people affected by the dilemma. Speaking in terms of international economic integration, for instance, benefits from contractual cooperation should increase with a higher number of nations.

Olson (1982) provides both empirical test and consequences of the hypothesis. Arguably, the hypothesis stems from two sub-arguments, both related to a decline in an individual's share:

Argument 1: *Withdrawal effect*. Participation makes little difference for whether the good is provided or not – thus, withdrawal is not risky.

Argument 2: *Worse identification*. Selective rewards/punishments (selective incentives) are less applicable as individual contributions are less identifiable. Plus, individual contributions are more easily open to manipulation in terms of acting against interest of the principal (corruption).

Argument 1: Withdrawal effect

With higher n , the marginal contributions of an additional member are said to be decreasing, and if he/she stops contributing, it hardly affects if the good is provided. Thus existing members of a group have relatively little incentive to keep contributing. Large group should be more prone to underproviding resources.

Sandler (1992) counters that the additional members may contribute a lot unless their evaluations of the marginal benefit of public good are very low. As a result, inclusion

of another member may increase total contributions rather than just to balance the outflow of contributions of existing members.

In the context of this discussion, it is substantial to note that the marginal benefits of additional contributions depend on the technology of public goods supply. In fact it is crucial how the smallest contribution is counted. In the case of the weakest-link technology, the smallest contribution plays the major role and the withdrawal effect is consequently the smallest. As the smallest contribution decreases in importance, the withdrawal effect increases. It grows for the summation technology, and achieves maximum for the best-shot technology.⁸

To sum up, various assumptions about the production reflect varying nature of the collective dilemma. It is therefore difficult to generalise n-person dilemmas and assess the magnitude of withdrawal effect. The effect is in effect, after all, and it maybe complicated when agents are heterogeneous, and perform non-Nash behaviour.

Argument 2: Worse identification

The main theoretical difference between Multilateral and Bilateral PD is that active player A cannot discriminate against various passive players (P_i) when one of them refuses to cooperate in a constitutional game. Thus, Tit-for-Tat strategy is unstable if not impossible to play in more than one round. Unless some private gains are at stake, they cannot be individually (separately) threatened with non-cooperation.⁹

Even when reward/punishment measures can be applied selectively, worse identification diminishes possibility of doing so effectively. Those who find this line of reasoning resembling transaction-costs argument are correct – enforcement costs are part of transaction costs.

Frohlich and Oppenheimer (1970) point at transaction costs when they stress that rationality and self-interest suffice not to conclude that the extent of free-riding

⁸ Best shot: $Q = \max (q_1, \dots, q_n)$

Summation: $Q = \sum_{i=1}^n q_i$

The weakest link: $Q = \min (q_1, \dots, q_n)$

⁹ In international political economy, European integration notwithstanding, the private (country-specific) gains are in place, thus it is more difficult to interpret consent as a step toward eliminating European-wide dilemmas.

increases with n . Also Olson, as early as in his path-breaking book (Olson 1962, pp. 46-52), indicates transaction and organisational costs are being related to size. The costs comprise the cost of organising the group and communication costs.

In general, when overcoming the dilemma, one camp of economists concentrates on solutions regarding Argument 2 (e.g. Olson 1962), while the others shows how to weaken the Argument 1 (notably Sandler 1992, p. 35). In coming section, I concentrate overwhelmingly on Argument 2 and present simplified cases. Finally my main topic – *incentives to adopt a multilateral complete contract* – will be discussed.

1.3.1 Production with constant marginal costs

A very simple multilateral PD illuminates uneasiness of organised production of public good for n persons. Suppose we have n homogenous persons for whom clean air is a public good. They all should individually decide on heating in their houses. Only two technologies are supplied on the market - gas vs. coal heating. Now there is a dilemma: which of cauldrons to install?

For simplicity of exposition, assume variable costs per unit of heat being equal, but fixed costs to differ. The difference shall be x , meaning the coal cauldron is cheaper. But each technology has a different lifetime effect on the cleanliness of air, denoted y . (It is a discounted value of marginal differences of value of clean vs. polluted air per person after instalment of one gas cauldron comparing to coal cauldron.)

Production of the clean air may presumably perform summation technology, according to the condition:

$$ny > x > y$$

Person i faces two options:

s_1 : gas cauldron instalment

s_2 : coal cauldron

Suppose, for the moment, that the counterpart behaves according to all-or-nothing strategy (all except person i choose the same). Then we have a bilateral PD depicted in Table 1.6.

Table 1.6

Gains of i -th person if $n-1$ persons behave identically

$i/n-1$	s_1	s_2
s_1	$yn - x$	$y - x$
s_2	$y(n-1)$	0

For $x > y$, the dominant strategy for i is “defective” s_2 .

Now we release the subsidiary assumption and allow the $n-1$ players behave heterogeneously. Let us by j denote a number of those who follow s_1 and $n-j-1$ a number of those who follow s_2 . (This all besides i , under condition: $0 \leq j \leq n-1$).

In payoff matrix, there should be $n-1$ columns against two rows of person i . Let us choose z ($0 \leq z \leq n-1$) and study only 3 columns, when $j = z-1$, $j = z$, and $j = z+1$.

Table 1.7

Gains of i -th person

	$z-1$ (1)	z (2)	$z+1$ (3)
s_1	$yz - x$	$y(z+1) - x$	$y(z+2) - x$
s_2	$y(z-1)$	yz	$y(z+1)$

Note: $j \in (z-1, z, z+1) \in \mathbb{N}$

For Column 1, s_2 is dominant because $x > y$. The same holds for Columns 2 and 3, and will be for any j of the permitted set. The marginal difference between payoffs of s_1 and s_2 are always $y - x < 0$.

For this technology of public good provision, there will be *zero incentive* for any party to install the gas device (s_1), although collectively they all would prefer having gas heating.

Continuous provision

By allowing for non-discrete (continuous) provision of public good we may generalise findings obtained so far. Thus, a person can choose whatever cost c_i it finds optimal, not only $c \in \{0, x\}$.

As the summation technology has zero economies of scale (a unit cost of investment brings always equal benefit), by r we can define a constant $r = y/x$ which is a marginal benefit of a unit of investment.

Total benefits: $u_{all} = r(c_i + c_{others})$

Now, pecuniary utility gains shall be expressed as:

$$u_i(c_i, c_{others}) = r(c_i + c_{others}) - c_i = c_i(r-1) + r c_{others}$$

We constrain each c_i to a closed bounded set by assumption (limited budget constraint, i.e. $0 \leq c_i \leq x \in \mathbb{R}$). Since utility u is concave in c_i (in fact it is linear), the corresponding non-cooperative voluntary-contribution game must have at least one pure strategy equilibrium (Ordeshook 1984, p. 223).

Now we make a simple maximisation of a linear function:

$$\max_{c_i} (u_i) = \max_{c_i} (-c_i) = \min_{c_i} (c_i)$$

$$x > y \Rightarrow r < 1$$

$$0 \leq c_i \Rightarrow \min (c_i) = 0$$

$$\forall i \in \mathbb{N}; c_i = 0 \Rightarrow c_{others} = 0$$

A unique pure-strategy equilibrium is the n-tuple $(0, \dots, 0)$. The PD aspect is evident – individual rationality dictates zero provision. In a final remark, I point to the fact that only for $r > 1/n$ the situation is an n-person PD. For lower r , the cooperative n-tuple $(1, \dots, 1)$ is Pareto-inferior to the pure-strategy equilibrium.

1.3.2 Production with increasing marginal costs

Perhaps a change in the technology of public good supply will lead to a change in the outcome. Suppose three homogenous persons whose participation has a structure of production with increasing marginal costs (i.e. decreasing marginal gains). Output is to be found in Table 1.8, whereas individual strategies of player C are in Tables 1.9, 1.10 and 1.11.

Table 1.8

Cooperation with increasing MC_i

Number of cooperating persons	0	1	2	3
Total gains	3	6	8	9
Marginal gains	-	3	2	1

Table 1.9

C+ matrix: payoffs when C cooperates

	B+	B-
A+	3,3,3	0,8,0
A-	8,0,0	3,3,0

Note: The order of gains is A,B,C

Table 1.10

C- matrix: payoffs when C defects

	B+	B-
A+	0,0,8	0,3,3
A-	3,0,3	1,1,1

Table 1.11

Strategies available for C

	A+B+	A+B-	A-B+	A-B-
C+	3	0	0	0
C-	8	3	3	1

From Table 1.11, we can infer that defection is the dominant strategy for player C. Had we relabelled the rows and columns, we would obtain the same result for A and B.

In public choice literature, there is only one extreme technology for which independent individual activities satisfy Pareto optimality. It is the weakest-link case technology,

where the condition for Pareto optimality for the community is satisfied (Mueller 1989, pp. 23-24, Sandler 1992, p. 53).

1.3.3 Step-by-step constitutionalisation

The rule of law is a classic instance of a public good advocated even by proponents of the minimal state. Buchanan (1975, pp. 28-34) demonstrates that step-by-step constitutionalisation of rights brings about the rule of law. But is the gradual approach a universal solution of collective dilemmas? As a matter of fact, rule of law is very specifically produced. Take an example of international law whose subject are only those who consent to it. When a network of assenting countries gradually extends, the costs of dispute resolutions dramatically fall.

Stability of legal entitlements is thus nothing but a club good with economies of scale – notion of rights can be exchanged and exclusively provided. Adopting rule of law is a positive sum game, because reduction of costs of the cooperating parties does not mean increase in benefits of defectors, like in the cases above.

Positive sum game of exclusive goods is unfortunately not our case when dealing with pure public goods in n-person setting.

What is left as potential solutions? Analytic solutions as explained in 2-person setting. Yet, effectiveness of metastrategies seems to decline in n for reasons discussed above (especially, Argument 1). Hardin (1982, p. 29) explicitly warns: "[T]his conclusion does not generalize to n-person dilemmas." Adoption of enforceable rules is dependent on credibility, which is impossible unless coalitions are made. Emergence of coalitions is susceptible to the same PD as provision of public good. In n-person cases, the *consistent threat is impossible without coalition building, and coalition building is impossible without consistent threat*.

In detail, it would be necessary to create a coalition large enough to threaten the others in a constitutional game. Two causes motivate a coalition (subgroup) to be created:

- A) *Privileged (core) subgroups*. Coalition C_i is privileged as long as their total gains of cooperation exceed total gains when non-cooperating; as a parallel effect, they may produce positive externalities, namely when non-allied players achieve great external gains.

B) *Pressure* groups. Any subgroup can be composed to achieve bargaining power vis-à-vis other groups.

Core subgroups can make use of both incentives (A, B), while the others only increase bargaining power (B). On the other hand, core groups are disadvantaged since their threats are not much credible since they would lose a lot by “punishing” the counterplayer via renegeing on unilateral cooperation.

All in all, coalitions are fragile inwards, and if they have a reason of existence besides bargaining, they are not very credible. A spontaneous solution is hard to be expected.

We shall not forget external solutions. They are real solutions of n-person PD only as long as they make emergence possible, and keep them surviving as well.

1. *Investments into social capital*. In extreme example, mafia decreases all transaction costs related to effective communication within the group.
2. *Embeddedness* (potential externalities). The world is so much interconnected that in some areas we can decrease utility of somebody and not be called to court. For instance, past oral agreements can be reverted, even if some resources must be expended.
3. *Additional private inducements*. Coalitions may employ additional selective incentives (private benefits tied to the collective benefits of the coalition).

When subgroups get composed, n plays role, as Arguments 1 and 2 claim. To retain the group in one, several options are on offer:

1. *Federal structure with small subgroups*. This approach follows criterion of transaction costs minimisation.
2. *Re-engineering the technology of public good supply*. If possible, a shift more toward weakest-link technology might improve interest of marginal contributors. For example, the fight against terrorism is successful according

to total expenditures, but in some phases, it can depend also on the weakest link, namely on existence of harbour (safe) countries.

3. *Tying private goods* or collective goods of smaller groups to the activities of the subgroup.

1.3.4 Conclusion and an application

It is interesting to see the difference between efficiency of a private good market and a public good market (to be distinguished as private and political markets). In private markets, as the number of participants n grows, transaction costs of using the market fall. It is mainly because bargaining over allocation of gains from trade is eliminated. The bargaining for two party exchanges may be very long. In contrary, political markets tend to become less efficient with higher n .

In a constitutional game, it is easier to establish federalist structure, and then search for consent, rather than to search for an extensive contract. For example, at the level of European national governments, there are only 20-30 players and negotiations have led to creation of subgroups, e.g. Visegrad countries. Despite pessimistic analysis set out in this section, it seems a multilateral European constitutional bargain is possible, with relatively small defection, due to low number of representatives.¹⁰ A chance for contract is enhanced if some groups have established prior cooperation, if transaction costs are minimised, country-specific inducements added, and technology of public good supply modified towards the weakest-link case.

1.4 Coordination

Coordination problems are quoted as a special class of collective dilemmas that might call for a political, hence constitutional solution. A big deal of coordination problems is nonetheless resolved on unhampered markets (Hayek 1978), and an unresolved issue is whether evolution can resolve the rest.¹¹ Furthermore, neither internal nor external division of labour falls under coordination dilemmas for these are solved via price mechanism.

¹⁰ Of course, a striking problem remains: are the individual citizens well represented at the national level?

¹¹ For proponents of free-banking, even money – the crucial device for an economy – do not exhibit the coordination problem and can be freely supplied on the market.

What can be termed as a lack of coordination is cooperation in means. Language, traffic rules, and measurement are the most frequently quoted cases. In macroeconomics, perhaps insufficient incentives to invest illustrate an example of coordination problem.

Instead of “cooperation” (collectively positive choice) and ”defection” (collectively negative choice), let us define *adherence to standards* and *ignorance/unwillingness to adhere* to be two basic strategies. Alternatively, we could term them as *abundance vs. shortage of means*, or *knowledge vs. ignorance* of coordination opportunities.

When knowledge of opportunity to share standards is costless, and there is no advantage in adhering to a particular standard, adoption of a standard is no problem. “Spontaneous order” is about to emerge. But the two conditions (*costless knowledge, zero unilateral advantage*) do not apply under all circumstances. In Section 1.4.1, I resume what happens if the first one is violated, namely when information is costly. In further sections, the second condition is invalidated, and several coordination games are brought to attention.

1.4.1 Costly information

Assume coordination opportunities exist in terms of non-exploited gains from sharing some information (standards). I postulate three states: knowledge (K), awareness (A), and ignorance (I). From analytical point of view, no other states of knowledge may exist, for any kind of imperfect knowledge is just another version of awareness. For my purpose, I thus set only one kind of imperfection of knowledge.

The players A and B can take either of the states.

Table 1.12

A/B	K	A	I
K	-	2	1
A	2a	4	3
I	1a	3a	-

Note: Numbers denote Situations 1-4, and their analogies (1a-4a)

Since A and B can be switched (the game is played simultaneously), it is plain that the Situations 1a, 2a and 3a are only pair analogies of Situations 1, 2, and 3. So, of the nine combinations, we will consider four Situations.

- K-K and I-I are combinations that have zero coordination opportunity. When information is full (K-K), as well as it is totally unperceived (I-I), there is nothing to transmit. As I have asserted above, we assume impossibility of unilateral move from I to A, since this possibility of "learning" would in our simple model entail that the person is already aware (in other words, imperfectly informed). This prevents coordinating efforts in I-I instance.
- **Situation 1:** It is impossible to offer an exchange about which the counterpart knows nothing. Thus, something must be revealed, and this makes the player aware: the now-aware party shifts to the Situation 2. Awareness must be raised by knowledge-holder, even if it is costly (but normally it is not, say a price of a telephone call).
- **Situation 2:** Is there a market for a standard (coordination information) making the price exogenous? If so (Situation 2a), the price is given, and it only depends on bargaining who pays the price necessary to carry out the contract.¹² But compensations can be instituted, so it needs not to be a binary choice.

If A has got asymmetric information over future payoffs (Situation 2b), it depends on B's expectations. The situation is too difficult to elaborate here (as is poker game). Suffice to say A will present the most credible information that will increase B's subjective expectation of the total payoff. The strength of A is thus given by bargaining power and by ability of providing credible promises.

It is very likely that the nature of future contract will be fully revealed and the Situation 2b turns to Situation 2a.

¹² For instance, for entrance to most universities, the private system of tests of English is used – TOEFL. Almost always it is up to students to pay for the test, but in some cases – e.g. CEU Budapest - the cost is paid by the university.

- **Situation 3:** The move towards Situation 4 will occur for the same reason as in Situation 1.
- **Situation 4 - Coordination version of PD.** Both parties are aware of possible improvements of the future, but none wants to employ full resources to its revelation. They know each can benefit at zero cost when the other party incurs loss by paying full cost.

Table 1.13

Coordination version of PD

A/B	Active B	Passive B
Active A	3,3	1,5
Passive A	5,1	0,0

Although Hardin (1997) notes coordination problems do not include free riding problem, here we can see the contrary. This sort of coordination game is again a zero-sum PD, and means no specific contribution to the theory of government. It is conceptually nothing different from the problem discussed in the previous section (for a tiny but important modification see matrix of Battle of Sexes below).

So, free riding arrives when standards have to be specified, and it is only intuitively known that improvements are possible (like computer language and the like). It is present when more standards are available, and on account of efficacy only one has to be costly adopted. Remind, however, a credible threat may lead to a successful constitutional game in 2-person setup (Section 1.2.4). In addition, bilateral bargaining over costs may complement the credible threat considerations.

1.4.2 Pure coordination games

In a pure coordination game, the players must decide on how to allocate efforts because no cooperation as well as mutual cooperation is Pareto inferior to the status quo. We can distinguish two cases.

Version A: Teamleader

In many groups only one leader can be efficient. The more people act as leaders, the less efficient the group is. The trouble is that in 2-person setting, becoming a leader is a dominant strategy of both players. Both want to be exclusive teamleaders, although they know that having two leaders is worse than one, and none is worse than one.

The situation can be described via the matrix on Table 1.14. Being active is the dominant strategy, but Nash equilibria are not only (a), but also (b) and (c).

Table 1.14

Teamleaders – a version of pure coordination game

A/B	Active B	Passive B
Active A	(a) 1,1	(b) 5,1
Passive A	(c) 1,5	(d) 0,0

Situation (a) is the one of three Nash equilibria that result from dominant strategies of both players. Therein lies the problem – (a) is Pareto-inferior to alternative equilibria (b) and (c). Is there a remedy to this dilemma?

A very simple solution can be offered as long as compensations can be introduced. By compensating the player who relinquishes to be a teamleader, both players may achieve a Pareto optimum. Teamleaders' game is virtually the same as a normal exchange, where mutual profit opportunity (a Pareto move) exists. Again, like in exclusive exchanges,¹³ there is a double incentive to find a price acceptable for both. Negotiations are certainly to be troublesome, but that is no longer a theoretical problem.

Regarding Teamleaders' game, I conclude there is no genuine coordination problem. For instance, a set of (European) countries facing such dilemma can resort to a solution

¹³ By "exclusive exchange" I mean a combination of monopoly-monopsony. It can also be a situation of Crusoe-Friday negotiations about the exchange terms of two goods (in Edgeworth box, a contracting curve will be achieved, but without information on bargaining it is impossible to a priori specify the exact point).

by introducing side-payments, and need not adopt a constitution. Of course, bargaining costs must not be prohibitive.

In coming subsection, we shall see how a slight change brings about a different result.

Version B: Battle of Sexes

Another game can be imagined immediately after we reverse the roles of the active and passive players. Now it is better to stay aside and let the other party adopt a standard. The one who makes one's standard public will carry full cost of its implementation. If both actors participate actively, total costs are of double size, but at last only one standard prevails. Hence Pareto-efficient is to keep one side implementing the standard. No dominant strategy exists in this game, and the Nash equilibria (b) and (c) are Pareto optimums, too.

Table 1.15

Battle of Sexes – a coordination game

A/B	Active B	Passive B
Active A	1,1	1,5
Passive A	5,1	0,0

For no dominant strategy exists, the only question is whether any Nash equilibrium will ever be achieved. In fact, this is the *coordination problem in narrow sense*. The pairs of strategies (A, A) and (P, P) can switch to one another infinitely.

Think about it in two ways. Is communication possible? If so, and compensation is available, the agreement can be achieved. In reality of international economies, it seems that there are no obstacles regarding either communication or side-payments.

If communication is nevertheless impossible, we cannot look for a constitutional solution since this presumes possibility of communication. But it can be contended that zero communication is a very restrictive instance without practical impact on pre-constitutional and constitutional bargains within current societies.

1.4.3 Summary

We have encountered three different sets of coordination dilemmas. For each of the cases, there was a means to overcome the dilemma: *bilateral constitutional game* with credible threat (Costly information), *compensation* accompanying retreat (Teamleader), and plain *communication* (Battle of Sexes). To sum up, one of the games called for a constitutional contract (simple binding commitment, for example).

The coordination games shall be more interesting when played under uncertainty. Assuming away knowledge about frequency of dilemmas, while retaining knowledge on future payoffs, the players might engage in interesting positive-sum constitutional games. But this is a topic for another study.

2 Incomplete contracts

2.1.1 Introduction

Owing to uncertainty, certain contracts are inevitably incomplete arise since not all contingencies can be described. An incomplete contract is thus more risky than a perfectly specified arrangement specifying the final state of affairs.

As regards constitutional contracts, this features is rather a pro than a con as it forces the decision-makers to adopt an insurance contract against possible risks of defection. Uncertainty means that the contracting parties, at the moment of its creation, cannot know perfectly what their position will be and thus support generally welfare-enhancing measures. A constitutional contract, inhibiting both allocation and redistributive properties, will be attractive when uncertainty is present; in fact, departure from a static and timeless environment is a precondition to a multilateral contract.

Obviously, rules improving situation in the private economy cannot be easily established right in the contract. To settle this issue at the constitutional stage, the parties to a contract must establish an intermediary discretionary stage - political decision-making. However, external costs produced by incomplete contracts make certain political decisions unattractive for a subset of agents. They must be considered as early as at the moment of considering rights and obligations of the constitutional contract. In the next section, there will be presented one specific way of their minimisation. But first we shall discuss whether an incomplete contract may ever emerge.

In this chapter we have to check where an onward-looking and inherently incomplete contract is sufficiently attractive for players. I examine conditions of their choice and specifically point to costs of an incomplete arrangement.

2.1.2 Motivation

Recall multilateral games under certainty perform deadlocks. Each player's behaviour is susceptible to dynamic inconsistency, since none promise of cooperation is credible. All players thus would need to set up an agency that would prevent them from resorting to collectively costliest strategies.

An incomplete constitutional contract gives birth exactly to this institution. A new decision-making realm is created – we shall call it politics or post-constitutional decision-making. Politics is supposed to perform in accordance with given procedures, but not all of its outcomes are predictable.

How happens that self-interested individuals pass approval to a new decision-making body? Before I sketch the answer, we must assume them to be behind the so-called “veil of uncertainty”, that is, to be *ex ante* homogenous. This makes them perceive future opportunities of cooperation equally.

Now, if they perceive the chances equally, and are unaware of their future positions, they will judge the contract by comparing the expected utility with the expected utility of “laissez-faire”. If average expected gains of the political arrangement are high, and risks relatively low, the contract is acceptable.

What makes adoption of an incomplete contract more likely?

1. **Expected lack of exogenous cooperative inducements.** When cooperative arrangements can not be secured for other reasons than self-interest, an external agency is the only solution.
2. **High number of participants.** As explained in Section 1.3, the higher number the lower voluntary contributions because of withdrawal effect and worse identification.
3. **Production towards summation technology.** If each contribution is relevant to the total level of production, free riding is collectively extremely costly and must be eliminated.
4. **Costly credibility.** Without credibility, it would be too difficult to resort to private or club solutions.

We should be aware of that this approach is not exclusive in discourse over constitutions adopting process. For example, a prime political economist, Frank Vibert (1999), asserts that since policy objectives are inherently unpredictable, we cannot construct it according to optimum policy domains, but by “arriving at principles of political association” (Vibert 1999, p. 151). In my concept, the principles must somehow deal with a set of expected dilemmas, however. Principles without specification would be too risky, bringing too high external costs.

2.1.3 Behavioural and uncertainty assumptions

Veil of ignorance

Homogenisation of players has been claimed to be achieved by means of „veil of uncertainty“. It can be defined as a situation when each individual is uncertain about his future skills relative to those of other players. Nor can he know which particular game he will be playing. Thus, the future is a game of pure chance for him. Most likely this situation happens when the relevant future is distant, and path-dependency weak.

Each individual is ignorant of the „luck“ to be given to him. This is *the original position* described in social contract theory. Buchanan and Tullock (1962, especially pp. 77-80) and Rawls (1971) show that out of this situation, a contract can emerge by consent, even if it includes rules that are ex post unacceptable by either of parties. For Rawls, the decision-making on the rules inhibits elements of fairness. It is not our concern here; in our economic view, fairness shall be replaced by insurance considerations.

Mueller (1991, p. 343) gives an example of very general uncertainty that writers of an ordinary constitution face, namely uncertainty over "future income levels, health, unemployment experiences..., values of skills and human capital, and property rights more generally." We can imagine virtually any situation when various future positions lead to various interests, thus differing preferences. (Rawls' stand was that individual's preference for redistribution depends on realisation of your productivity, and it is, I suppose controversially, to be stochastic function).

Assume individuals under veil of ignorance need to draw up rules facing such fundamental uncertainty. Players who approach the homogenised constitutional game are thus equal in all relevant features. This is called *impartiality assumption* and it greatly facilitates agreement, as we shall see below.

This kind of ignorance (uncertainty) has broad consequences:

- Social welfare issue can be contractually reintroduced (Mueller 1973). Unfortunately, it is still very strictly limited by assumptions about uncertainty, preventing from detailed interpersonal comparison of welfare.

- Externalities can be treated both regarding allocation and redistribution effects – this permits to use broad criteria (like fairness) and give them economic meaning during the constitutional contract. (Mueller 1977)

Recall Müller (1998) claimed that veil of ignorance in fact leads to Pareto-inferior equilibria. I have proved the thesis is based on erroneous claim that simple binding commitment is self-enforceable regardless of credibility.

Simple example of veil of ignorance

In this illustrative example, we shall put the individual into constitutional setting characterised by the veil of ignorance. He faces a zero-sum game that is played in laissez-faire. The probability of taking either of three positions A, B, and C is $1/3$. Thus, the expected payoff is zero, and the game is „fair“.

However, it depends on the shape of the individual’s utility curve whether the game is acceptable or not. From Table 2.1 we can deduct only a player with $u(i)$ considers the game neutral. The expected utilities of players with alternative evaluation, $v(i)$ and $w(i)$, are negative.

Under certainty and laissez-faire, the game cannot be reverted from definition. Neither have the players any incentive to share risk since their realisations of luck (i.e. positions) are known.

In stark contrast, under veil of uncertainty the expected utility of *each* individual is negative (-1.5). All individuals have the same interest to pool the risk and increase ex ante their welfare.

Table 2.1

Payoffs under uncertainty: an example

	Position A	Position B	Position C	Expected utility
Gain i	$a = -4$	$B = 1$	$c = 3$	0
u(i)	-8	2	6	0
V(i)	-10	1	7	-2
w(i)	-15	0.1	12.4	-2.5
				-1.5

Compromise effect

A risk-avoiding strategy can be accomplished via so-called “compromise effect” as well. This means that when a broad scope of alternative positions is introduced, the individual tends to choose the central one. Actually, such is the constitutional setting.

Speaking rather formally, „compromise effect“ occurs when a comparative evaluation of two options is dependent of which other alternatives are in the set of available options. Nurmi (1998, p. 32-35) claims it was at first found in consumer behaviour research, but it is conceivable that it may be operating in any constitutional setting.

The effect is caused by a violation of the context-free environment (one of the basic postulates of expected utility theory). This comes precisely when either of two conditions is violated (Sen 1970):

1. The option X, if selected from a large set A, shall also be opted for if the set is limited to any subset B.

Violation can be in two directions – introduction of a distant alternative leads to more extreme position, or to a more compromising position. In constitutional setting, we can expect the latter because of uncertainty over future positions (realisations). By introducing any other cell of the dilemma (or one more dilemma), we broaden the variance of the realisations and provide additional incentive for insurance.

2. Should options X and Y be chosen from a large set A, then either both of them or neither of them should be chosen from any superset of A.

2.2 Collective decision-making costs

By introducing a political body ruled by collective decision-making not only additional gains of cooperation are secured. There is a cost side on the other side of the balance account, depending on details of a constitution.

The very first examination of the trade-off between potentially improving political exchanges and the risk of incurring external loss is specified in Buchanan and Tullock (1962). They distinguished between *external costs* and *decision-making costs* as two major categories of cost evaluated at the constitutional level. In total, a sum of the costs gives so-called *interdependence costs* is supposed to be minimised by a rational individual confronted with constitutional choice.

Nonetheless, there might be even more types of costs associated with the process of post-constitutional decision-making. Recall the political entity with its origin in the constitutional contract will do the following:

1. Investigate and reveal dilemmas.
2. Evaluate their relevance, and inform the principals.
3. Decide on means of how to improve them, including resources used.

Type 1: External costs

Buchanan and Tullock (1962) defined external costs as those costs that the individual expects to bear as a result of the actions of others over which he has no direct control. They are crucially determined by a decision-making rule – in the case of unanimity, the cost would be nil. However, unanimity decision-making rule can hardly be adopted since it would re-introduce strategic behaviour and prevent from resolving dilemmas. On the other hand, any less restrictive rule affects minority groups.

Type 2: Decision-making costs

This is a resource cost associated with reaching agreement of two or more individuals. Positions must be communicated and surplus bargained. Bargaining uncertainty may prolong the game until the parties agree to a division of surplus. Note that on private markets with a large number of participants, each individual is price taker and there is no problem over the division of surplus. In collective decision-making, each individual is conscious of the existence of alternative solutions that would have left him better off, so he may be willing to bargain for another solution that would make him better off at the expense of the others. This is expected to grow with larger n .

Moreover, when the number of participants is greater than two, a shared sense of fairness – called a "focal point" – may be required (Haller 1986).

Type 3: Principal-agent incentive costs

Only theoretically are constituents perfectly represented by their bargaining agents. In fact the election process is a competition which attracts imperfect agents and features adverse selection.

Type 4: Cost of surveillance

The authorities have their stake when informing about their activities. As a result, the bias can be corrected by private means (media), which means social costs.

Type 5: Revelation costs and inter-temporal costs of biased research

Certainly, to discover that a public good might be provided is also a public good. Information on benefits and costs of collective activity is not available at zero cost. Nor preferences over bargaining outcomes and the resources of participants are common knowledge.

Because of distorted incentives of public sector, resources devoted to the public research are scarcely effectively employed. First, there is a trend to look for public solutions only and suppress private ones, since they limit discretion. Second, there is no time left for long-term non-interventionist solutions to emerge. A public dilemma of lacking incentive to search for a technology of exclusion is present, as asserts economics of time and ignorance.

2.2.1 Determinants of external costs

We have seen that external costs and decision-making costs are determined by the size of majority. Interestingly, external costs are determined both by the size of majority and the scope of collective action. I shall demonstrate the two factors exhibit a trade-off – external costs are higher for a big number of dilemmas (more extensive collective action) and increase when the size of majority sufficient to pass a post-constitutional decision is falling.

Define m as the size of majority ($\frac{1}{2} \leq m \leq 1$), and n as a number of collective dilemmas. Imagine multidimensional decision-making with n dimensions (each dimension is one dilemma). Utility U_i of the player i is given by the absolute distance of the i -th optimal point $A_i = (a_1, \dots, a_n)$ from the outcome of the decision-making procedure $O = (o_1, \dots, o_n)$

(i.e. indifference curves are circles with centre in A_i). The distribution of optimal points is symmetric with respect to O , so $E(A_i) = O$.

All in all, we have an equation (2.1).

$$U_i = \sqrt{\sum^i (a_i - o_i)^2} \quad (2.1)$$

Now, define C_E as external costs. It is determined by two variables (see equation 2.2):

$L(n)$ - Heterogeneity of preferences (A_i) in the dilemma.

$VP(m)$ - Voting power for a player in a committee with stable number of representatives, and majority m . In the game-theory literature, it is found that $VP_m \leq 0$.

$$E(C_E) = f[L(n)]g[VP(m)] \quad (2.2)$$

How is the heterogeneity of preferences influenced by the number of dilemmas, n ?

Suppose variance is increasing in n by $L(n) = \sqrt{n} \text{Var } \theta$.

Generally, for issues of different importance we have:

$$L(n) = \sqrt{n} \sqrt{\text{Var } \theta^2} \quad (2.3)$$

$$L_n \geq 0$$

Assume f to be a positive monotonic transformation over L ($f_L \geq 0$), i.e. $f_n \geq 0$. I do not specify function f for it only describes riskiness of heterogeneity of preferences – the more diverse opinions, the higher external costs in each instance from the set of available solutions (recall the set is given by m).

By combining (2.3) and positive monotonicity of f , we receive the following:

$$dC_E/dn \geq 0 \quad (2.4)$$

Hence, with a higher number of issues, expected external costs grow up.

As regards g , assume it to be a negative monotonic transformation, such as $g_{VP} \leq 0$, and $g_m \geq 0$. The function g (incompletely specified like f) describes the fact that with lower voting power, the outcome will be less in player's interests.

By combining monotonicity of g and $VP_m \leq 0$ (see definition of $VP(m)$), we can infer that:

$$dC_E/dm \leq 0 \quad (2.5)$$

The trade-off between determinants of C_E is a result of (2.4) and (2.5). An increase in m and a decrease in n are substitutes, both serving as means of decreasing expected external costs.

2.2.2 Diminishing external costs by unanimity with packages

The safe way to ensure that none party is affected on the post-constitutional level is to allow unanimity rule even. It clearly ensures that only Pareto optimal changes are adopted. But, as we saw in definition of decision-making costs, the might level of acceptance implies a loss – delays, salaries to negotiators etc. Moreover, if losers cannot assess the benefits of winners, and ask a lot during compensation, this will make the winners withdraw the project. Overall, large compensation power is handed over to losers of the projects. On the other hand, the winners have a strategic incentive to underestimate their benefits.

All in all, it is conceivable to say that the unanimity rule under bargaining uncertainty leads to an undersupply of collectively efficient projects, or to prohibitive delays.

On the other hand, majoritarian rules imply redistribution. Ex ante, it is costly because of external costs, and ex post we can add effects of distortionary taxation.

Erlenmaier and Gersbach (2000) developed an interesting remedy to this problem. They hold that a combination of *unanimity rule* and *single voting about a broad package of public projects* is least costly both as regards external and decision-making costs. Their proposal lies in a two-stage decision-making:¹⁴

¹⁴ Interestingly, the 2-stage procedure to some extent resembles what is coming in Section 3.4.

Stage 1: A package is proposed. Its composition is in competence of autonomous agenda-setter. The limit is that a package can be proposed only once in a term, so that strategic behaviour is reduced.

Stage 2: The package is adopted or rejected. If rejected, single projects are open.

The reason to accept the package (including projects with negative benefits) is that a lower overall tax burden shall be connected to it. Thus, the tax externality of redistributive measures is internalised by those who propose their bills.

The authors say the procedure must be accompanied by the following three rules:

- a) **Amendment rule.** If an initial proposal, which might include a whole package of public projects, has been rejected, a next proposal can include only one single project. This rule prevents from strategic voting.
- b) **Maximal taxation of the agenda setter.** The agenda setter pays the highest taxes he is proposing. In other words, only the players with the strongest interest (thus, highest willingness to pay) become the agenda-setters.
- c) **Ban on subsidies.** This limits compensation options of the losers; now, it is only possible to lower the tax burden.

A full proof and discussion on this prospective proposal is given in Erlenmaier and Gersbach (2000).

2.3 Constitutional game behind the veil of uncertainty

To return to our constitutional game, we shall first explore „laissez-faire“ alternative. Its expected costs equal zero ($C_E^{LF} = 0$), but what are its expected benefits (B_E^{LF})?

We saw that in multilateral setting free rider incentive is extremely strong since the option of punishing strategy in tit-for-tat strategy is not binding, thus non-credible. The players know they will be heterogeneous after the curtains of ignorance are dropped, and may look forward to seizing a chance to free ride on groups that will resort to unilateral cooperation.

Let us assume that the laissez-faire game is zero-sum in a sense that the gains of the free-ride are fully incurred by the cooperative group. The potential free-rider doesn't know whether he will have a high need for a certain public good and, consequently, if it will have to join the cooperative group. So, on the constitutional level, the expected effects cancel each other (the game is zero-sum), and the expected benefits are given only by the amount of public good provided by cooperative groups. It is reasonable to assume that this is a very low number.

In effect, expected benefits of laissez-faire are only marginally above zero, and so is the expected profit of the laissez-faire option:

$$P_{E}^{LF} = B_{E}^{LF} - C_{E}^{LF}$$

Let us denote the expected profit from incomplete contract as P_{E}^{IC} :

$$P_{E}^{IC} = B_{E}^{IC} - C_{E}^{IC}$$

If gains from cooperation are substantial (high B_{E}^{IC}) and external costs relatively small (low C_{E}^{IC}), we can see that:

$$P_{E}^{IC} > P_{E}^{LF}$$

The next problem is whether there is any bargaining involved during constitutional game. Since nobody is certain about his future position, he cannot negotiate for any special rule. All players are homogenous, so it will be virtually impossible to negotiate something else than equal rules for all, since otherwise the proposal can be refused. The players have exactly the same incentive to adopt the incomplete contract. So, it is rational for all of them to accept a fair rule.

2.4 Concluding remarks

Unlike Chapter 1 this section has been devoted to a very broad line of reasoning. Its goal was only to point at the origins of incomplete constitutional contracts. There are numerous caveats to the argument, however. The above shown constitutional game is explained rather informally and much is missing to find completely specified solution. There are other, methodologically serious doubts, too:

- 1) Is the way the veil of ignorance is specified realistic or not?

- 2) On the basis of what are the players able to assess the external costs? (The metastructure of preferences given by expected utilities can be prohibitively difficult to internalise.)
- 3) Where did the individuals get knowledge about the effects of decision-making rules? (Experts often disagree on their effects.)

The very simplified argument in this chapter has illustrated how constitutional games played under uncertainty may lead to agreement on an incomplete contract. But this very interesting area of constitutional economics needs a lot of clarification. One example of this is given in the coming section, when it is formally shown how to minimise costs of incomplete contracts.

3 Division of powers as constitutional insurance

3.1 Coping with collective decision-making costs

As yet, it has been stressed that optimal post-constitutional architecture is to be determined by two factors – *costs* of collective decision-making, and the *nature of collective goods* provided (excludability of benefits, technology of supply etc.). Of the two, the former is subject of primary interest in the current section.

3.1.1 Accounting for costs of redistribution

External costs, broadly speaking, have been understood as inevitable side effects of preference diversity. In addition, external costs emerge in redistribution schemes when the more lucky parties have to hand over a share of their income, which happens whenever they earn income above the average. Nonetheless, some constitutional economists (Mueller 1989, p. 433) assert that pure redistribution scheme must be adopted as a complete (perfect) contract, or it will not be adopted at all; therefore, by his logic, the costs of redistribution fall not into the category of external costs *ex ante*.

Provided the veil of uncertainty is perfect, and no other external factor intervenes, it is undoubtedly the constitutional contract that sets all details of redistribution. We can well think of external factors, anyway, which would influence the redistributive system – like war, breakdown of public budgets and so on. A political system rid of possibility to change the scheme would have to keep running a very inefficient system, and this is not in constitutional interests of the players. In a very general sense, we can think that at least the magnitude of redistribution is likely to be set in post-constitutional stage, which means that majoritarian political institutions, i.e. ordinary democratic decision-making procedures, play role also in respect to a part of external costs imposed by redistribution. But this issue deserves to be comprehensively explored and settled in a special study.

3.1.2 From “principal vs. principal” to “principal vs. agent”

In Section 2, the cost side of the “constitutional account” was supposed to be determined by the level of majority. The major topic was reconciliation of conflicting ends of *effectiveness* and *representativeness* – a huge trade-off problem recognised both

in political economy and modern political science. Yet economisation on costs of collective decision-making involves more features, and is a far more complex question.

The publicly-induced dilemmas appear not only between heterogeneous parties of contract (heterogeneous “principals”), as there are dilemmas between appointees (agents) and those appointing (principals). The agents have more information, and may not behave in accordance with interests of their principals. Or, they may relocate burden upon different principals. The agents are neither omniscient nor omnipotent, thus facing knowledge-problem, and incentive-problem. In the end, provision of a pure public good by a government may not significantly improve efficiency.

This is even more striking where agent’s ”mission” is non-clearly specified (as it holds in incomplete contracts). The principal-agent relationship, as termed by neoinstitutional economics, is a problem calling for an incentive mechanism to be put into place to motivate the elected officials.

Agency theory thus attempts to design an optimal contractual arrangement between a principal and an agent. It takes into account the problem of asymmetric information - when an exogenous risk factor intervenes in the provision process, the agent’s effort is no longer uniquely tied to each outcome. Rather, a distribution of outcomes is associated with each effort level and the effort level is known only to the acting agent. In firms, more efficient contracts often involve the sharing of risk between the principal and the agent.

As regards contents of this section, I will not deal with asymmetric information¹⁵ for simplicity, but will consider rent-capturing of the officials for which there is space in any political body which possesses with discretion. Rents are to be perceived in a broad meaning, comprising all resources diverted from optimal allocation of resources. Rent-capturing occurs not only by purpose of politicians. There are also alternative reasons:

- Informational barriers that make it costly to achieve information. (There is organisational “slack”, as discussed in comparative studies of efficiency of private and public sector.)
- Bureaucracy with own productivity function. (Niskanen 1994)

¹⁵ A simple extension towards “informational rents” can be found in Persson, Roland, Tabellini (1997).

3.1.3 Disciplining agents

Any mechanism of disciplining agents is costly for exactly the same reason that makes it costly to reduce costs related to “principal vs. principal” problem. Once we restrain agents, they cannot respond to unforeseeable situations. In a very “regulated political market”, political entrepreneurship may be blocked and thus perform very slowly; the true entrepreneurs will consider opportunity costs in private markets, and the politics will be a domain of class of inflexible retired persons. All in all, regulation of political markets leads to various static and dynamic effects, which are difficult to assess.

A large variety of measures have been used in current political systems. I have selected some important ones and sorted them from the simplest to the most complex provision:

- Law on conflicting interests
- Constrained immunity
- Auditing Bureau
- Constitutional Court
- Separation of powers
- Elections

The purpose of this section is to focus on fifth point, namely on separation of powers. I shall demonstrate separation of powers can be an effective constraint disciplining politicians, involving very little implementation and monitoring costs.

The separation (or division) of power does include the two features:

- *Division of responsibilities*, i.e. exclusivity in realms of competence (also called separation of powers in a narrow sense). I shall demonstrate (Section 3.4) that having only this feature, we only increase malign behaviour of the representatives. An explanation of why a functional division of powers without any checks and balances hurts voters is given in Brennan and Hamlin (1994).
- *Checks and balances*, i.e. shared responsibilities (joint agreement in other words). As long as the branches of government are composed of different conflicting people, there are competitive efforts, which serve voters’ interests.

In the upcoming approach, a very general division of power will be introduced, with only the executive and legislative branches of government the only two bodies. This neglects nuances of existing arrangements which actually differ a lot from each other: there are systems with strict separation of powers (presidential systems, represented by the U.S.) on one side while there are also systems which blend executive and legislative power (the classic example is the Great Britain). The division of power also includes judicial power.

On top of that, we should be concerned about effective, not nominal separation of powers. That is why a party system should be incorporated in the analysis. In constitutional setting, the party system can be influenced by electoral laws so effective division of powers can be prepared already at the constitutional phase. Some crucial factors nevertheless can hardly be "engineered" when constructing separation of powers. Most importantly, coalition of parties and their coalitions can only to some degree be designed by electoral laws. The two-body system is a first step for understanding effects of the division, and the study is open to numerous extensions.

3.2 Executive vs. legislative power

The principal-agent problem arises mainly in case of incomplete contracts, when there are not well-defined payoffs for all states of the world. The elected officials can capture rents and their activities remain unnoticed. For this case, only implicit incentive schemes are available.

However, even under perfect information the agents capture rents regularly. I shall demonstrate a certain level of rent-capturing is accepted on the political market, reflecting the power (discretion) the representatives have in-between elections. This shall be explained in subsection 3.3. The level of rent-capturing can be influenced, however. Thus I identify two variables – separation of powers, and periodicity of elections – and use them as the main modes of discipline-raising.

In my study, I will use simple but completely specified extensive-form games. My reasoning is based on three works: Shepsle (1979) makes an explanation of the structure-induced equilibria; Persson, Roland and Tabellini (1997) discuss political accountability – this is the major source of inspiration; and, finally, Padovano, Sgarra and Fiorino (2003) refine Persson et al. by incorporating judicial power.

3.2.1 Assumptions

There are two political bodies, the *Executive* and the *Legislature*. I do not explicitly model their utilities; only suppose they *maximise rents over the period in office*. When maximising rents, they trade in probability of re-election for the size of rent-capturing.

The rents include of all conflicts of interests between the executive and voters – not only rent-seeking per se (covert stealing), but also salary above competitive rate, and side payments by third parties. The rent-capturing behaviour describes any departure of allocation of resources from the optimal allocation – for example, the regional redistribution of region-specific goods, inefficiencies of procured companies etc. In our model, we shall replace this consideration by one method – by diversion of resources for a public good production.

So, we have a public good provided at the level g_t . The amount of public good is dependant on productivity of production a_t , which is assumed to be a positive random variable identically distributed over-time ($0 \leq a_t \leq 1$, $a_t \in \mathbf{R}$). The production has constant economies of scale.

The rent-seeking behaviour is captured by variable r_t , denoting the proportion of the total product diverted by the political bodies. The total rate of rent-capturing can be negative (only $r_t = 1$, $r_t \in \mathbf{R}$ apply).

Thus, for exogenous tax costs (we presume a unit), the following level of public good is provided:

$$g_t = a_t(1 - r_t) \quad (3.1)$$

For the moment, suppose we have only one political body, namely the Executive. As stated in the introductory paragraph, it shall maximise the following term:

$$\sum_t \delta^t r_t$$

Next we assume homogeneity of pool of potential executives. Simply, any removed politician will be replaced by equally economising person.

Another assumption is homogeneity of voters. This allows us to create the representative *Voter* maximising the above discounted sum of rents.

From (3.1), we conjecture a clear conflict of interest between the Executive and the Voter exists:

$$\frac{\partial g_t}{\partial r_t} = -a_t < 0 \quad (3.2)$$

Now it remains to clarify the relationship between the Voter and the Executive.

3.3 The minimum price for discretion (Model 1)

Two disciplining measures exist – *periodic elections*, and the *separation of powers*. I shall limit the argument to the former mechanism only, leaving the latter for next subsections.

As we have assumed earlier, we have one political body (Executive) being disciplined by the elections. In this model, each period is composed of four steps:

- The Executive observes realisation of a_t and chooses r_t with respect to prospects of re-election.
- The Voter observes g_t .
- As full information is available in Model 1, the Voter observes a_t .
- The Voter evaluates the Executive according to performance in period t , namely according to g_t (or a_t , respectively).¹⁶

¹⁶ This assumption is restrictive, since evaluation based on historical performance would improve situation of the Voter. Persson, Roland and Tabellini (1997, p. 1171) claim that "historical-dependent voting rule would be optimal only under the assumption of commitment across periods." As a result, we have dynamic inconsistency, a problem well-known from the previous section.

This set-up is a genuine game between Executive and a representative Voter. Is there an equilibrium solution with dominant strategies fitting this game?

3.3.1 Game

An obvious and first-shot idea is that an equilibrium is at $r_t = 0$. Why should the Voter allow the Executive to keep the office if it overtly captures some positive amount of rents?

The reason is that for the Executive, the best alternative strategy of striving for re-election is to grasp *all* rents and then be laid out. Accordingly, we can define a lifetime value of the office for the Executive – it is equal to capturing *all* rents in one term.

$$V_{min} = r_{max} = 1 \quad (3.3)$$

Of course, in reality, there are substantive mechanisms blocking such discretion. If it were possible to evaluate their efficacy, we would be able to replace $V_{min} = 1$ with a smaller value. That is why I keep V_{min} instead of a particular number.

Any “cooperative strategy” is thus bound to offer the Executive a lifetime profit V_C at least as big as the lifetime value of the office. The one-term rent r_m will be positive, then. In order to continue, the Executive must be sure that (3.4) holds:

$$EV_C = \sum_t \delta^t r_t = V_{min} \quad (3.4)$$

We have to find $r_m = r_t$ for all t such that (3.4) holds. By counting up an infinite series and re-arranging the equation, we get:

$$r_m = (1 - \delta)V_{min} \quad (3.5)$$

Let us perceive r_m to be *maintenance rent*. To put it blatantly, it is *the minimum price for discretion*, the power handed in the Executive. We can conclude: If the promise of

future payoff of r_m is credible, the Executive is indifferent between r_m in every period (plus certainty of being re-elected), and taking all rents (r_{max}) in current period.

In consequence of that, we have:

$$g_t = a_t \delta V_{\min} \quad (3.6)$$

3.3.2 Implications

1. Prospective politicians are less costly

One can see that the more the future is discounted (the lower δ), the higher r_m is. A future-oriented Executive (with high δ) is thus favourable for Voters.

However, assuming heterogeneity is not sufficiently to be welcome. We would have to model entry/exit procedure, and, above all, discuss whether adverse selection phenomenon is involved in the process of selection of the Executive.

2. Counterproductive limits on re-election

In this highly stylised model, imposing limits on re-election (several terms only) drastically increases r_m . To be precise, $r_m = r_{max}$. Only in less stylised models the effect may be mitigated.

An intuitive explanation can be provided recursively. Suppose we have an n -term limit. What is the Executive supposed to do in $n-1$ period? Unsurprisingly, it will take all and leave. The Voter knows this and therefore the effective limit is $n-1$ periods. But what the Executive does in period $n-2$ if it knows that the limit is $n-1$ periods? Again, it will take all and leave. This will make the Voter decrease the limit to $n-2$ periods, and, recursively, to one

Since the Voter *cannot* credibly restrain itself from sacking the agent, the Executive takes up the opportunity in the first period and extracts as many resources as possible. Paradoxically, a measure designed to improve accountability of Executive works in the opposite direction – it induces the politicians to capture as much as possible over the first period and then leave.

3.4 Simple division of powers (Model 2)

By presenting two decision-makers in Model 2, I shall introduce separation of powers. I aim at proving that non-constrained separation of agenda brings no improvement.

As has been specified in assumption, the second player shall be called the Legislature, behaving in the same manner as the Executive. (Note we use this labelling even though the same division of responsibilities might be understood as separation between any couple of decision-making bodies, like two chambers, local and central government etc.).

For the time, the separation of powers means that *each agent sets its own level of rent-capturing*, r_e and r_l (for example, imagine they prepare their parts of budget). Each body is thus the full agenda-setting power in its area of competency and no joint agreement or any other kind of obligatory coordination of two bodies is required. (This can be further modified, as shall be discussed in subsection 3.6.)

Their rents are bounded, however, in the way that the sum of rents captured r_e+r_l is perceived by the Voter as one inseparable sum r_t . So, even if the Voter elects the Legislature independently on the Executive, it can evaluate only current performance of both. This makes agents' behaviour interdependent, and the Voter can only re-appoint both agents simultaneously, or get rid of both of them.

The public good is offered at the following amount:

$$g_t = a_t(1 - r_e - r_l) \quad (3.7)$$

3.4.1 Publicly induced externality

At first, let us frame the problem. We shall presume that the Executive sets r_e , and, similarly, Legislature decides on its r_l . If $r_e+r_l < 1$, their "demands" are satisfied. If not ($r_e+r_l \geq 1$), all rents are split equally: $r_e = r_l = 1/2$.

Total rent-seeking

Consider which vector of demands has a chance to be a self-enforcing equilibrium. The first equilibrium will be reached by all couples r_e, r_l that lead to $r_e = r_l = 1/2 = r_{total}$. This holds, as we know, for demands such that $r_e+r_l \geq 1$. We may this equilibrium a "total rent-seeking exploitation" ($g_t = 0$).

The Voter, in order to keep a chance of a more promising equilibrium, must respond to these demands by removing the agents from the office (although new holders of office will behave the same). By analogy to Model 1, we can say the lifetime value of the office for each player is equal to $V_{total} = 1/2$. Each alternative strategy must be as profitable as this.

So, does a Voter have any chance to induce the agents to get into a less rent-diverting equilibrium, and secure any positive amount of public good?

Moderate rent-seeking

Consider an equilibrium in which both players are indifferent whether to continue in the offices. Again, we know from (3.4) this happens only when $EV_C = V_{min}$.

Now, the difference is that V_{min} is definitely not equal 1. No player can grasp total product when he decides to withdraw unilaterally from the office. In an equilibrium with the counterplayer suggesting r_{eq} , the maximum rent to extract in one term will be $V_{min} = 1 - r_{eq}$.

We can also remember that the subsequent goal was to find r_m corresponding with (3.4). If we replace r_m by r_{eq} , we can look for the for an equilibrium value r_{eq} :

$$\begin{aligned} EV_C = V_{min} &\Rightarrow r_{eq}/(1-\delta) = 1 - r_{eq} \\ r_{eq} &= (1-\delta)/(2-\delta) \end{aligned} \quad (3.8)$$

At this point of argument, we have to compare the two equilibria. We will do so by comparing lifetime value of each strategy, V_{total} and V_{min} :

$$\begin{aligned} 0 \leq \delta \leq 1 &\Rightarrow r_{eq} < 1/2 \\ V_{min} = 1 - r_{eq} &> 1/2 = V_{total} \end{aligned} \quad (3.9)$$

Therefore, this equilibrium value of rents in *moderate rent-seeking is superior* to the total rent-seeking exploitation. All parties are satisfied in comparison with the former equilibrium – the Voter gets strictly positive amount of public good, and both the

Executive and the Legislature achieve higher EV_C as they are reappointed in their offices.

Evaluation of Model 2

The only but crucial drawback of this procedure is that the dominant equilibrium is still worse comparing to the simple model with one decision-maker. Suffice to compare total costs:

$$\begin{aligned}
 TC_1 &= r_t = 1 - \delta \\
 TC_2 &= 2r_{eq} = (2 - 2\delta)/(2 - \delta) = 1 - \delta/(2 - \delta) \\
 TC_1 &< TC_2 < 1 = TC_{total} \quad (3.10)
 \end{aligned}$$

Total costs of the moderate rent-seeking equilibrium (TC_2) are smaller than in the exploitative equilibrium, but still prevail over the costs in a situation with no other player but Executive. This is a pessimistic outlook for the division of power. The common view of division of powers as functional division of competencies seems to be false – pure separation of agenda is not an improvement, if we consider total amount of rent-capturing.

3.5 Agenda setting power vs. veto power (Model 3)

Persson, Roland, and Tabellini (1997) offer a model in which the division of power is treatment to the extent that the rent-capturing matches the situation with one decision-maker. Their model can be achieved by refining the previous thoughts (instead of their labels, I keep mine for consistency).

First and foremost, suppose the two agents (Executive and Legislature) have to agree on a proposal. The Executive has got exclusive *agenda-setting power*, while the Legislature has got *veto* at disposal, but it cannot change the proposal at all. It is all-or-nothing decision-making for the Legislature.

After a_t gets realised, the Executive prepares a proposal with r_e, r_l . Since hard-budget constraint applies, the Executive is limited by providing a non-negative amount of the public good $g_t = a_t (1 - r_e - r_l) \geq 0$. If the proposal passes the Legislature, it becomes valid, and it will be upon the Voter to appoint or replace any of the agents.

Whereas if the proposal fails to pass the Legislature, it is assumed that a predetermined status quo prevails, with $r_e = r_e^{sq}$, $r_l = r_l^{sq}$.¹⁷

Penalty for disagreement

We have to introduce one more detail that restrains options of the Voter. So far, we have told the Voter can base the reappointment only on the current performance of the agents,¹⁸ even if it could theoretically follow plenty of alternative decision-making rules. For now, we shall restrain the Voter by one more step - it shall be necessary for our model to work to presume that Voter demands agreement from the Executive and the Legislature.

What if it did not? Then it could happen that the Voter would block any proposal arriving from the Executive and the Legislature. It is because for relatively small r_e^{sq} and r_l^{sq} , it would be best for the Voter to maintain the least costly status quo. But this is strikingly unrealistic. We know that the Voter would suffer from inability of the agents to reach an agreement as the provision of the public good would be affected (the government would break down). However, in this very simplistic model, we do have not considered that the status quo would mean lower capability of public good provision.

Therefore, Persson, Roland and Tabellini (1997, p. 1180) suggest including a penalty (denote it p) into the payoff of the Voter:

$$g_t = a_t (1 - r_e^{sq} - r_l^{sq} - p) \quad (3.11)$$

I suggest another possibility, i.e. making the productivity of public good provision diminish:

$$g_t = (a_t - p)(1 - r_e^{sq} - r_l^{sq}) \quad (3.12)$$

¹⁷ These relatively small amounts are determined exogenously. For our purpose, suffice to have $r_e^{sq} < \delta$ and $r_l^{sq} < 1 - \delta$. The status-quo values can be elegantly interpreted as provisory budget, which typically provides smaller budgetary flows than in proposed budgets.

¹⁸ The assumption may be legitimised by myopia of the median voter.

Either way, the penalty is here only so as to push the Voter to require agreement from the Executive and the Legislature.

Maintenance rents

Like in previous models, we are looking for a sustainable equilibrium. The game is played between three players, each setting up his own variable. Their activities are interconnected as can be seen on Figure 3. The sub-index m denotes maintenance-value – as usually, this is a one-period rent whose lifetime value over infinite time equals the value of grasping all the product in one period.

As all variables are interrelated, we must assume at least one as given (suppose r_e^m) and derive the others; finally, we can define r_e^m backwards. The maintenance equilibrium will be a Nash-equilibrium, but we must also discuss if it can be achieved at all.

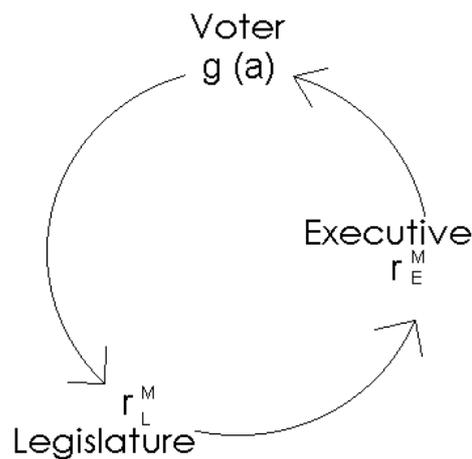


Figure 2.

Circle derivation of variables

Step 1: Voter

We shall begin with the Voter whose reappointment rule has far-reaching consequences. The Voter needs agreement of the Executive and the Legislature, as defined by the prohibitive penalty p . Therefore it is willing to sacrifice relatively high maintenance rents both to the Executive and the Legislature: $r_l^m + r_e^m$. The maintenance rent for the Executive must be transferred, otherwise the Executive proposes exploitative budget, that certainly meets agreement of the Legislature.

But does the Voter also have to offer maintenance rent to the Legislature? Not necessarily. The Legislature will accept any value of rent x such that $r_l^{sq} \leq x \leq r_l^m$. Shall it refuse, it would receive only r_l^{sq} as the best alternative.

As a result, the Voter can set an upper bound of total maintenance rent at a level $r_l^{sq} + r_e^m$. (Remember the Voter can observe only total maintenance rents.) At this level, g^m units of the public good will be available (see 3.13). It is up to the Executive to consider that offer.

$$g^m(a_t) = a_t(1 - r_l^{sq} - r_e^m) \quad (3.13)$$

Simply, g^m is the pivotal value for the Voter to reappoint the Executive and the Legislature.

Step 2: Executive

The Executive is virtually the key-player because of total agenda-setting power. Basically it can follow two strategies:

- *Maintenance*: keep maximum maintenance rents and stay in the office.
- *Exploitation*: in one period, cooperate with Legislature on capturing all rents, and then leave (take-and-leave strategy).

Of course, we are mostly interested in a), but it is interesting to see what happens if the Executive decides to collude with the Legislature on total exploitation.

Step 3: Legislature

So, which specific value r_l^m must be offered to the Legislature to resort to exploitation?

$$r_l^m = r_l^{sq} / (1 - \delta) \quad (3.14)$$

At this value, the Legislature is indifferent between exploitation and keeping office.

Step 4: Executive once again

Now, we are free to determine the Executive's maintenance rent as well, i.e. value at which the Executive feels indifferent between maintenance and exploitation strategy.

It is clear than in the exploitative proposal communicated to the Legislature, the total rents will be 1. The legislature will have to obtain at least r_l^m , so $1 - r_l^m$ is left.

$$1 - r_l^m = r_e^m / (1 - \delta)$$

$$r_e^m = [1 - r_l^{sq} / (1 - \delta)](1 - \delta) = 1 - \delta - r_l^{sq} \quad (3.15)$$

In (3.13), we have clearly an equilibrium. Is there any reason for any party to unilaterally violate this equilibrium?

It was discussed in Step 1 that Voter as a principal cannot discipline agents stricter than by offering maintenance rent $r_l^{sq} + r_e^m$. Therefore, the Voter will not act against this equilibrium.

Now it remains questionable why particular values r_e^m and r_l^m are stable. The Legislature may feel disadvantaged in this game comparing to the Executive, and find the outcome unfair. But, as we noted, its defective steps will bring it only r_l^{sq} gain. In our setting, the Executive has absolutely no incentive to grant it more, since $r_e^m = (1 - r_l^m)(1 - \delta)$. In addition, when they decide to collude for exploitation, the Legislature has zero bargaining power. Why? Had it wanted more than r_l^m , less than $1 - r_l^m$ would remain for the Executive, but this is less than infinitely discounted value of r_e^m , so it is by no means acceptable.

Evaluation

To evaluate the equilibrium, we shall combine equations (3.13) and (3.15).

$$g^m(a_t) = a_t(1 - r_l^{sq} - r_e^m) \wedge r_e^m = 1 - \delta - r_l^{sq} \Rightarrow g(a_t) = a_t\delta \quad (3.16)$$

Total costs yield:

$$TC_3 = r_l^{sq} - r_e^m + r_l^{sq} = 1 - \delta$$

This is the same result as TC_1 in Section 1.3.2 with only Executive. Although the Voter cannot see who is capturing resources, the level of rent-capturing is on the same level.

We can conclude that this model, in contrast to unconstrained separation of powers, at least does not make extra harm to the Voter.

3.6 Separation of powers by 2-level joint agreement (Model 4)

3.6.1 Semper et aude – a pure conflict of interests

Is separation of powers of any use from the point of view of the Voter? Is it able to limit rent-seeking activities? There is an affirmative answer to this question, given in Person, Roland and Tabellini (1997). They highlight a need to put the agents into genuinely conflicting relationship.

Consider the following procedure that is not far from ordinary parliamentary decision-making (budgetary) procedures. It has been illustrated as an algorithm on Figure 3.

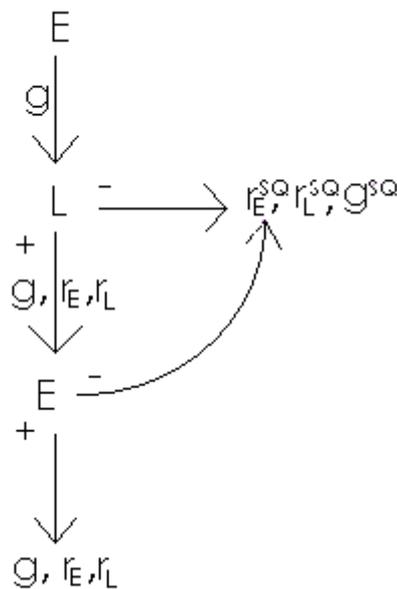


Figure 3.

2-stage joint agreement

The procedure can be decomposed in three steps:

- The Executive (E), knowing the realisation of random variable a , proposes a total amount of provided public good. Simultaneously, the proposal includes a sum of rents for both the Executive and the Legislature.

- The Legislature (L) can block the proposal or let it pass. In the case of agreement, it has the right to specify r_e and $r_l = 1 - r_e$ (the sum is given by the Executive).
- Now it is up to the Executive to approve the proposed rents, or block it.

Any rejection leads to the status quo defined as $[r_e^{sq}, r_l^{sq}, g^{sq}]$. Furthermore, not any secondary procedure of reconciliation is available.

In this game, we have two decisions – on the *total* amount, and regarding *specific* composition. Both have to be agreed jointly, as in the previous model, and in both cases there is an exclusive agenda-setter. The innovation is that they are *two*, not only one, and the two always fall in hands of a different body. This implies very attractive properties.

Game

The Legislature has the crucial role in defining specific amounts of rents. Theoretically, it could propose 0 for the Executive. The problem is that the Executive's opportunity costs are r_e^{sq} , so it will offer exactly this payoff (or an infinitesimally higher rent). Otherwise its proposal would fail.

The Executive would like to take this amount and be rewarded by reappointment as well; it is because the only (clearly worse) alternative is to take the amount and be sacked. Therefore, it is bound to propose such total g that provides both Legislature and Executive exactly maintenance rents. If it proposed less, the proposal would fail since either of the parties would have to block it. In contrast, suggesting more would be a useless gift for the Legislature and, accordingly, would be punished by the Voter by a layoff of both.

As a result, we have a unique two-tuple that is acceptable for both the Legislature, and the Executive. The Voter cannot hold back and demand more, since the amounts are equal to opportunity costs of the agents. This deserves a slightly more precise statement.

Maintenance rents

Specifically, what are the opportunity costs of the agents? These are r_e^{sq} and r_l^{sq} in this case.

It is very promising for the Voter to see that they are significantly smaller than total exploitative rents in Model 2, namely 1.

If maximum amount to be exploited in one period is r_e^{sq} , the maintenance rent for an infinite period is:

$$\begin{aligned} r_e^{sq} &= r_e^{m2}/(1 - \delta) \\ r_e^{m2} &= (1 - \delta) r_e^{sq} \end{aligned} \quad (3.17)$$

An analogy for the Legislature yields:

$$r_l^{m2} = (1 - \delta) r_l^{sq} \quad (3.18)$$

Once again and more precisely, let us check whether $r_e^{m2} + r_l^{m2}$ can be total maintenance rents (denote r_{total}) that shall be permitted by the Voter. Put in other words, whether

$g^{m2} = a(1 - r_e^{m2} - r_l^{m2})$ is a cut-off value.

Let us first think about the intermediary step made by the Legislature. One option for the Legislature is to propose $[r_e^{sq}, r_{total} - r_e^{sq}]$, since the Executive will take anything as large as the status-quo payoff r_e^{sq} . The other chance is to propose a cooperative combination that would made both players stay in the office.

The Executive, in the first step, is thus forced to propose g^{m2} – only this keeps a chance that it will retain the office (this may or may not happen; in any case, it will receive r_e^{sq} – either in one period, or dispersed over time).

Now back to the Legislature. It could propose the combination $[r_e^{sq}, r_{total} - r_e^{sq}]$, and remain in the office. But, what for? A better option is to propose $[r_e^{m2}, r_{total} - r_e^{m2}]$. This will have the following advantages:

- The payoff for the Legislature is higher: $r_{total} - r_e^{m2} > r_{total} - r_e^{sq}$.
- The agents remain in their offices (at least it is not worse).

- Since the agents keep their offices, we can compare the lifetime value of periodically paid r_e^{m2} to r_e^{sq} – it is equal, so the Executive will not oppose the proposal.

Consequently, the Legislature strictly prefers $[r_e^{m2}, r_l^{m2}]$ to other combinations such that g^{m2} is maintained. The Executive weakly prefers $[r_e^{m2}, r_l^{m2}]$ to $[r_e^{sq}, r_{total} - r_e^{sq}]$ (the best alternative of the Legislature). The conjecture is that g^{m2} will be set by the Executive and that the combination $[r_e^{m2}, r_l^{m2}]$ will be proposed by the Legislature. The Voter will accept this level of maintenance rents.

What are the total costs?

$$TC_4 = r_e^{m2} + r_l^{m2} = (1 - \delta)(r_e^{sq} + r_l^{sq}) = (1 - \delta)r$$

Comparison of Models 1-4

A comparison of total costs in all models to be found in the Table 3.1:

Table 3.1

Total costs in all considered models

Model		Total costs
1. Single decision maker	TC ₁	1- δ
2. Pure division of powers	TC ₂	1- $\delta/(2-\delta)$
3. Simple joint agreement	TC ₃	1- δ
4. Two-level joint agreement	TC ₄	$(1 - \delta)r^{sq}$

Note: $0 < r^{sq} < 1$; $0 < \delta < 1$

By comparing all the models, we see the constraining ability of the fourth model.

$$TC_4 < TC_1 = TC_3 < TC_2$$

This is a promising mechanism for players who aim at minimising collective decision-making costs during the constitutional contract.

It is proper to discuss the logic of the model in some details. First, it should be stated clearly that the mechanism holds only for two agents. We need only one of them to be a “residual claimant” who will always be offered its *exogenous* status quo payoff. If it holds, it is generally possible to prevent the residual claimant (who is also a total amount setter) from proposing excessive total amounts; the residual claimant will propose only as much as the other agent (with power to set details of agenda) receives its maintenance rent.

Second, if there is any additional distributional rule for both parties (given shares of the budget, for instance), then it will turn the situation back to the model of simple joint agreement. We need, as stated above, one residual claimant whom an exogenous amount will be offered. If a distributional rule exists in contrast, the amount is endogenised, and the effect disappears.

Third, any pre-play cooperation must be prohibited. In our model, we thus assume strict division of power, without collusion implying credible binding agreements. If it is feasible, the constitutional decision-makers can exploit a conflict of interest of the political bodies. They will propose the two-level decision-making rule that gives agenda-setting power to one body, and ties the other body to a predetermined status quo.

3.7 Possible extensions

In this section, I explored a possibility of the separation-of-powers mechanism to limit rent-capturing behaviour of political agents. The most effective measure, two-level joint agreement, is very simple, and in fact is often part of decision-making procedures.

Besides division of power, there are other constitutional safeguards, like the Charter of Rights, secession clause, or the institution of so-called “ombudsman” (from Swedish, it means “a representative”). But we need not introduce them, since the division of powers deserves more thorough attention. In order to make it a truly workable mechanism, it is necessary for economics of constitutional games to extend take steps towards different, more realistic assumptions. Let me name but a few the most important:

- *Asymmetric information* and informational rents and. Both mild and strong forms of asymmetric information play role, and make it difficult for voters to discipline the politicians; sometimes information about the state of nature is available, but is costly. It is up to external actors (media) to achieve economies of scale.
- *Elections* often serve more functions than limiting rent-capturing. These functions weaken the functioning of the separation of powers.
- *Outward monitoring*, or more structured division of power, respectively, is possible. In Padovano, Sgarra, Fiorino (2003), a model of separation of powers is enriched by incorporation of the judiciary power.
- *Bureaucracy* as the major channel of rent-seeking. The political economy of bureaucracy might be helpful in assessing whether separation of powers does work.
- More *complicated decision-making process*, specifically numerous budgetary rules, may be employed.
- Combining *effects of electoral system and party system* gives an undistorted picture of the effective division of power. Political science since 1960ies has been tackling this problem in depth. A good example of a recent contribution in the field is given in Sartori (1997).
- *Vertical division of power*. There is a broad literature not only on “fiscal federalism”, but also on “administrative theory of federalism”, i.e. the way policy decisions turn into allocation outcomes. It is based on New Institutional Economics in narrow sense - transaction-costs and principal-agent problems. See e.g. Holström and Tirole (1989).
- *Incorporating transaction costs* incurred by separation of powers; Posner (1987, p. 11) reminds us that separation of powers increases the transaction costs of governing, which is a finding reflected in well-known trade-off “representativeness vs. efficacy” in political science.

Conclusion

On private markets, individuals easily carry out exchanges and set contracts provided enforcement is guaranteed. An automatic enforcement mechanism by a third party does not exist in state-less environment, where players have to resort to other means of securing benefits from exchanges. Often, the only way to capture the gains are constitutional games. For example, non-existence of superior enforcement mechanism relates to international law cases (Non-Proliferation Treaty, for instance), civil wars in Africa, and the creation of the Constitution for the European Union.

The purpose of the study has been to shed light on the possibility of creation of such enforcement mechanism by a constitutional contract of externally unconstrained parties. A constitution can be a feasible solution of collective dilemmas the players face, but the main obstacle to its enactment are free riding incentives they face.

First and foremost, I proved two players can agree on fully specified commitment (a primitive constitution, or a *complete contract*) if they pass credibility threshold. A specific level of the threshold has been specified in a simple model. Also a mechanism of credibility building has been constructed. However, it has been shown that the same commitment cannot be adopted in multilateral games.

A successful constitutional game for n players apparently needs subsidiary assumptions. I have elaborated some of them, namely uncertainty over payoffs and homogenisation of players via veil of uncertainty. Then I have discussed whether n players agree on political authority with limited discretion. It is generally possible as long as expected benefits override expected costs, and the contract will be *incomplete*.

A great deal of the costs nevertheless arise in relation to a principal-agent problem that is pertinent within the government carrying out the incomplete contract. By introducing separation of powers I demonstrate that the costs can be lowered without significant trade-offs. Economising on costs, other things being equal, leads to a higher likelihood of adoption of incomplete multilateral contract. Division of powers thus makes constitution more attractive, and widens the set of positive solutions of constitutional games.

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