The fallacy of representative democracy and the random selection of legislators

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Abstract
In this paper we discuss the problems of modern representative democracy and we look at the random selection of legislators as an extreme form of the proportional political representation, arguing that it is the way to make representative democracy as close to direct democracy as possible. In this respect we present a new mathematical model which attempts at describing a more efficient parliament where part of the members are selected by lot. It will be shown that starting from a parliament working with two parties (or coalitions), where the costs of representative democracy are quite apparent, one can beneficially move towards a parliament where independent legislators, randomly selected from the population of constituents, sit alongside with party members. The paper shows that increasing the number of independent legislators up to a point enhances the efficiency of the parliament.

Keywords
Elections, Parliament, Democracy, Sortition, Efficiency

1. Introduction
It is deeply ingrained in our minds the conviction that we are free to run our own life and that any attempt to interfere with it should be strongly opposed. We are aware that there are constraints, but make a point of making sure that those constraints leave enough space for us to fully exercise our freedom. We, humans, like to entertain this idea and have long debated the issue of free will.

However, no matter whether humans are actually free or not, and no matter what it means to be free, we have built institutions designed to coordinate our decisions, with the obvious purpose of reducing the external negative effects of our overlapping decisions. The need for collective choices springs precisely from the impossibility for the market to solve such a source of inefficiency. When it comes to take collective decisions, humans have come up with a brilliant solution: voting. It would be interesting to ponder over how we came to decide that voting is the right way, whether by voting the voting system or by chance or by force. Regardless of how we came to decide that voting is the right way, we assume here that it is the normal way of coordinating our decisions. Generically speaking, when more than one option is available, the final decision can be reached in two different ways. We either vote directly for what we think appropriate, or vote for those who later will decide. In
the first case we call it direct democracy; in the second case we call it representative democracy.

The representative democracy calls naturally for an act of intermediation, which is usually played by those organizations called ‘parties’. Dealing with representative bodies, this paper follows the line traced by Downs (1957), and shares its fundamental hypothesis: political parties act to maximize something different from the constituents’ interests. According to Downs, the argument of the parties’ utility function is the number of votes they can collect in the elections. This could still lead to an overlapping of interests between parties and constituents but only as a matter of chance. So, what matters here is that the two different utility functions could eventually fail to coincide.¹

If the decisions to be taken were immediate, binary, based on perfect information, and implying no transaction costs, no reason would exist to prefer representative to direct democracy. For a decision to be immediate, its implementation should strictly follow, since any change in the original circumstances could make that decision no longer appropriate and timely. A decision is binary when it implies a choice between just two options. The existence of just two options, indeed, allows escaping any intransitivity problem; at the same time, it implies that the terms of the decision are inherently clear or that someone made them clear. Perfect information makes the devolution of the decision to anybody who could be better informed quite useless. Finally, the assumption of no transaction costs implies that voters, however large in number, do not slow down the decision, thus avoiding the risk of an untimely decision. Furthermore, the gradual reduction of transaction costs, which the digital technologies have recently made possible, could be feeding the desire to take common decisions without any form of intermediation. Indeed, thanks to such technologies, the number of constituents is not per se a reason to delegate: to collect the vote of millions of individuals only a few seconds are in principle necessary.²

If all these assumptions held, no delegation would clearly be necessary, and the parties would turn out to be an useless but costly gimmick. However, the sheer fact that constitutional representative structures exist throughout the world is an indication that one or more of such assumptions do not hold in all cases. When the assumptions supporting direct democracy gradually vanish, quite clearly the need of representation increasingly arises. The impact of the institutions of direct democracy is not unambiguous. Matsusaka (2005) shows that direct democracy does affect economic outputs of the countries that adopt it, but Blume, Muller and Voigt (2009) find that productivity and budget deficits are uncorrelated to the institutions of direct democracy.³ Hence, it is worth investigating further the impact of direct democracy as opposed to, or combined with, representative democracy.

¹ Downs, cit. p.137.

² It is not so obvious, however, that the Internet could effectively wipe out imperfect information: consider the current debate on the so called “fake news”. Alcott and Gentzkow (2017) provide a background to frame the debate about the influence of false stories for the elections for the President of the United States of America in 2016. They also propose some interventions, aimed at reducing the impact of fake news on future elections.

³ In fact, the two partially different results could also be attributed to the different panels that the two papers adopt: just Blume, Muller and Voigt, indeed, conduct the analysis on a cross-country basis.
The paper is precisely designed to discuss the economics of representative versus direct democracy, with special regard to the deliberation process. The final decision is based in both cases upon the option that commands the majority of the votes. O'Flaherty (1990) finds in the implications of the principal-agent model a convincing argument in support of the majority rule, but nobody seriously questions this issue in a democratic context. It is taken for granted that some people will have to accept the option they did not choose in the first place. In case they do not accept the majority decision, they will have to leave the agreed common system and organize their decisions in a different way.

If this is true in principle, nevertheless there exist organizations that do not allow individuals to leave them. This is the case of legal orders, which repress any individual attempt to refuse the formally adopted decisions. So, once the vote is cast, collective will is formed and everybody will accept the outcome of the vote. In this respect direct democracy and representative democracy are quite different. In the case of direct democracy voters are directly responsible for their decision. It is only minority voters who face disappointment, as they have to accept the will of the majority. In the case of representative democracy there could be a further reason for disappointment, as representatives could behave in a different way than promised and vote in favour of something different from what they received the vote for.

It may well be possible then that what emerges from the collective decision is not what the majority really wanted. A number of reasons may bring about such a departure. It may be the case that representatives are not faithful to their constituents; or it may be that new circumstances require a different view; or it may be that representatives follow the party line, which is not necessarily consistent with the view of most constituents. In all such cases they will not represent properly their constituents’ opinions. A problem arises then as to whether different representation mechanisms are flawed or not with this kind of problem. The making of collective decisions, therefore, is more troublesome when we ask somebody else to take decisions in our place.

Collective decision-making, therefore, when it is organized on the basis of representation, may be faulty and produce results that have nothing to do with the will of the majority. It could be argued, however, that constituents may not be competent enough to legislate, albeit indirectly, on every single issue. Once they select their representative in a parliament, or in any other legislative or regulatory body, they entrust that representative with the responsibility to decide according to some general agreed principles. Constituents do not expect to be fully and accurately represented, as they recognize that, on some issues, they may even be unable to develop any sensible thought. In that case they prefer their representatives to take responsibility and make a decision themselves, instead of going back to constituents for consultation.

It is generally recognized, however, that such a system may lead to decisions that greatly depart even from the general principles upon which the representatives had been selected. As Buchanan (1977) made clear, the fundamental reason for such a result is the misalignment between the utility functions of the constituents and the utility functions of representatives. This paper examines precisely this case, by making the simplifying assumption that individual representatives’ will is entirely subjected to the will of the party leaders. In other terms, every political party shows just one will, which coincides with that of its leader. So, the paper essentially examines the case, which effectively we find in several
countries, where a rigid party discipline applies. The economic literature has examined some implications of party discipline. Among others, Grossman and Helpman (2005) studied how it affects fiscal policies, and Eguia (2011) discussed some of its determinants. Nevertheless, to the best of our knowledge, neither its distortion effects nor the ways to correct them have been properly investigated.

Precisely because of party discipline, the collective decisions taken by representatives may offer a positive or a negative contribution to the general welfare, or even no contribution at all. It is only a matter of chance depending either on the personal characteristics of the party leaders or on the specific mechanism governing parties’ deliberations. Hence, what we have come to call ‘liberal or representative democracy’ may turn out to be fallacious, in so far as there is no certainty that the ‘people’s will’ finds its way into public decision-making. If direct democracy appeared untenable because of the strict assumptions required, representative democracy proves difficult, too. Although representative democracy may reduce transaction costs associated to the high number of voters typical of direct democracy, bring in the contributions of experts, handle not-binary questions, or design solutions which were not among those constituents had voted them for, it may be equally ineffective because of the way parties behave and the particular behaviour they expect from their members.

Is there any antidote against such an undesirable development? Can we strengthen the link between constituents and their representatives so that the latter cannot make decisions without any regard for the former’s preferences? Can we save liberal democracy from parties’ self-referentiality, and prevent it from turning into technocracy?

One could set the rule that no decision should be taken, and no bill passed in the deliberative body, if the majority of the ‘free’ votes is not reached. By free votes we mean the votes of those who are not ready to give up their preferences and remain faithful to the preferences of their constituents. If such circumstances could be arranged and representatives were freed of any party discipline so that their individual will could be always expressed, collective decision-making would no longer depart from general preferences as to what the majority of people think is best for society. The will of the people would thus be vindicated. For this to be the case agents/legislators should be endowed with such a set of incentives as to make them prefer following their constituents’ will instead of the will of their party leaders.

Would this work? While, on the one hand, only widely popular decisions would be taken, on the other, decision-making would be inevitably slowed down, with the result that only few decisions would be successfully taken. Since the majority of the votes can be reached only if a large enough number of representatives accepts to approve of any particular decision without any compulsion, it might be the case that only a limited number of decisions are good enough for a large number of representatives. What may happen then is that on a number of important issues no decision, good or bad, is taken, and this, in the end, may turn out to be detrimental to society at large. After all, this is the rationale behind the party discipline. Thus, invoking the people’s will, and making representative democracy as close as possible to direct democracy, may lead to results as bad as those likely to occur with the party system. Making legislators free to choose what to vote for, regardless of the party indication, while re-establishing the connection with their constituents, may slow down the whole process. Somehow paradoxically, making representatives behave consistently with their constituents’ indication could reduce the overall efficiency of the legislative effort.
In this paper we look at the random selection of legislators as an extreme form of the proportional political representation, and argue that it is the way to make representative democracy as close to direct democracy as possible. In both the random and the proportional cases a representative body is expected to be a miniature replica of the general constituency. In the case of proportional representation the replica is obtained through voting and a complete array of political options; in the case of random selection one could expect that the sample extracted accurately replicates, on average, the original population. Provided the general population preferences are carried over to the representatives’ preferences, and provided representatives decide and vote according to their convictions, the system produces the best possible outcomes. However, as shown in the following, such good outcomes may turn out to be very few in number.

Is there a way of rescuing representative democracy from its two opposite risks: technocracy, on the one hand, and irrelevance, on the other? Since the party system and the proportional representation system, or its extreme version of the random selection, can be expected to perform badly, maybe a third solution exists. This paper is precisely designed to show that the merits of a mixed system, where random selection and the party system together produce the best possible outcome. In so doing, we differ from Lockard (2003), where the results of the usual mechanisms of selection with the results of selection by sortition are compared, but where a combination between them is not spelled out nor investigated. Rather, our work is in line both with one of our previous explorations (Pluchino et al., 2011), and with the words of Gil Delannoi (2016, p. 11): “[...] sortition must be an addition, not a substitution for existing arrangements”.

This paper carries an attempt at modelling a parliament. It will be shown that starting from a parliament working with two parties, where the costs of representative democracy are quite apparent, one can beneficially move towards a parliament where independent legislators, randomly selected from the population of constituents, sit alongside party members. The paper shows that increasing the number of independent legislators up to a point enhances the efficiency of parliament. Section 2 will sketch the way parliament is going to be modelled. Section 3 introduces the notion of efficiency of a parliament in the case of a parliament with two parties. Section 4 extends the model to the case of independent legislators, randomly selected from the underlying constituency, and derives analytically the efficiency of both polar cases. Section 5 introduces the possibility of a mixed composition of parliament and shows how the number of accepted proposals, i.e. the productivity of parliament, changes as the number of independent legislators is increased. Section 6 finally looks at the efficiency of parliament and shows that moving from a two-party system to a parliament where independent legislators sit alongside party members improves parliamentary performances. Section 7 draws conclusions and suggests some possible implementation of the model.

2. Modelling a Parliament
We have assumed before that voting is the way individuals take collective decisions. In the case of a parliament (or any other deliberative body) those decisions are acts of parliament. The problem we are trying to address here is whether the whole job of making decisions (the job of members of parliament) can yield better results by changing the composition of parliament. To this end, prospective decisions (or proposed acts of parliament) are ordered
according to the social gain they are capable of generating, from the least beneficial ones (or the most harmful) to the most beneficial ones. Decisions are submitted to parliament. In actual fact, only those decisions which command a majority of votes are taken. Since the bunch of decisions taken at any given run of parliament may differ in the aggregate social gain it manages to generate, it is interesting to ask whether different compositions of parliament may have a differential impact on that aggregate social gain.

There is no discussion in the following on the way such an ordering is set up. It is assumed right at the beginning that it is a socially accepted ordering. Therefore it is accepted by members of parliament, as well. However, members of parliament may have a different idea as to the threshold that makes a given proposal acceptable or not. In the following it is assumed that members of parliament are distributed equally across the socially accepted ordering of decisions, so that we have members who would be prepared to accept anything, however low may be the social contribution the decision is supposed to make, and members of parliament who expect decisions to produce a significant contribution to social welfare before they can be prepared to vote in their favour.

The way proposals are submitted is not going to affect the way proposals are voted. This means that submission could be modelled in many different ways. It is assumed here that it is legislators who take the responsibility for submitting proposals. They are expected to submit the same number of proposals. It goes without saying that individual proposals must meet the threshold associated to each legislator. In this particular case it is assumed that the threshold is just met. Legislators submit proposals that are expected to generate a social gain no larger or smaller than their personal welfare threshold.

A well functioning parliament is one which, during any single term, can be expected to yield the best possible results, as measured by the aggregate social welfare gain. Ideally, parliaments should be prepared to pass only those acts that produce positive contributions to welfare. In fact, members of parliament may be prepared to accept even acts that produce negative contributions to welfare. If a majority for those acts can be put together, those acts will be passed, thus producing a negative contribution to social welfare. The following analysis is designed to look for those conditions required to make sure that parliaments reduce the risk of making negative contributions to welfare.

3. The efficiency of a Parliament

In this section we present a one dimensional model of a parliament with $N$ members (legislators) $A_i$ ($i=1,\ldots,N$) and two parties (or coalitions), the majority party ($P_1$) and the opposition (minority) party ($P_2$). From now on we will consider the terms “party” and “coalition” as synonymous, since our model applies indistinctly to both of them. For the time being we set the percentage of legislators of the two parties as: $P_1 = 60\%$ and $P_2 = 40\%$. During a given Legislature $L$, each legislator can perform only two actions: submitting a bill for approval and voting in favor or against any bill. Legislators are represented as points of a 1D space, i.e. of an horizontal axis indicated with the capital letter $Y$. Each point of this $Y$-axis, associated to a real number in the interval $[-1,+1]$, shows the (average) social gain attached to the bill submitted by the legislator $A_i$. As mentioned above, this represents the welfare threshold below which the legislator is not prepared to go when it comes to vote. In a previous study [A.Pluchino et Al., 2011] we considered a 2D model of parliament, where two different thresholds were associated to each legislator, one related to a personal interest (X-
axis) and another related to the social welfare (Y-axis). In the 1D version employed here, to make the model simpler and more suitable for an analytical approach, we explicitly consider only the second threshold (maintaining the same name for the axis) but somehow account for the influence of the personal interest (as explained later).

Within the 1D space, the distributions of legislators belonging to the two parties can be represented, in the limit for N>>1, as two probability density functions (PDF) defined over the Y-axis (see Figure 1). Both the distributions $P_1(Y)$ and $P_2(Y)$ are assumed to be Gaussians, with means $<Y_1>$ and $<Y_2>$, and with the same standard deviation $\sigma$:

$$P_1(Y) = \frac{1}{\sqrt{2\pi}\sigma} e^{-\frac{(Y-<Y_1>)^2}{2\sigma^2}}$$

$$P_2(Y) = \frac{1}{\sqrt{2\pi}\sigma} e^{-\frac{(Y-<Y_2>)^2}{2\sigma^2}}$$

Both the curves are normalized to have unitary area, but the size of the $P_2$ curve in this and in the next figures has been reduced only in order to distinguish it at a first sight. For a given legislative term $L$, the centroids $<Y_1>$ and $<Y_2>$ of the distributions are fixed and randomly chosen in the interval $[-1 + \sigma, 1 - \sigma]$:

During each parliamentary term (legislature), we assume that each legislator puts forward the same number of proposals. Therefore, the overall percentage of proposals coming from the members of a particular party is equal to the percentage of legislators of that party. Since the Y coordinate of each legislator represents the social gain of her proposal, the distributions $P_1(Y)$ and $P_2(Y)$ can be also regarded as the distributions of their proposals.

When it comes to voting a given proposal, say $p^*$ with abscissa $Y^*$, party discipline applies for each legislator $A_k$. Suppose $A_k$ belongs to the majority party $P_1$ (but of course the same considerations hold also for $P_2$), there are two possibilities:

- $p^*$ is an internal proposal (i.e. it comes from a member of $P_1$): it is accepted by $A_k$ regardless of its social gain $Y^*$;
- $p^*$ is an external proposal (i.e. it comes from a member of the other party $P_2$): it is accepted only if $Y^*$ is greater than the party mean $<Y_1>$, which represents the minimum social gain which a proposal coming from legislators of $P_2$ should yield to be accepted by legislators of $P_1$; moreover, if this condition is fulfilled, we assume that, due to internal motivations (personal interests) of $P_2$, only 50% of its legislators will accept the proposal.
Proposals are accepted by parliament provided they receive half plus one \((N/2 + 1)\) of the votes. Due to party discipline for internal proposals, this requirement will be always fulfilled for the majority party \(P_1\), which alone owns 60 per cent of the legislators. We should not forget, however, the proposals of the opposition party. The final number of accepted proposals at the end of a term will depend also on the contribution of the opposition Party \(P_2\), whose proposals are voted inasmuch as the majority party likes them. Therefore, the number of opposition party proposals which finally gets to be approved should also depend on the relative position of the two parties along the \(Y\) axis. Actually, as already mentioned, due to the influence of personal interests, only one half of members of \(P_1\) will vote for the opposition proposals lying on the right of the \(P_1\) mean. This means that, limited to these proposals (indicated by the dark parts of the \(P_2\) Gaussians in Figure 2), 30\% of legislators belonging to \(P_1\) will sum their vote to the 40\% of legislators belonging to \(P_2\), thus always exceeding the \(N/2+1\) threshold necessary for the approval of the proposals.

![Figure 2](image2.png)

**Figure 2.** A couple of example where the fraction of accepted proposals coming from \(P_2\) (in dark blue) are shown as function of the relative positions of the two parties.

In this paper we will always consider a sequence of \(N_L\) parliamentary terms, each one with a different random position of the centroids of both parties. It is reasonable to assume that, averaging over many terms \((N_L>>1)\), the asymptotic distributions of both parties will be centered at \(Y=0\) (see Figure 3). In the following we will always make this assumption for all the analytic derivations. In particular, under this hypothesis, the opposition party proposals which finally gets to be approved with the contribution of the majority will be all the positive ones. We will analyse in detail this situation in the next section.

![Figure 3](image3.png)

**Figure 3.** Asymptotic distributions of both parties after averaging over many terms \((N_L>>1)\). The contribution of the opposition party \(P_2\) to the expected percentage of accepted proposals is now represented by the positive side (in dark blue) of the corresponding asymptotic distribution.
Let us define, now, the global efficiency $Eff (L)$ of a term. It will be given by the net social gain yielded by the accepted proposals, i.e. by the product of the percentage $N_{\%ACC} (L)$ of the accepted proposals (calculated with respect to the total number of proposals put forward during the term) times their average social gain $Y_{AV} (L)$:

$$Eff (L) = N_{\%ACC} (L) \cdot Y_{AV} (L)$$

(1)

Averaging over $N_L$ terms, one can obtain the expected global efficiency:

$$Eff_{exp} = \frac{1}{N_L} \sum_{j=1}^{N_L} Eff (L)$$

(2)

Defining $N_{\%ACC}$ as the expected percentage of accepted proposals and $Y_{AV}$ as their expected social gain, both averaged over the $N_L$ terms:

$$N_{\%ACC} = \frac{1}{N_L} \sum_{j=1}^{N_L} N_{\%ACC} (L) \quad Y_{AV} = \frac{1}{N_L} \sum_{j=1}^{N_L} Y_{AV} (L)$$

one can also expect that, in the limit $N_L >> 1$:

$$Eff_{exp} \approx N_{\%ACC} \cdot Y_{AV}$$

(3)

The expected global efficiency is the fundamental measure of the efficiency of a deliberative body like a parliament. In the following we shall develop this notion much further with the purpose of investigating the effects on such a measure of a variable composition of parliament. We shall address the question of what happens when members of parliament have no longer an obligation of following the party line, simply because they do not belong to any party. They might be assumed to be drawn randomly from the population of constituents. Given their particular way of accessing parliament they will be free from any party discipline. The whole purpose of this paper is precisely to show how expected global efficiency changes as parliament allows randomly selected members in.

4. Analytic derivation of the expected global efficiency

In this section we will show how to derive analytically the proposed measure of parliamentary efficiency in the limit of many legislators ($N >> 1$) and many parliamentary terms ($N_L >> 1$). These limits will allow us to consider Gaussian distribution of legislators and to substitute integrals to the summations for calculating the averages of the various quantities. For the time being, the derivation will concern the two polar cases: a parliament with just two parties and a parliament with just randomly selected members.

A Parliament with only two parties (60%-40%)

To determine the global efficiency in the case of a parliament with a majority party $P_1$ with 60 per cent of members and the opposition party $P_2$ with 40 per cent, we proceed by evaluating separately the two factors in Equation 3. Consistently with the assumption $N_L >> 1$, for the Gaussian distributions of the two parties we assume that $<Y_1>=<Y_2>=0$. We also assume the same standard deviation $\sigma=0.15$. Because of the previously illustrated voting rules and recalling that the percentage of proposals coming from the members of a party is equal to the percentage of legislators of that party, the expected percentage of accepted proposals $N_{\%ACC}$, averaged over many parliamentary terms, is given by the sum of two
elements (consider again Figure 3 as reference): the first one, which is the contribution of party $P_1$, is represented by the whole area below the corresponding asymptotic distribution $P_1(Y)$, while the second one, the contribution of party $P_2$, is represented only by the (dark) area below the positive part of the corresponding asymptotic distribution $P_2(Y)$, since — as already shown in the previous section — the positive proposals coming from the opposition party are the only ones voted also from the majority party.

Here follows the formal expression:

$$N_{\%ACC} = \int_{-1}^{1} P_1(Y) dY \cdot 60\% + \int_{0}^{1} P_2(Y) dY \cdot 40\%$$

(4)

where the two contributions are weighted according to the percentage of proposals put forward by each party, in this case equal to its relative size. Since both the distributions are normalized, i.e. their total area is equal to 1, the expected value for $N_{\%ACC}$ over the entire set of $N_L$ terms will be:

$$N_{\%ACC} = 1 \cdot 60 + 0.5 \cdot 40 = 80\%$$

(5)

In the same fashion, the expected average social gain $Y_{AV}$ of these proposals over the same set of parliamentary terms is given, again, by the sum of two elements, stemming from the contributions of $P_1$ and $P_2$ (in terms of fraction of proposals submitted multiplied by their welfare contribution)

$$Y_{AV} = \int_{-1}^{1} P_1(Y) Y dY + \int_{0}^{1} P_2(Y) Y dY$$

(6)

The first integral gives a null result since, because of party discipline, the majority party accepts all its internal proposals, regardless of their contribution (positive or negative) to the social gain; on the other hand, the second integral is calculated only over the positive Y-axis, therefore it gives a small positive result:

$$Y_{AV} = 0 + 0.06 = 0.06$$

(7)

Therefore, the expected global efficiency over many parliamentary terms will be:

$$Eff_{exp} = N_{\%ACC} \cdot Y_{AV} = 80\% \cdot 0.06 = 4.8\%$$

(8)

it is not surprising that we get such a very small value. The only positive contribution to social welfare comes from the opposition party that, thanks to the support of the majority party, will see its positive proposals approved with a large majority. It may sound paradoxical that the majority party is capable of giving rise to a positive social gain only when other parties’ proposals are at stake. We will see later that this value can be increased if different circumstances apply. In particular, we shall look at the possibility of filling parliament with independent legislators, free from any party linkage.

This could be realized in practice by selecting them at random from all the citizens with the necessary requirements (in principle, the same that allow them to express their preferences for the parties during the elections). Because of this particular selection procedure, we will assume that the independent legislators are not subject to any kind of party discipline: each of them votes independently from the other independent legislators and from the parties. In
particular, given a proposal $p^*$ with abscissa $Y^*$, any independent member $A_k$ with abscissa $Y_k$ will accept it only if $Y^* > Y_k$, since $Y_k$ represents the minimum social gain that the proposal should yield for it to be accepted by $A_k$. Again, as already seen for the parties’ vote, for a given proposal $p^*$, we assume that, because of internal motivations (*personal interests*), only 50% of the independent legislators fulfilling the condition $Y_k < Y^*$ will accept the proposal.

**A Parliament with only independent legislators**

Let us now consider the extreme case of an entirely independent parliament, that is a parliament with only independent legislators ($N_{\text{ind}} = N$). We assume that, in the limit $N \gg 1$, their probability distribution $P(Y)$ along the $Y$-axis is a uniform one (from $-1$ to $+1$) with unitary area (see Figure 5). Due to this latter requirement, we will have $P(Y) = 1/2$.

![Figure 4. Uniform distribution of independent legislators.](image)

We know that the main feature of independent legislators is that they are not subject to any party discipline. This, in principle, brings into the parliament a positive element, since each proposal needs to be largely discussed to reach the consensus of the majority ($N/2 + 1$) of legislators. However, in such circumstances (since an average over many parliamentary terms is considered), none of the proposals will be accepted. In fact, it is quite clear that only proposals with a positive abscissa $Y^*$ could have a chance to be accepted, since the required majority could be reached only for those proposals (see dark area in Figure 4). However, because of their personal interests, we know that only one half of the independent legislators with $Y_k < Y^*$ will accept these proposals. Therefore, to reach $N/2 + 1$ votes, a given proposal should have an abscissa $Y^*$ not only greater than zero but also greater than 1.

In conclusion, for an hypothetical parliament with only independent legislators, we will always find a null result for the expected values of both the percentage of accepted proposals and the average social gain. This means that the expected global efficiency over many terms will be:

$$E_{\text{exp}} = N_{\%\text{ACC}} \cdot Y_{AV} = 0$$  

(9)

This unexpected result makes party discipline not so difficult to accept, especially when it makes good proposals (i.e. with a positive value of social gain) easier to accept. But certainly not when it is designed to impose the dictatorship of the majority. As argued above, in a parliament without parties, none of the proposals commands enough votes to get approved, since no proposal is good enough for half of the legislators. This result mirrors that arising from a parliament with only parties, where hardly any positive contribution to social welfare is likely on average to emerge.
However, it has certainly not gone unnoticed that the very small efficiency associated to both illustrated cases - a parliament with only parties and one with only independent legislators - depends on opposite reasons. In the case of a parliament with parties many proposals get accepted, but they yield a very small average social gain. In the case of a parliament with only independent legislators, parliament accepts only extremely good proposals, but their number is close to zero. Therefore, we can expect that contaminating a parliament with two parties with an increasing number of independent legislators would reduces the number of accepted proposals while increasing their average social gain (at least until the percentage of accepted proposals is greater than zero). As a consequence, the value of the global efficiency as a function of the percentage of independents sneaking into parliament, calculated as product point by point of the previous two quantities, should show an initial increase from its quite low extreme typical of the two-party case, then it should reach a central peak in correspondence of a given percentage of uniformly distributed independents, and finally it should slip towards zero, when the percentage of independents approaches a hundred per cent. In the following section we will provide a demonstration that this is roughly the case.

5. A parliament with an increasing number of independent members
Let us start with the analytic derivation of the percentage of accepted proposals as function of the number of independents, in a parliament with $N>>1$ members and in the limit of many legislative terms. In order to make some concrete example, we will sometimes consider a parliament with $N = 500$ members, but of course our results are valid for any (great) value of $N$. It is worth noticing that, with $N_{ind}$ independent legislators, the effective number of members belonging to the two parties $P_1$ and $P_2$ has to be calculated by taking, respectively, 60 per cent and 40 per cent of the difference $N - N_{ind}$. This means that, above a given threshold of $N_{ind}$, $P_1$ will be no longer the absolute majority party but only the relative one. We will see that it is precisely this feature, together with the presence of the independent legislators, that makes possible to enhance the efficiency of the parliament.

As we know, in the limit of many legislative terms, both parties are centered at $Y=0$, thus positive proposals (i.e. proposals with $Y^* > 0$), which represent the 50% over the total number, are accepted by 100 per cent of the members of the party proposing them (for party discipline) and by 50 per cent of the members of the other party (due to the influence of personal interests). Furthermore, in principle, these proposals should be accepted also by one half of the independent legislators with abscissa $Y < 0$. But, from the independent legislators point of view, the average social gain of the positive proposals is not $Y=0$ but $Y=0.5$ (the middle point of the positive part of the Y axis). One can easily notice that some proposals lying on the positive axis will be voted by independent legislators having an abscissa higher than zero. Therefore, one half of the independent ones with $-1 < Y < 0.5$ will vote, on average, for positive proposals: this means that, since they are uniformly distributed along the Y axis, a percentage of 37.5% of independent legislators will accept these proposals (as shown in Figure 5).
Pooling together the three contributions of the majority party, the opposition party and independent legislators, we can easily work out the number of votes received, on average, by the positive proposals coming from the legislators, as a function of the percentage of independent legislators sitting in parliament. The results are shown in Figure 6. Looking at the details of the plot, where the example of a parliament with N=500 members is considered, one can notice that:

- positive proposals coming from independent legislators are never accepted, since they never reach the threshold of $N/2 + 1 = 251$ favorable votes (indicated by the horizontal line);
- positive proposals coming from the relative minority party $P_2$ are accepted until the percentage of independent legislators in the parliament stays below 61 per cent;
- positive proposals coming from the relative majority party $P_1$ are accepted until the percentage of independent legislators in the parliament stays below 70 per cent.
In the same Figure, negative proposals have been also considered (i.e. proposals with $Y^* < 0$). It is straightforward to notice (and it is confirmed by the plot) that only those coming from the relative majority party $P_1$ can be accepted, until this party maintains the absolute majority, since its members accept both good and bad proposals because of party discipline. Negative proposals coming from $P_2$ and independent legislators are never accepted. When $P_1$ loses the absolute majority, its negative proposals (on average) can still be accepted due to the contribution of one half of independent legislators with $-1 < Y < -0.5$ (who represent the $12.5\%$ of the total, see Figure 7), being $Y = -0.5$ the average social gain of negative proposals coming from $P_1$. This happens until the percentage of independent legislators in the parliament stays below $21$ per cent. It is interesting to notice that neither positive nor negative proposals coming from independent legislators can be accepted, no matter how many of them sit in parliament.

![Figure 7: Percentage of independent legislators voting, on average and in the limit of many legislative terms, for the negative proposals coming from the parties.](image)

Summarizing, in Figure 6 we saw that three progressive thresholds $th_{AB}$, $th_{BC}$ and $th_{CD}$ do exist, identifying four different intervals in the percentage of independent legislators, namely A, B, C and D, each one with a given (decreasing) percentage of accepted proposals. Quite clearly, the values of these thresholds strictly depend on the size $p$ of the relative majority party $P_1$. In the case considered, i.e. for $p = 60$ per cent, we already found (empirically) $th_{AB}=21\%$ $th_{BC}=61\%$ and $th_{CD}=70\%$. Let us analytically determine, now, the values of these thresholds for any value of $p$ and any value of $N$.

The first threshold $th_{AB}(p)$ will be obtained by imposing the condition that the number of votes for the negative proposals of the majority party $P_1$ (due, as we know, to the contribution of $P_1$ itself and of $12.5\%$ of independent legislators) is equal to $N/2 + 1$, i.e.:

$$
(N - N_{ind}) \cdot \frac{p}{100} + \frac{12.5}{100} N_{ind} = \frac{N}{2} + 1
$$

Solving with respect to $N_{ind}$, we have:

$$
N_{ind} = \frac{N(p-50)-100}{(p-12.5)}
$$
Then, dividing by $N$ and multiplying by 100, we obtain the threshold value in percentage:

$$th_{AB} = \frac{N(p - 50) - 100}{(p - 12.5)} \cdot \frac{100}{N}$$

(11)

For $N=500$ and $p=60$ we have, as expected, $th_{AB}=21\%$ (corresponding to $N_{ind}=103$).

In a similar way, the second threshold $th_{BC}(p)$ will be obtained by imposing the condition that the number of votes for the positive proposals of the relative minority party $P_2$ (due to the contribution of all members of $P_2$, one half of $P_1$ and of 37.5% of independents) is equal to $N/2 + 1$, i.e.:

$$(N - N_{ind}) \frac{100 - p}{100} + (N - N_{ind}) \frac{p}{100} \frac{1}{2} + \frac{37.5}{100} N_{ind} = \frac{N}{2} + 1$$

(12)

Going on as in the previous case, after some algebra we obtain:

$$th_{BC} = \frac{N(100 - p) - 200}{(125 - p)} \cdot \frac{100}{N}$$

(13)

that, for $N=500$ and $p=60$, gives, as expected, $th_{BC}=61\%$ (corresponding to $N_{ind}=305$).

Finally, the third threshold $th_{CD}(p)$ can be obtained by imposing the condition that the number of votes for the positive proposals of the majority party $P_1$ (due to the contribution of all members of $P_1$, one half of $P_2$ and of 37.5% of independents) is equal to $N/2 + 1$, i.e.:

$$(N - N_{ind}) \frac{p}{100} + (N - N_{ind}) \frac{100 - p}{100} \frac{1}{2} + \frac{37.5}{100} N_{ind} = \frac{N}{2} + 1$$

(14)

Going on as in the two previous cases, we obtain:

$$th_{CD} = \frac{Np - 200}{(p + 25)} \cdot \frac{100}{N}$$

(15)

that, for $N=500$ and $p=60$, gives, as expected, $th_{CD}=70\%$ (corresponding to $N_{ind}=350$).

Looking to the behavior of $th_{AB}$, $th_{BC}$, $th_{CD}$ as function of $p$ for $N=500$, reported in Figure 8, one sees that the four regions A, B, C and D are well defined in a plausible range of values of $p$, going from 51% to 80%. On the other hand, for $p > 80\%$ the region B would disappear, but the values of $p$ would be unrealistic: in fact, also with randomly selected legislators, the relative size of the two parties in the real world should continue to be decided by elections results (in this respect we imagine a *mixed* electoral system), and it is very unlikely that any party or coalition obtains more than 60-65% of preferences.
At this point, inside each one of these four regions, we can finally work out the percentage of accepted proposals $N_{\%ACC}$ as a function of the number of independent legislators $N_{ind}$.

A. In this region, $N_{\%ACC}$ is the sum of three terms, one due to the contribution of the positive proposals of the relative majority party $P_1$, another one due to the contribution of the positive proposals of the opposition party $P_2$, and a third one due to the contribution of the negative proposals of $P_1$:

$$N_{\%ACC-A}(N_{ind}) = p \frac{N - N_{ind}}{N} \int_{0}^{1} P_1(Y) dY + (100 - p) \frac{N - N_{ind}}{N} \int_{0}^{1} P_2(Y) dY + p \frac{N - N_{ind}}{N} \int_{-1}^{0} P_1(Y) dY \tag{16}$$

B. In this region $N_{\%ACC}$ is the sum of two terms, one due to the contribution of the positive proposals of $P_1$ and the other one due to the contribution of the positive proposals of $P_2$:

$$N_{\%ACC-B}(N_{ind}) = p \frac{N - N_{ind}}{N} \int_{0}^{1} P_1(Y) dY + (100 - p) \frac{N - N_{ind}}{N} \int_{0}^{1} P_2(Y) dY \tag{17}$$

C. In this region $N_{\%ACC}$ is due only to the contribution of the positive proposals of $P_1$:

$$N_{\%ACC-C}(N_{ind}) = p \frac{N - N_{ind}}{N} \int_{0}^{1} P_1(Y) dY \tag{18}$$

D. Finally, in this region there are no more contributions and $N_{\%ACC}$ is zero:

$$N_{\%ACC-D}(N_{ind}) = 0 \tag{19}$$

What should we now expect, in the limit of many legislative terms, for the theoretical average value of the social gain $Y_{AV}$ produced by the accepted proposals inside each of the four regions? Of course, this strictly depends on the kind of proposals accepted:

A. In this interval, positive and negative accepted proposals coming from the relative majority party $P_1$ give, on average, a globally null value of the social gain; the only positive contribution to the social gain is given by the positive accepted proposals coming from the relative minority party $P_2$. But now we need, again, to distinguish between two
different perspectives: that one of the parties, for which the average social gain of the positive proposals is worked out considering the parties themselves centered at $Y=0$, and that of the independent legislators, for which the average social gain of the positive proposals coming from the parties is centered at $Y=0.5$. This gives rise to two different contributions, weighted by the relative number of both parties and independent legislators:

$$Y_{AV-A}(N_{ind}) = \frac{N-N_{ind}}{N} \left[ \int_{-1}^{1} P_1(Y) dY + \int_{0}^{1} P_2(Y) dY \right] + \frac{N_{ind}}{N} 0.5$$  \hspace{1cm} (20)$$

B. In this interval, the negative proposals of $P_1$ are no longer accepted, therefore the average social gain results from the contribution of the positive proposals only, coming from both $P_1$ and $P_2$. Again, the different perspectives of parties and independents give rise to two different contributions, weighted by their relative number:

$$Y_{AV-B}(N_{ind}) = \frac{N-N_{ind}}{N} \left[ \int_{0}^{1} P_1(Y) Y dY + \int_{0}^{1} P_2(Y) Y dY \right] + \frac{N_{ind}}{N} 0.5$$ \hspace{1cm} (21)$$

C. In this interval, the average social gain is only due to the contribution of positive proposals of $P_1$, where – again – one has to distinguish the two terms representing, respectively, the parties’ perspective and the independent legislators perspective:

$$Y_{AV-C}(N_{ind}) = \frac{N-N_{ind}}{N} \left[ \int_{0}^{1} P_1(Y) Y dY \right] + \frac{N_{ind}}{N} 0.5$$ \hspace{1cm} (22)$$

D. In this interval no more proposal are accepted at all, therefore the average social gain should be null:

$$Y_{AV-D}(N_{ind}) = 0$$ \hspace{1cm} (23)$$

We expect that this it is strictly true only in the limits of an infinite number of both legislators and legislative terms: for finite numbers of them, fluctuations in the Gaussian distributions of parties and in their positions on the $Y$ axis will make the null prediction an underestimation of the numerical results.

6. Searching for the maximum efficiency
We are now ready to calculate the expected average global efficiency $Eff_{exp}$ of our parliament as a function of $p$, $N$ and $N_{indr}$ in the four regions A, B, C and D, by multiplying inside each of them the value of $N_{SAAC}$ (Equations 16-19) for the corresponding value of $Y_{AV}$ (Equations 20-23). To do so, we preliminarily substitute in all the obtained equations the various definite integrals with their effective values, which do not depend on $p$, $N$ and $N_{ind}$ but are fixed. These values, which follow from the normalization of the probability distributions of the proposals, are:

$$\int_{-1}^{1} P_1(Y) dY = 1; \quad \int_{0}^{1} P_1(Y) dY = 0.5; \quad \int_{-1}^{1} P_1(Y) Y dY = 0; \quad \int_{0}^{1} P_i(Y) Y dY = 0.06 \quad \text{for } i=1,2$$ \hspace{1cm} (24)$$
Let us start with region A (with $0 < N_{\text{ind}} < th_{AB}$), where one has:

$$Eff_A(p,N,N_{\text{ind}}) = N_{\text{ACC-A}} \cdot Y_{AV-A} = \left( p \frac{N-N_{\text{ind}}}{N} + (100-p) \frac{N-N_{\text{ind}}}{N} \cdot 0.5 \right) \left( \frac{N-N_{\text{ind}}}{N} \cdot 0.06 + \frac{N_{\text{ind}}}{N} \cdot 0.5 \right)$$

from which, after some algebra:

$$Eff_A(p,N,N_{\text{ind}}) = (1 - \frac{N_{\text{ind}}}{N})(50 + \frac{p}{2})(0.06 + 0.44 \frac{N_{\text{ind}}}{N})$$

(25)

Plotting the efficiency $Eff_A$ as function of $N_{\text{ind}}/N$ for three increasing values of $p$ from 51% to 70% (see Figure 9), we observe that, within its maximum possible range (i.e. between 0 and $th_{AB}(\text{max})=43\%$, i.e. for $0 < N_{\text{ind}}/N < 0.43$), it is a monotonically increasing function:

![Figure 9: Behavior of the efficiency $Eff_A$ as function of $N_{\text{ind}}/N$ for three increasing values of $p$. The derivative of $Eff_A$ is plotted in the inset and it is always positive in the same interval for any $p$.](image)

This is also confirmed by its derivative (plotted in the inset), which (for any $p$) is always positive within the interval considered:

$$\frac{d}{dx} Eff_A(p,x) = \frac{d}{dx} (1-x)(50 + \frac{p}{2})(0.06 + 0.44x) = p(0.19 - 0.44x) - 44x + 19 > 0 \quad \text{for} \quad x < 0.43$$

Let’s now continue with region B (with $th_{AB} < N_{\text{ind}} < th_{BC}$), where we find:

$$Eff_B(p,N,N_{\text{ind}}) = N_{\text{ACC-B}} \cdot Y_{AV-B} = \left( p \frac{N-N_{\text{ind}}}{N} \cdot 0.5 + (100-p) \frac{N-N_{\text{ind}}}{N} \cdot 0.5 \right) \left( \frac{N-N_{\text{ind}}}{N} \cdot 0.06 + 0.06 N_{\text{ind}} \right) \left( \frac{N-N_{\text{ind}}}{N} \cdot 0.06 + 0.5 \right)$$

from which one obtains:

$$Eff_B(N,N_{\text{ind}}) = 50 \left( 1 - \frac{N_{\text{ind}}}{N} \right)(0.12 + 0.38 \frac{N_{\text{ind}}}{N})$$

(26)

Notice that inside this region $Eff_B$ does not depend on $p$. Furthermore, plotting the efficiency $Eff_B$ as function of $N_{\text{ind}}/N$ (see Figure 10), we observe that, in its maximum possible range (i.e. between 0 and $th_{BC}(\text{max})=65\%$), it has always a maximum.
Figure 10. Behavior of the efficiency $Eff_B$ as function of $N_{ind}/N$ for any value of $p$. The derivative of $Eff_B$ is plotted in the inset and the position of the maximum is visible.

The value of the maximum can be obtained by equating to zero the derivative (see also the inset):

$$\frac{d}{dx} Eff_B(p,x) = \frac{d}{dx} 50 (1-x)(0.12 + 0.38x) = 13 - 38x = 0 \quad \Rightarrow \quad x = \frac{13}{38} \approx 0.34$$

The value thus obtained ($N_{ind} = 34\%$) ensures the maximum in region B until the size $p$ of the majority party stays below 70\% (above this size, as visible in Figure 9, region B becomes too smaller).

For the region C (with $th_{BC} < N_{ind} < th_{CD}$), one has:

$$Eff_C(p,N,N_{ind}) = N_{ACC-C} \cdot Y_{AV-C} = \left( p \frac{N-N_{ind}}{N} \right) \cdot \left( N_{ind} - N_{ind} \right)$$

from which the following expression can be derived:

$$Eff_C(p,N,N_{ind}) = \left( 1 - \frac{N_{ind}}{N} \right) \frac{p}{2} \left( 0.06 + 0.44 \frac{N_{ind}}{N} \right)$$

Plotting in Figure 11 the efficiency $Eff_C$ as function of $N_{ind}/N$ for the same three values of $p$ considered in Figure 10, we notice that, in its maximum possible range (i.e. between $th_{AB}(\text{max})=43\%$ and $th_{CD}(\text{max})=76\%$), it is a monotonically decreasing function:

Figure 11. Behavior of the efficiency $Eff_C$ as function of $N_{ind}/N$ for three increasing values of $p$. The derivative of $Eff_C$ is also plotted in the inset and it is always negative in the same interval for any $p$. 
This is also confirmed by its derivative (see the inset), which (for any \( p \)) is always negative in the interval considered:

\[
\frac{d}{dx} \text{Eff}_C(p,x) = \frac{d}{dx} \left(1 - x\right) \frac{p}{2} \left(0.06 + 0.44x\right) = p(0.19 - 0.44x) < 0 \quad \text{for} \quad x > 0.43
\]

Finally, for region D (with \( \text{th}_{CD} < N_{\text{ind}} < N \)):

\[
\text{Eff}_D(p,N,N_{\text{ind}}) = N_{\%ACC-D} \cdot Y_{AV-D} = 0
\]

Summing up so far, the behavior of the average global efficiency in the three regions A, B and C, where it assumes non null values, seems consistent with the hypothesis that this efficiency has a minimum at the two extrema (\( N_{\text{ind}}=0 \) and \( N_{\text{ind}}=N \)), starts to monotonically increase for small values of \( N_{\text{ind}} \) (region A), reaches a maximum for \( N_{\text{ind}}/N=0.34 \) (region B), then monotonically decreases towards zero (region C).

Let us now look into this scenario in greater detail, and plot in Figure 12 the average global efficiency in the range \( 0 < N_{\text{ind}} < \text{th}_{CD}(\max) \) for four increasing values of \( p \). The positions of the three thresholds \( \text{th}_{AB} \), \( \text{th}_{BC} \) and \( \text{th}_{CD} \), which separate the four regions, are indicated by vertical dashed lines. Of course, the sudden change in efficiency observed in all the plots when the value of \( N_{\text{ind}}/N \) crosses each one of the three thresholds, is an effect of the assumed limit of many (infinite) legislative terms. Averaging over a relatively small number of them, the fluctuations mainly due to the random positions of the two parties along the Y axis would make these transitions much smoother.

![Figure 12](image)

Figure 12. The average global efficiency in the range \( 0 < N_{\text{ind}} < \text{th}_{CD}(\max) \) is plotted for four increasing values of \( p \), i.e.: 51\% (a), 55\% (b), 60\% (c) and 70\% (d).
By looking closely at the four panels, it clearly appears that the position of the maximum value for the global efficiency, say $Eff_{\text{max}}$, is not always situated in region B but strictly depends on the value of $p$. As is visible in panels (a) and (b), the initial insertion of independent legislators in a parliament with only parties induces a sudden increase in the global efficiency, similar for any value of $p$, which reaches its maximum value $Eff_{\text{max}}(A)$ at the threshold $th_{AB}$. However, since the position of this threshold does depend on $p$, for intermediate values of $N_{\text{ind}}$ it may occur that, as shown in panels (c) and (d), the value $Eff_{\text{max}}(A)$ exceeds the maximum value of the efficiency in region B, $Eff_{\text{max}}(B)$.

Following these insights, in Figure 13 we plot, as dashed lines, both the constant position of the absolute maximum for $Eff_{\text{max}}(B)$ (34% of independent legislators) and the variable position of the threshold $th_{AB}$, also expressed as percentage of the independent legislators. Then, in bold, we highlight the position of the global maximum efficiency $Eff_{\text{max}}(p)$. We found that, until $p < 56.5$ (%), it results $Eff_{\text{max}}(B) = 8.22 > Eff_{\text{max}}(A)$, therefore $Eff_{\text{max}}(p) = Eff_{\text{max}}(B)$. However, for $p > 56.5$ (%), $Eff_{\text{max}}(A)$ starts to exceed 8.22, thus becoming the new global maximum efficiency $Eff_{\text{max}}(p)$. This implies that at $p = 56.5$ (%) the percentage of independent legislators needed to get the maximum efficiency suddenly rushes down from 34% to 14.3%, then it slowly goes back towards 34%, reached again around $p = 70$ (%), where region B tends to disappear and the maximum efficiency reaches its highest value $Eff_{\text{max}}(A) = 11.8$.

![Figure 13](image.png)

**Figure 13.** The position of the absolute maximum for $Eff_{\text{max}}(B)$ and the variable position of the threshold $th_{AB} = Eff_{\text{max}}(A)$ are plotted as dashed lines. In bold, partially superimposed to the previous lines, we indicate the position of the global maximum efficiency $Eff_{\text{max}}(p)$.

In conclusion, the analysis of the parliament in the limit of many legislative terms confirms that an intermediate percentage $N_{\text{ind}}$ (between 14% and 34%) of legislators independent from the two parties and not subject to any party discipline, can always improve the efficiency of the system, regardless of the size of the relative majority party. This general analytical result is in full agreement with our previous findings, obtained through a computational study of the 2D model of parliament, where both a variable relative size for the two parties and a variable percentage of independent legislators were considered [A.Pluchino et Al., 2011] and suggests a possible policy for effectively increasing parliamentary efficiency.
7. Repairing the fallacy of representative democracy

As shown in the previous sections, representative democracy, when based on the party system, fails to deliver one of its most important outcomes, i.e., a faithful representation of its constituents’ will and acts of parliament consistent with that will. This is especially the case when the majority representation systems is adopted. In that case, there is always a party in a position to command an absolute majority in parliament. This system is usually advocated as a system capable of delivering decisions, thus denying any serious fallacy and arguing that the ability of taking decisions makes up for the failings of representation. In fact, one can improve upon that outcome. This paper was designed to show that this is possible when independent legislators, randomly selected from the relevant constituency, are allowed to sit in parliament alongside elected members of parties.

The main argument was based upon the costs a representative democracy typically entails. Those costs emerge from the failure of the relationship between constituents and political representatives. It typically happens that political representatives cease to be faithful agents of their constituents and turn into agents of their parties. As extensively illustrated in the paper, this shift in the agency relationship deprives the representative system of its ability to deliver decisions which command a large consensus in the population of constituents. For one can expect that the system delivers unpopular decisions just as easily as it can deliver popular ones. Its cost, therefore, is the forgone benefit of not delivering just popular decisions.

It has been argued in the paper that there is a way to repair this fallacy and minimize the cost of representative democracy. The logic underlying this endeavour is preserving the ability of representative democracy to deliver decisions while increasing as much as possible their net contribution to welfare. The way to do so is shifting the balance of decision making towards the positive side. Letting a number of independent legislators, drawn at random among common citizens, sitting in parliament with the same prerogatives of the other legislators, has an outstanding advantage: it allows in parliament legislators who will vote only for acts that meet their personal threshold. This is a major improvement in a system where legislators, due to party discipline, vote also for acts they do not like. By gradually allowing more and more independent legislators in parliament, the detrimental effects of party discipline are curtailed and the beneficial effects of voting according to one’s preferences are enlarged. There comes a point where the ability of a party to make its members vote for whatever comes from within loses its strength, thus magnifying the role of those legislators who are not subjected to any imposition. However, one should not think that the larger the number of independent legislators, the better. Party discipline has its merits and should not be discarded altogether. As extensively shown in the previous sections, if only independent legislators sat in parliament hardly any decision would be taken, whether good or bad. The model of parliament illustrated in this paper has precisely shown that a virtuous combination of party discipline and freedom of choice is possible.

Implementing a mixed parliament is not impossible. The number of independent legislators to be introduced in the parliament could be linked to the level of abstention in the election (in the last 2014 European elections the abstention area was by far the first party, with a 57% of non voters, but a typical percentage in almost all modern democracies is around 30%). Our proposal may provide an option to those constituents who are typically oriented towards abstention: each of them, going to the polls during the election day, could choose whether to vote for a party candidate or enroll in a list for a sortition.
Then, after the elections, a percentage of seats proportional to the width of the abstention area will be reserved to randomly selected citizens picked out from the list of candidates: thanks to the so-called “invisible hand effect”, this percentage would guarantee synchronic equality since such a large assembly of independent legislators would be a representative sample of the whole constituency. Of course the remaining seats will be assigned to candidates of the parties in a proportion established by the preferences expressed by voting people. It is likely that such a procedure will give rise to a parliament without any absolute majority party or coalition, and this could be considered dangerous in parliamentary systems since it could make difficult to have a stable Government (which is usually expressed by the absolute majority). But, as we shown in this paper, the absence of an absolute majority, due to the presence of independent legislators, is precisely the feature that make it possible to improve the efficiency of the parliament. Actually, we believe that this will not necessarily have to hinder the expression of a stable Government by the relative majority party. In fact, the role of the independent legislators should be, on one hand, that of supporting the majority every time its action will be considered as bringing a positive contribution to the general interest (thus reducing the possibility of authoritarian drifts away from it); on the other hand, that of mitigating the effects of any a-priori obstructionist strategy coming from the relative minority party (which usually is the main source of instability in absence of a strong absolute majority).

Finally, in order to protect the independent legislators from the attempts of acquisition by the parties during the entire legislative term (a practice unfortunately very common in modern representative democracies), we could also think not to have permanent independent legislators who occupy the percentage of seats established by the abstention, but to assign to those seats new independent legislators randomly extracted from the originary list every time that any new act of parliament needs to be discussed and voted in the parliament. In such a way we would ensure a very frequent rotation of legislators, i.e. a diachronic equality, useful to avoid any kind of corruption (“Blind Break” effect). This suggestion is also coherent with another interesting feature of our model, pointed out in section 5, i.e. the evidence that, independently on the number of independent legislators sitting in the parliament, neither positive nor negative proposals coming from them can be accepted by the assembly. Therefore, it is clear that the main role of independent legislators would not be so much to propose laws, a task which anyway would be difficult in the hypothesis of their frequent rotation, but to select, among the proposals coming from the parties, those which ensure a high level of social gain.

Definitely, having both synchronic and diachronic equality could produce a final result very close to direct democracy [see Gil Dellanoi (Ed.), 2016].
**References**


