

Revolutions and rational choice: a critical discussion

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Abstract.

Since the early studies of Olson (1971/1965) and Tullock (1971), who first defined the paradox of revolution, there has been a great deal of relevant work based on rational choice theory. While the main point of this research is to investigate solutions to this apparent paradox, its overall contribution is the provision of a rich analysis of revolutions in the light of rational choice. This article provides an overview of the literature over the last fifty years, highlighting the richness and complexity of the issues underlying the paradox and, more generally, collective action. The emphasis is placed on the salient points of what this literature and its evolution teach us about revolutionary commitment.

Keywords. Paradox of revolution, selective incentives, asymmetric information, leadership, collective rationality

1. Introduction

What motivates a rational individual to participate in a revolution? This question is not trivial because, by doing so, the individual turns their back on non-violent political solutions. They risk serious injury in the fighting and government repression if the revolution fails.

The first theoretical work on the subject comes from Olson (1971/1965) and Tullock (1971), who show that participation in a revolution is subject to a paradox that Tullock calls the paradox of revolution, also referred to in the literature as the rebel's dilemma (Lichbach 1995a) or the paradox of rebellion (Kurrild-Klitgaard 2004). As Olson (1971/1965) points out, a rational individual who has a choice between participating in collective rebellion and doing nothing will opt for the latter. Indeed, although the individual benefits from the overthrow of the regime, it is not in their interest to participate, as it is individually costly and best done by others, posing a free-rider problem. Since each individual thinks alike, none would participate in collective rebellion, reflecting the incentive structure of a prisoner's dilemma.

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1 More generally, the paradox of revolution belongs to a family of problems known as social dilemmas, i.e., it
2 describes a situation “in which individual rationality leads to collective irrationality” in the sense that what
3 pays off individually is harmful collectively (Kollock 1998, p. 183). Another, perhaps more meaningful, way
4 of characterising the paradox is to follow the classification of paradoxes proposed by the logician and
5 philosopher Quine (1962). The paradox of revolution is what Quine calls a veridical paradox, i.e., the result is
6 correct from the point of view of reasoning but absurd from the point of view of reality in that, in the course
7 of history, revolutions have occurred and, when they have occurred, they have not been the work of a small
8 group of rebels but of a vast number of individuals. In other words, we cannot be satisfied with the theoretical
9 prediction of Olson (1971/1965) and Tullock (1971), which invites us to overcome the paradox. Beyond the
10 paradox itself, it is the model of rational choice that is at issue. As James Buchanan (1987, p. 14) suggests,
11 “perhaps the most difficult, and most questionable, extension of the [rational choice] model is to the behavior
12 of those persons who initiate and participate in revolution activity, along with those persons who seem to
13 sacrifice themselves voluntarily in wars ... In my assessment, there are the extensions of the model that are
14 the most vulnerable to criticism”. Therefore, the analysis of the paradox of revolution extends to the way in
15 which social dilemmas are overcome and, more generally, to the analysis of properties inherent to the rational
16 choice model.

17
18 The paradox has given rise to an extensive literature based on distinct solutions. The first, from Olson
19 (1971/1965), discusses selective incentives, which are private rewards that rebels seek by taking part in
20 collective action. Selective incentives play a crucial role in this literature and received considerable attention
21 in the 1970s and 1980s, mainly because Tullock (1971) provides a formal analysis through the prism of rational
22 choice, and Popkin (1979) illustrates their relevance by applying the concept to the Vietnam War. In the 1980s,
23 analytical Marxists seized on the question by analysing the conditions underpinning revolution (e.g., Roemer
24 1985; Elster 1985; Cohen 1988). By examining revolution through the prism of a confrontation between a
25 regime in power and its population, this literature is less concerned with the incentives for revolutionary
26 commitment than with which properties of the regime and the rebels cause a revolution. In the 1990s, Kuran
27 (1989, 1991, 1995) approached the paradox from the angle of asymmetric information. He depicts revolutions
28 as unpredictable phenomena while seeking to identify their dynamics and how information matters.

29
30 Complementing this seminal work, several authors analyse the paradox by defining analytical frameworks
31 with asymmetric information (see, among others, Lohmann 1993, 1994; Yin 1998; Ginkel and Smith 1999;
32 Leeson 2010; and Shadmehr and Bernhardt 2011). They are particularly interested in the ways in which a
33 revolutionary coalition can be formed in the presence of a regime that sanctions revolutionaries. In the 2000s,
34 work on revolutions focused on democracy and the voting paradox. Rather than analysing the making of a
35 revolution, this literature studies how democracy spreads. We owe this perspective change to Acemoglu and
36 Robinson (2000, 2006), who establish a link between revolutions and democracy, offering an analysis in which
37 a revolution is conceived as a threat. It is this threat that would encourage the wealthy elite (who hold political

1 power) to extend the right to vote to the poor, thus contributing to democratisation. In other words, extending
2 democracy to all citizens would be the best way of preventing the emergence of a revolution. The originality
3 of the approach is to leave aside the choice of a rebel's commitment and, therefore, the paradox itself.

4
5 However, the issue of revolutionary commitment and the emergence of revolution quickly resurfaced with the
6 Arab revolutions that began in the 2010s. The failure of these leaderless revolutions has raised an important
7 question in relation to successful revolutions of the past, namely the nature of revolutionary leaders and their
8 value in terms of promoting regime change. Recent rational choice literature has, therefore, focused on
9 analysing the role of revolutionary leaders and their ability to influence the masses (Bueno de Mesquita 2010;
10 Shadmehr and Bernhardt 2019; Bhalla et al. 2021; Chen and Suen 2021; Bueno de Mesquita and Shadmehr
11 2023). Paradoxically, this literature pays little attention to the paradox of revolution, setting aside the problem
12 of free-riding.

13
14 Main surveys on the topic were conducted in the 1990s but are not exhaustive. Among them, Lichbach (1994)
15 focuses exclusively on selective incentives, drawing on examples of all forms of protests by peasants, including
16 *charivari* and *jacqueries*. As the author claims, "the focus is on selective incentives because the idea is so
17 controversial: some believe that selective incentives often solve collective action problems, whereas others
18 minimize their significance" (Lichbach 1994, p. 385). This work does not reference the literature on
19 asymmetric information or the solutions provided by analytical Marxism. Undehn (1993) and Moore (1995)
20 partly fill this gap by illustrating the limits of selective incentives and listing some alternative arguments that
21 have been put forward in the literature. In addition to this work, Lichbach (1995a) summarises some twenty
22 solutions proposed in the literature, which he divides into four categories: market, community, contract and
23 hierarchy. However, he also omits the solutions proposed by analytical Marxism. Kurrild-Klitgaard (1997)
24 covers most of the work from the 1970s to the early 1990s and, therefore, includes some of the arguments of
25 analytical Marxism but naturally omits the more recent literature on information asymmetry and leadership.
26 Wintrobe (2004) is somewhat more exhaustive. However, although the author refers to the paradox of
27 revolution by mentioning the selective incentives of revolutionary leaders, the object of his synthesis
28 essentially concerns the rationality of revolution from the dictator's point of view. Thus, the aim of the review
29 is not to address the paradox but the logic of the dictator's behaviour. To our knowledge, there has been no
30 subsequent review of the literature, even though the subject of study remains crucial and contemporary, with
31 new contributions notably analysing the role of leaders, their emergence and the formation of mass movements
32 but also, and more generally, the paradoxes of collective action.

33
34 This article aims to fill this gap by providing a comprehensive review of the main strands of the rational choice
35 literature discussing the formation of revolutions. The approach is reflexive and presents how each proposed
36 solution explains revolutionary commitment, though none are entirely satisfactory in resolving the paradox of
37 revolution. After an overview of what the literature usually defines as revolutions and the main features that

1 characterise them, we proceed chronologically. Starting with the early work on selective incentives, we
2 examine the social dilemma of a leader's commitment and explain how these incentives are intended to
3 overcome it, albeit imperfectly. Because the choice of revolutionary commitment is the product of interactions,
4 with a regime on the one hand and people likely to form a mass movement on the other, we next focus on the
5 problem of the formation and coordination of revolutionary action. We review the contributions of analytical
6 Marxism and the various explanations for the formation of a revolutionary coalition, including bandwagon
7 effects, contract theory, information asymmetries, leadership and explanations based on collective rationality.
8 This overview of fifty years of rational choice literature on the making of revolutions allows us to highlight
9 the richness and complexity of the issues associated with revolutionary commitment and to summarise the
10 major contributions of the literature on the topic.

11 2. What we know about revolutions

13 2.1 On definitions

14 Although in the paper we use the terms revolution, revolt and rebellion interchangeably, historians, sociologists
15 and political scientists distinguish among them. It is useful to return to these distinctions in order to discuss
16 the different definitions of revolution found in the literature. According to Skocpol (1979, p. 4), revolutions
17 are “rapid, basic transformations of a society's state and class structures; and they are accompanied and in part
18 carried through by class-based revolts from below”. Revolutions are thus distinguished from rebellions in that
19 the latter do not involve structural changes even though they involve “the revolt of subordinate classes” (p.
20 4). They also differ from failed revolutions, which do not involve rapid and fundamental transformations of
21 class and state structures, although they are revolts of the popular strata. Other authors stress that a revolution
22 requires the use of violence. This case applies, for example, to Russell (1974), who makes violent rebellion a
23 prerequisite for revolution. For her, “rebellion is defined as a form of violent power struggle in which the
24 overthrow of the regime is threatened by means that include violence. In a successful rebellion, overthrow
25 is achieved, whereas it is not achieved in an unsuccessful rebellion. A successful revolution may be said to
26 have occurred when substantial social change follows a rebellion” (Russell 1974, p. 6). While violence is, in
27 many cases, the driving force of revolution, this perspective does not allow the peaceful upheavals in Central
28 and Eastern Europe in 1989 to be considered revolutions.¹

31
32 In another approach, Kotowski (1984) relativises the role of violence and focuses instead on the illegality of
33 political change. When change is legal, it is, by definition, non-violent. But, if it is illegal, it can be violent or
34 non-violent (through civil disobedience). For this author, it is the illegality of a mass movement that underpins

¹ Although it is common to speak of democratic revolutions when characterising the regime changes in Eastern European countries, Garton Ash (1990) introduces the term “refolution”. He points out that in countries such as Poland and Hungary, the changes were partly the result of reforms that had been undertaken by the (Communist) government. Thus, the term “refolution” combines reform and revolution.

1 its revolutionary character. Zimmermann (1990) disagrees and claims that illegality is unnecessary when
2 defining revolutions, as illegality is already included in the term ‘overthrow’. Instead, he classifies revolution
3 as “the successful overthrow of the prevailing elite(s) by a new elite(s) who after having taken over power
4 (which usually involves the use of considerable violence and the mobilization of masses) fundamentally
5 change the social structure and therewith the structure of authority” (Zimmermann 1990, p. 39). Similarly,
6 Arjomand (1986) describes revolution “as the collapse of the political order and its replacement by a new one”
7 (Arjomand 1986, p. 383). However, this definition is far too broad, as it could just as easily describe a coup
8 (where a democracy becomes a military dictatorship). More recently, Ritter (2019) has proposed a definition
9 that is both simple and broad enough to include both violent and democratic revolutions: “an irregular
10 overthrow of a political regime through mass mobilization”. Illegality, the scale of the mobilisation and the
11 fall of the regime would be the three ingredients of the revolution, leaving aside the scale of the institutional
12 transformations.

13
14 Walton (1984) would certainly disagree with all these definitions that have in common that revolutions are, at
15 the very least, associated with the fall of a regime. They *de facto* exclude ‘national revolts’ in which the rebels
16 were defeated, and the regime was not overthrown, but major changes took place. Based on the study of the
17 Huck rebellion in the Philippines (1946–1956), the *violencia* in Colombia (1949–1958) and the Mau Mau
18 revolt in colonial Kenya (1952–1956), Walton (1984) shows that ‘failed national revolts’ can have the same
19 causes as successful revolutions and bring about profound changes. Therefore, he claims that they are
20 indistinguishable from (successful) revolutions because, while they failed, some achieved their goal by
21 promoting fundamental changes in the state and society.

22
23 We could go on listing the definitions proposed in the literature. However, this would only reinforce the idea
24 that the notion of revolution gives rise to different appreciations that ultimately do not help us understand its
25 content. Lawson (2019, p. 51) expresses this claim, recalling that “the concept of revolution has not just been
26 forged in history, it has been remade and contested *through* history”. As the concept is redefined with each
27 revolution, it is constantly being forged and reforged. It is, therefore, not surprising that authors on the topic
28 illustrate their argument via the list of revolutions they reference. For example, for the period 1900 to 1980,
29 Dix (1983) considers that fourteen revolutions took place, Zimmermann (1990) only eleven, Walt (1992) nine
30 and Goodwin (2001) seventeen. This variation reflects the lack of consensus on what is considered a revolution
31 and what is not. At the very least, it is generally accepted that the French Revolution of 1789, the Russian
32 Revolution of 1917 and the Chinese Revolution of 1949 are considered “real” revolutions because of the
33 significant participation of the peasant masses and the social transformations that these revolutions brought
34 about (Goldstone 1980).

35
36 Nevertheless, several authors also distinguish between different categories of revolutions. For example,
37 Trimberger (1978) distinguishes between “revolutions from above”, provoked by civil and military elites, and

1 “revolutions from below”, which start as peasant protests. The former would be exemplified by the Turkish
2 Revolution of 1923 led by Ataturk and the Meiji Restoration in Japan, while the latter would be “true”
3 revolutions. Huntington (1968) distinguishes between “Western-type revolutions”, which take power in the
4 centre and then move to the periphery, and “Eastern-type revolutions”, which move from the periphery to the
5 centre. The former includes the French, Russian and Mexican Revolutions, while the latter includes the
6 Chinese Revolution and colonial struggles against imperialist powers. For Zimmermann (1990), the
7 particularity of the successful revolutions of the twentieth century is that they are all anti-colonial except the
8 Russian Revolution; they are also all fuelled by a communist or socialist ideology, except the Mexican and
9 Iranian Shiite Revolutions. Foran (2005) does not fully agree with this last statement. While he acknowledges
10 that some twentieth-century revolutions were marked by anti-colonialism, what they all have in common is
11 that they were “Third World revolutions”. It is beyond the scope of this paper to go into the details of all the
12 proposed categories, but it should be remembered that there is no unanimity on the definition of revolutions or
13 their categorisation.

14 2.2 The importance of peasants and young leaders

17 Proposing a theoretical analysis of revolutions is complex because they have taken very different forms
18 throughout history. Some have involved a relatively high level of organisation, implying the emergence of
19 armed guerrilla warfare, as was the case with the Chinese Revolution of 1949 or the Cuban Revolution of
20 1959. Others occurred spontaneously, without any preparation, although organisations took control afterwards,
21 such as the Mensheviks and Bolsheviks in the Russian Revolution of 1917 (Tiruneh 2014). However, one can
22 observe that the vast majority of revolutions have been led by peasants, which in itself is perfectly
23 understandable given that rural life predominated until very recently and remains the primary way of life in
24 many developing countries. As Skocpol (1979) notes, attention to peasant revolts remained negligible for a
25 long time, as historians and social scientists preferred to study urban revolts. Wolf (1969) is one of the first to
26 highlight peasant revolts, his aim being to identify the different motives for revolt while proposing a
27 classification according to their specific features. He asks: “who is it, then, that speaks to the peasant and what
28 is it that they communicate which moves the peasant to violent political action?” (Wolf 1969, p. xii–xiii).

30 In a subsequent study, Paige (1975) analyses rural conflicts in Peru, Angola and Vietnam; Chirot and Ragin
31 (1975) focus on the failed Romanian rebellion of 1907, while Skocpol (1979) conducts a comparative study of
32 the French Revolution of 1789, the Russian Revolution of 1917 and the Chinese Revolution of 1949 (as well
33 as studying the Meiji Restoration of 1868 in Japan and the aborted 1848 revolution in Germany). Hooglund
34 (1980, 1982) analyses the Iranian Revolution of 1979, while McClintock (1984) focuses on Peru through the
35 study of the Shining Path guerrilla movement, and Tutino (1986) on the various revolts that Mexico
36 experienced between 1750 and 1940. Last, Brustein and Levi (1987) analyse the peasant revolts that England,
37 Spain and France experienced from 1500 to 1700 (of which there were five in England, three in Spain and

1 nineteen in France). This list is not exhaustive but is sufficient to demonstrate the attention to the role of the
2 peasantry in revolutions.

3

4 The substantial representation of peasants in revolutions should not obscure the fact that, in several cases, they
5 benefited from the support of an urban elite. Pipes (1990) reveals this feature in the October Revolution in
6 Russia, where the communist elite played a leading role; Skocpol (1979) makes a similar observation for the
7 Chinese Revolution. Finally, Dix (1983) argues that revolutions in developing countries dominated by
8 authoritarian regimes have always involved coalitions between urban and rural forces.

9

10 In addition to the involvement of peasants, many revolutions have also been marked by significant youth
11 participation. On this point, Goldstone (2002, p. 11) is the most categorical, pointing out that “youths have
12 played a prominent role in political violence throughout recorded history”. He adds that “most major
13 revolutions – the English Revolution of the seventeenth century, the French Revolution of the eighteenth
14 century and most twentieth-century revolutions in developing countries – have occurred where exceptionally
15 large youth bulges were present” (p. 11). This observation is supported by Hooglund (1980, p. 3) in his
16 synthesis of the Iranian Revolution: “the extensive involvement of lower class youth in the numerous
17 demonstrations which led to the abolition of monarchy and the establishment of Islamic Republic was one of
18 the most striking characteristics of the Iranian Revolution. Of particular interest was the participation of young
19 men of village origins. Their activities, in contrast to the usual view of passive Iranian peasantry, were on a
20 relatively widespread scale”. Similarly, Beezley and Meyer (2010) indicate that the Mexican Revolution
21 involved a whole generation of young provincials.

22

23 Youth also characterises the leaders of several peasant and urban revolutions. Déplanche (2011, p. 225), for
24 example, notes that “a striking feature of the French Revolution of 1789 was the relative Youth of its main
25 protagonists. Men such as Robespierre, Danton and Brissot, indeed became among the most influential and
26 charismatic leaders of the Revolution during their thirties”. In 1789, Robespierre, Danton, and Brissot were
27 31, 30, and 35 years old, respectively. Another leader, Saint-Just, was only 22 years old. This same
28 youthfulness is found among the leaders of the Cuban Revolution – Fidel Castro, Ernesto Guevara, Raul
29 Castro and Camilo Cienfuegos, who in 1958 were 32, 30, 27 and 26 years old, respectively. This is also the
30 case for the leaders of the Sandinista National Liberation Front who took power in Nicaragua. Among them,
31 Daniel Ortega, Humberto Ortega, Omar Hallelevens, and Joaquim Cuadro were 33, 31, 29, and 27 years old,
32 respectively, in 1978. The leaders of the Algerian National Liberation Front were no exception. Following
33 the 46-year-old Ahmed Ben Bella, who was to become the first president of independent Algeria in 1962,
34 Houari Boumédiène was 30, and Abdelaziz Bouteflika was only 25.

35

36 While these examples illustrate the youthfulness of the revolutionary leaders, they also highlight that these
37 revolutions were not led by one person but by a group of leaders. More specifically, successful revolutions

1 were characterised by the cooperation of two types of leaders: task- and people-oriented leaders (Aminzade
 2 et al. 2001). The former can be seen as action leaders in the sense that they organise the revolution by
 3 determining the most appropriate strategy to implement given the means and the context. The latter are those
 4 who know how to put anger into words while being able to convince people to rethink their worldview. They
 5 can be seen as charismatic or visionary persons. If we take the American Revolution as an illustration,
 6 George Washington was task-oriented. He led the battles against the English troops, but the revolution was
 7 “given its voice by the rhetorical fire of Thomas Jefferson and Thomas Paine” (Aminzade et al. 2001, p.
 8 129). As for the Cuban Revolution, the visionary was Fidel Castro (and, to a lesser extent, Che Guevara),
 9 while the organisation was the work of Raul Castro and Camillo Cienfuegos.

10 3. The foundations of the paradox and incentive-based solutions

11
 12 The little we have just presented allows us to identify some key features of revolutions: (violent) revolutions
 13 are most often the work of (relatively young) peasants, whose (often young) leaders are not necessarily
 14 peasants. These leaders would be of two complementary types: task-oriented and people-oriented. Although
 15 ideally, a theory of revolutions ought to explain the process that links these different factors, this is not the
 16 path that proponents of rational choice theory have taken. Instead, the starting point of this theory is the
 17 determination of the rebels’ motivations. This commitment is a necessary condition for the emergence of a
 18 revolution. As we shall see, it is not, however, a sufficient condition to explain the whole process at work.

20 3.1 The framework and its extensions

21
 22 The basic framework of revolutionary choice is based on the following assumptions.² An individual i is
 23 assumed to suffer from the incumbent regime and is aware of the possibility of participating in a collective
 24 rebellion to overthrow it and replace it with an alternative regime. Individual i can choose between participating
 25 in the collective rebellion action or not. Their preferences are represented by a utility function U , which takes
 26 the value V if the collective action succeeds ($U(\text{success}) = V$) and 0 if the collective action fails ($U(\text{failure})$
 27 $= 0$). We denote by $E(C) > 0$ the expected cost for individual i to participate in the collective action of
 28 rebellion. This cost can be interpreted as the risk that the individual will be injured during the fight or the
 29 punishment that the regime will inflict if the collective action fails.

30
 31 For i , participation in collective action is only worthwhile (i.e., resulting in the overthrow of the regime) if the
 32 forces involved are equally matched and the participation of i makes the difference. Otherwise, their
 33 participation has absolutely no impact. If the forces involved are such that collective action largely triumphs
 34 or is defeated, their participation makes no difference. There are, in fact, three different situations that
 35 individual i may face when making their choice:
 36

² We present here a simplified version of the Tullock (1971) framework.

- 1 - Situation S_1 : the forces involved are such that collective action largely triumphs
 2 - Situation S_2 : the forces involved are equally matched
 3 - Situation S_3 : the forces involved are such that the regime largely triumphs
 4

5 If situation S_1 prevails, the collective action of rebellion triumphs whether the individual participates or not.
 6 By participating, i gets $V - E(C)$, while by remaining inactive, they obtain V . If situation S_2 prevails, by
 7 participating in the collective action of rebellion, i contributes to victory and obtains $V - E(C)$. If, on the other
 8 hand, i does not participate, the status quo prevails, and i obtains 0. Finally, if situation S_3 prevails, the
 9 collective action of rebellion fails irrespective of the action of individual i . In this case, i obtains $-E(C)$ by
 10 participating, 0 otherwise. As the individual maximises their expected utility, they have beliefs about the
 11 distribution of states of nature. These are represented by the following subjective probability vector:

$$12 \quad p = (p_1, p_2, p_3) \text{ with } \sum_j p_j = 1,$$

13 where p_j is i 's subjective probability that situation S_j occurs. For individual i , the expected utility $E(R)$ to
 14 participate in the collective action of rebellion is therefore given by:

$$15 \quad E(R) = p_1(V - E(C)) + p_2(V - E(C)) + (1 - p_1 - p_2)(-E(C)) = (p_1 + p_2)V - E(C),$$

16 while the expected utility $E(I)$ to not participate is:

$$17 \quad E(I) = p_1V.$$

18 The difference between the two is:

$$19 \quad E(R) - E(I) = p_2V - E(C).$$

20 As this difference measures the incentive to participate in a collective action of rebellion, p_2 can be interpreted
 21 as the probability that i 's participation affects the outcome of the rebellion. As Olson (1971, p. 44) notes, "no
 22 single individual's contribution makes a perceptible difference to the group as a whole", making p_2 a priori
 23 low. It follows that when $E(R) - E(I) < 0$, the incentive for an individual to participate in collective action
 24 is negative.

25

26 While highlighting this paradox, Olson also offers a solution by emphasising that selective incentives facilitate
 27 collective action. As he writes, "only a separate and selective incentive will stimulate a rational individual in
 28 a latent group to act in a group-oriented way ... The incentive must be 'selective' so that those who do not ...
 29 contribute to the attainment of the group's interest, can be treated differently from those who do" (Olson 1971,
 30 p. 51). Olson distinguishes between positive and negative selective incentives. Negative selective incentives³
 31 involve the use of coercion or punishment (to overcome the free-rider problem). Positive selective incentives
 32 are the rewards an individual receives privately for participating in successful collective action. These rewards
 33 can be economic (such as monetary incentives or the provision of material goods), social (such as the desire

³ Negative incentives have been poorly studied by the literature, though Gates (2002) discusses them in the context of civil wars. However, no one has addressed the question of when it would be better to use coercion rather than positive selective incentives.

1 to be accepted by group members) or psychological (such as an increase in one's self-esteem).⁴ However,
 2 Olson differentiates between these selective incentives and argues that social and psychological incentives are
 3 only valid for small groups, while economic incentives are most likely to ensure the formation and stability of
 4 large groups.⁵

5
 6 The concept of selective incentives was quickly taken up by Tullock (1971), who applies a formal approach⁶.
 7 His model includes economic incentives in the form of a private reward to the individual for participating in
 8 the collective action of rebellion (which they will receive if the collective action is successful). It also includes
 9 social incentives in the form of an "entertainment value of participation", which Tullock (1971, p. 92) justifies
 10 as follows: "people are willing to take some risks for the fun of it, but not very severe ones".⁷ Silver (1974)
 11 builds on Tullock (1971) but replaces "the entertainment value of participation" with a "psychic income" that
 12 includes "the individual's sense of duty of class, country, democratic institutions, the law, race, humanity, the
 13 rulers, God, or a revolutionary brotherhood, as well as his taste for conspiracy, violence, and adventure" (Silver
 14 1974, p. 64–65). Selective incentives were fully established by Popkin (1979) in his study of the Vietnamese
 15 Revolution (covering the period 1945–1954). Subsequently, Moe (1980) extends their scope by applying
 16 selective incentives to the study of participation in interest groups (e.g., political parties, unions), showing their
 17 impact.⁸

18 3.2. Selective incentives and leaders' commitment

19 The first case study of a revolution from the perspective of selective incentives is that of Popkin (1979) and
 20 concerns post-1945 Vietnam.⁹ Popkin's work explains what led Vietnamese peasants to fight the French
 21 colonial power. Revolution is only one aspect of this work, as Popkin's main objective is to propose a theory
 22 of (Vietnamese) peasant society using a historical perspective of Vietnam through the lens of rational choice.¹⁰
 23 The Vietnamese Revolution is treated as an application of this theory in which the Vietnamese peasant is
 24 described as a "rational problem solver" (p. ix).

⁴ Olson also mentions selective incentives of a moral nature, but he urges readers not to dwell on them because they are difficult to evaluate empirically.

⁵ "Social pressure and social incentives operate only ... in the group so small that the members can have face-to-face contact with one another" (Olson 1971, p. 62).

⁶ Ireland (1967) was the first to put forward a formalised representation of the problem of revolutionary commitment, while Tullock (1971) revisited it in relation to selective incentives.

⁷ For a detailed presentation of Tullock's (1971) work and an explicit formalisation of his ideas, see Apolte (2016).

⁸ Note that Moe (1980) does not use Olson's vocabulary in his typology of selective incentives. Instead, he considers that: "Material incentives are tangible costs and benefits. Solidary incentives are intangible costs and benefits of a social nature deriving, for example, from friendship, camaraderie, recreational activity, status, social pressure, or a sense of belonging. Purposeful incentives are intangible costs and benefits ultimately grounded on values of a suprapersonal nature, e.g., notions of right and wrong, moral or religious principles, political ideology, and notions of fairness and justice" (p. 615).

⁹ Under French colonialism, Vietnam was divided into three territories: Tonkin in the north, Annam in the centre and Cochinchina in the south.

¹⁰ Popkin (1979) prefers to speak of a political economy approach.

1 Facing the French colonial government and powerful landowners, the Vietnamese peasants, driven by their
2 individual interests, were never able to overcome the free-rider problem. Collective action, when it took place,
3 was the work of a religious structure (such as the Catholic Church, the Hoa Hao Buddhist sect or the Cao Dai
4 syncretist religion) or a political one (the Viet Minh, a political and military organisation created by the
5 Vietnamese Communist Party that brought together nationalists of different persuasions). In order to overcome
6 the problem of collective action, these structures, at different times and independently of each other, played an
7 important role. Although there were differences between them (especially in the way they operated), they acted
8 according to similar logics in order to gain the trust of the peasants. The local leaders of these organisations¹¹
9 adhered to a simple way of life and demonstrated high moral integrity, to the point of being recognised for
10 their honesty. In addition, they offered peasants various benefits, such as representing them in court in a
11 landlord dispute, providing them with networks in the administration to facilitate administrative procedures,
12 helping to reduce rents or even eliminating a landlord. These benefits were only granted to peasants who joined
13 the movement. For the more specific post-1945 period, of all the existing organisations, the Viet Minh took
14 the dominant leadership position and found itself at the forefront of the struggle against the French colonial
15 power, not least because of its national dimension. As Popkin (1979, p. 254) states: “the Viet Minh
16 substantially outreached other organizations because it was able to convince them that contributions would
17 do the most good if channelled through the Viet Minh”.

18
19 Popkin’s work highlights how external organisations, which provided peasants with local benefits, led them to
20 pursue their own national goal (which was, in part, through rebellion). To show it, he draws on events in the
21 central provinces of Nghệ An and Hà Tĩnh. In these regions, peasants revolted against the French colonial
22 power in 1930–1931, and the argument frequently put forward in the literature maintained that the increase in
23 taxes imposed by the French colonial power contributed to the famine affecting those regions at the time.
24 Popkin (1979, p. 248) rejects this argument, noting that “in this same area, there had been an even worse famine
25 at the turn of the century. At that time, thirty thousand persons died; yet there was no widespread protest”. So,
26 what did change between the two periods? According to the author, “the difference between the two reactions
27 was not level of misery: it was organization, particularly communication and coordination. By 1930, there
28 were more than three hundred Communists (including cadres trained in Thailand, China, and Russia)”. If the
29 Communists managed to organise the rebellion, it was because they had enough resources to distribute in the
30 form of selective incentives.

31
32 Using rational choice, Popkin (1979) offers an original explanation for the involvement of peasants in the
33 Vietnamese Revolution. But is this enough to be considered a relevant explanation for the Vietnamese
34 involvement and a fortiori for committing to revolution in general? One may disagree, noting that a critical

¹¹ Whether priests, bomzes or communists, Popkin likens them to “political entrepreneurs”, defined as people who are willing to invest their time and resources in coordinating the behaviour of others to produce collective action.

1 ingredient is left out of this explanation. If the main instigators of the revolution are organisations (religious
2 and political) with the means to encourage peasants to follow them, it remains unclear why and how these
3 organisations emerged. Although the fifth chapter of Popkin's book details the history of each of these groups,
4 no information is provided on how they managed to bypass the free-rider problem and become stable
5 organisations capable of providing selective incentives.¹² It is simply assumed that these organisations pre-
6 existed the Vietnamese peasantry, which is questionable and calls Popkin's contribution into question. This
7 argument aligns with Elster's (1989) criticism¹³ of selective incentives (especially of an economic nature), as
8 they presuppose that a group has already been formed to distribute them. However, the formation of this group
9 is as difficult to explain as the use of selective incentives itself. Indeed, the first potential members bear the
10 costs of organising the group alone. These costs can be high, such as the burden of agreeing on a strategy,
11 acquiring the means to implement the chosen strategy and suffering the repression of the regime. Consequently,
12 it is difficult to see what would lead these first potential members to form the original group, which brings us
13 back to the initial paradox.

14
15 This problem, which we call the first-mover paradox, is found in many articles that assume that a group of
16 leaders is already formed. For example, Maranto and Tuchman (1992) analyse the Vietnamese Revolution
17 beyond 1954, accounting for the end of French colonialism and the partition of Vietnam into two independent
18 states. The originality of their work lies in their analysis of the behaviour of peasants during the war between
19 North and South Vietnam, focusing on the role played by the communist organisation, the National Liberation
20 Front of South Vietnam (also called Viet Cong by its opponents). However, again, nothing is said about how
21 the Viet Cong, which sought to act on the peasants, managed to overcome the free-rider problem. Similarly,
22 in a paper based on multiple cases of revolutions, Lichbach (1994) refers to "guerrilla leaders", "dissident
23 leaders", "guerrilla leadership", "external leaders" or "peasant leaders" to refer to those distributing selective
24 incentives. However, at no point does he explain how these groups manage to overcome the free-rider problem.
25 The same can be said of Chong (1991), who presupposes a leader group in his study of the US civil rights
26 movement. For him, "a group of highly motivated individuals-purists, zealots, moralists, Kantians, what have
27 you – will have to provide the leadership required to convince others that large-scale coordination will be a
28 profitable activity" (Chong 1991, p. 95). Thus, leaders would be driven by a particular motivation that could
29 be interpreted as a moral commitment. However, no evidence or data is provided to support this explanation.¹⁴

¹² This is exactly the criticism made by Elster (1985).

¹³ Other criticisms of selective incentives include Fireman and Gamson (1979), Holmstrom (1983), Blumel et al. (1986), Berejikian (1992) and Moore (1995), among others.

¹⁴ Frolich and Oppenheimer (1970) and Frolich et al. (1971) also assume the existence of a leader at the origin of the movement. They call this person a political leader and define them as "any individual who acts to provide a collective good without providing all the resources himself" (Frolich et al. 1971, p. 6), reducing leadership to the level of the individual. Similar to other authors, they say nothing about how that person became a leader.

1 Complementarily, Van Belle (1996) analyses the rationale for the existence of a group of leaders by introducing
2 the notion of ‘leadership benefits’. These benefits reward leaders for initiating activities that contribute to their
3 prestige, and these rewards are large enough to offset the costs of the risks involved. They are also more
4 important than the benefits that would accrue to those who join the movement later. For example, by organising
5 an event, those responsible would gain prestige and have greater influence in defining the objectives to be
6 achieved. If, in addition, the event is successful, they will enjoy the various benefits associated with the position
7 of leader, such as being interviewed by the media and being invited to programmes. Further, as Van Belle
8 (1996, p. 111) points out, “the prestige and the interview are relatively concrete leadership benefits, leading to
9 perhaps enhanced political power or opportunities”. In the case of a revolution, in addition to the selective
10 incentives, some of these leadership benefits would be used to increase the means of achieving victory, if only
11 by expanding the movement to include new members. The argument is valid, but as the benefits from
12 leadership diminish rapidly with the number of new members joining the movement, it is not always
13 guaranteed that the resulting membership will be sufficient for collective action to be successful.

14
15 Moreover, there is another more problematic issue to consider. According to Van Belle, there are those who
16 become leaders because it pays to be one. One might suspect that if there are leaders, it is because they gain
17 from being leaders, but there is a step between having an interest in being a leader and being a leader, and little
18 has been said about this issue. The shift from being the initiators of a meaningful activity (such as a
19 demonstration) to becoming leaders of a structured organisation is not clearly explained. Van Belle argues that
20 initiators will make up the leadership group (of an organisation) because of the prestige and visibility they
21 have gained with their initiative. However, this is more of a hypothesis than a demonstration per se.

22
23 In contrast, several revolutionary leaders claimed that they would no longer be alive for the triumph of the
24 revolution, which seems to suggest that they were not necessarily looking for future personal gain. Lenin, for
25 example, in a speech entitled “Lecture on the 1905 Revolution”, delivered on 9 January 1917 at a meeting of
26 young workers in the People’s House in Zurich, concluded his speech with an unambiguous statement about
27 his expectations for the future. He wrote: “We of the older generation may not live to see the decisive battles
28 of this coming revolution. But I can, I believe, express the confident hope that the youth which is working so
29 splendidly in the socialist movement of Switzerland, and of the whole world, will be fortunate enough not only
30 to fight, but also to win, in the coming proletarian revolution” (Lenin 1964, p. 253).¹⁵ However, the revolution
31 triumphed in October of the same year. Referring to the revolution in Nicaragua, Pastor (1987, p. xiv) states
32 in the preface to his book: “Reminiscent of Lenin’s famous prediction in March 1917 that he would ‘probably
33 not live to see the decisive battles of the revolution’, Daniel Ortega admitted that as late as July 1979, days
34 before Somoza’s departure, he doubted he would live to see the Sandinista victory”. Thus, by anticipating the
35 coming of the revolution in a future from which they believed they would be absent, Lenin (in exile) and

¹⁵ This text was first published in the 22 January 1925 edition of the daily *Pravda*.

1 Ortega (in guerrilla) explained that they were not seeking any direct personal benefit. This understanding
2 suggests the ambiguity of the true motivations of revolutionary leaders and echoes, more generally, the
3 problem of individual incentives to participate in a potentially costly action to which selective incentives are
4 supposed to provide an answer.

5
6 Barry (1970, p. 33) makes a more fundamental critique of selective incentives in this regard. For him, “the
7 constant danger of ‘economic’ theories is that they can come to ‘explain’ everything merely by redescribing
8 it. They then fail to be of any use in predicting that one thing will happen rather than another. Thus if an
9 organization maintain itself, we say ‘It must have provided selective incentives’; and this is bound to be true
10 since whatever motives people had for supporting it are called selective incentives”. In other words, if it is a
11 matter of balancing the cost of participating in a collective rebellion action by adding a positive term called
12 selective incentives, the whole rebellion action is included in this one term, and consequently, anything could
13 be interpreted as a selective incentive. The paradox is thus resolved but without a convincing argument about
14 the makeup of selective incentives and their relevance.

15
16 As Udehn (1993) points out, the problem raised by Barry can be well understood by drawing a parallel between
17 the work of Tullock (1971) and Silver (1974). What Tullock describes as an “entertainment value of
18 participation” is described by Silver as a “psychic income”. While following Tullock’s lead, Silver adds to this
19 new terminology a series of arguments ranging from class duty (or democratic institutions) to recourse to the
20 sacred or a taste for violence (or adventure). Hence, behind the generic term ‘selective incentive’, there are
21 distinct arguments, though it is questionable how this helps us to identify the motives for participation in
22 collective rebellion. Indeed, the satisfaction associated with the different arguments does not necessarily follow
23 the same logic. For example, if an individual is motivated by a sense of duty to democratic institutions, they
24 participate because they feel morally obliged to defend the democratic cause (or ideal). In contrast, if they are
25 motivated by a taste for violence, they participate solely for the pleasure of fighting. In the first case, the
26 individual is satisfied with having defended the democratic cause, and in the second, they are satisfied with
27 having shown violence, and all this is supposed to correspond to the same logic, which sustains the idea that
28 any argument can be used as an incentive.

29
30 Similarly, Hirschman (1974) offers an alternative interpretation of the selective incentive framework and
31 questions the very existence of the paradox of revolution. In his view, “the sudden, historically so decisive
32 outbursts of popular energies must be explained by precisely ... the turning of what is normally sensed as a
33 cost that is to be shirked into a benefit, a rewarding experience, and a ‘happiness of pursuit’; in which one
34 simply must share” (Hirschman, 1974, p. 10). This point is reiterated in his 1982 book, *Shifting Involvements,*
35 *Private Interest and Public Action*, in which he claims that “the benefit of collective action for an individual
36 [may not be] the difference between the hoped-for result and the effort furnished by him or her, but the sum of
37 these two magnitudes” (Hirschman 1982, p. 82). Thus, for Hirschman, associating costs with the act of

1 rebellion amounts to mischaracterising revolutionary commitment because the cost of rebellion can then be
2 perceived by the rebels as a benefit. Behind this benefit lies the fact that the act of rebellion itself is gratifying.
3 Imbued with an ideal, the struggle to achieve it is in itself a pleasure for the rebel. This benefit is consistent
4 with selective incentives in that it is a reward for participation in collective action. However, it differs in that
5 it is not intended to compensate for the costs associated with taking part in the collective action of rebellion.
6 This argument brings us back to Barry's critique (1970): to assume that rebellious action is in itself beneficial
7 is to assume that there is no first-mover paradox since rebel participation is – by definition – granted.

8 9 3.3. Selective incentives and complementary or alternative motivations

10 Many authors, following Popkin (1979), interpret revolutions (as well as social movements and protest
11 movements) based on selective incentives alone, without producing complementary arguments that could
12 provide more realism. For example, Lichbach (1994, p. 389) justifies the importance of selective incentives in
13 rather definitive terms: "Students of peasant upheavals thus recognize several truths. Peasants are unconcerned
14 with broad purpose, philosophical systems, political theories, and revolutionary organisations. Peasant
15 grievances are specific and well-defined, limited and local. Peasant actions are correspondingly designed to
16 satisfy material self-interest. Thus, peasants will join a dissident group or participate in collective dissent
17 because of particularistic benefits'.

18
19
20 However, several empirical works show that not everything is so categorical (see, among others, Anderson
21 1997; Finkel and Muller 1998; Tezcür 2016). For example, using data from three rural villages in Nicaragua
22 and three in Costa Rica, Anderson (1997, p. 530) concludes that: "When one examines the full data set, both
23 economic and moral concerns appear statistically significant. Although moral concerns exhibit a higher level
24 of significance, the equation indicates that both types of motivation are important and necessary in
25 understanding the full range of peasant political action. This constitutes fascinating empirical evidence of the
26 need for a combined theory".

27
28 There are also case studies where arguments such as indignation/dignity (i.e., immaterial rewards,
29 psychological motivations) are used to explain participation. This approach is used by Wood (2003, p. 233) –
30 focusing on Salvadoran peasants who joined the FMLN¹⁶ rebel movement, she writes: "Some activists who
31 suffered at the hands of the authorities or saw the suffering of their families or neighbours supported or joined
32 the insurgents because of feelings of moral outrage at the government's response to what they perceived as
33 their just activities. ... Continued activism expressed defiance and asserted a claim to dignity and personhood.
34 Its value was not contingent on success or even on one's contributing to the likelihood of success". Similarly,
35 drawing on an analysis of the micro-foundations of the 2011 Arab uprisings, Pearlman (2013) argues that

¹⁶ Frente Farabundo Martí para la Liberación Nacional (in English: the Farabundo Martí National Liberation Front).

1 emboldening emotions (e.g., joy, anger, pride) encourage the prioritisation of dignity and increase the
 2 willingness to engage in revolutions.

3
 4 Popkin (1979) is perfectly lucid on this point. While privileging the argument of selective incentives, he opens
 5 the possibility of considering other (more or less complementary) arguments to explain the collective action
 6 of rebellion. He acknowledges in particular that there may be people who participate “on the grounds of ethics,
 7 altruism, or conscience” (Popkin 1979, p. 254), in which case it was not necessary for the leader to offer them
 8 selective incentives. Similarly, he suggests that peasants may participate because they believe “their
 9 contribution will make a big enough difference” (p. 257). This argument has been developed in two variants.
 10 The first is where the individual believes that their participation might influence others to do the same, which
 11 should have a noticeable effect on the final outcome. The second relates to “situations where every little bit
 12 [of overall goal] is seen as a crucial step in a long process” (p. 257). For this second variant, he makes the
 13 following clarification: “If a large overall goal can be broken into many small independent pieces, all of which
 14 are necessary, the free rider problem can be overcome, for if each person has a monopoly on a necessary factor
 15 for the final goal, all contributions are essential” (p. 257). Therefore, if a leader divides the final objective into
 16 several independent but necessary (smaller) objectives, each of the (potential) members assigned to one of
 17 these objectives self-identifies as a key player. Further, because this (smaller) objective contributes to the final
 18 objective, this member realises their impact on the achievement of the final objective.¹⁷

19
 20 Another point developed by Popkin (1979) concerns the different facets of the Viet Minh’s strategy towards
 21 peasants (which is not reduced to individualised benefits). We learn that, in the Annam territory, for rural
 22 villages where the French presence was absent (because it had failed), the Viet Minh provided public goods,
 23 guaranteeing security, education and other needs. For example, on the issue of education, Popkin explains that:
 24 “All schoolteachers and educated youth were *drafted* to begin literacy campaigns throughout the countryside.
 25 In some cases, villages were not even allowed to enter the marketplace until they had learned the new words
 26 for the day. This was an important policy identifying the Viet Minh with progress and a generalized
 27 *antifeudalism*, and it was overwhelmingly popular. [...] for the first time the poor in many villages were able
 28 to afford education” (p. 225). The success of this education programme was later extended to other regions. In
 29 terms of its impact in Cochinchina, we are told that: “As in Annam, education opportunities were greatly
 30 expanded. The literacy classes were enormously attractive and demonstrated to many the Viet Minh’s break
 31 with the feudal past” (p. 239).

¹⁷ Popkin’s analysis can be complemented by a third variant that has been highlighted by empirical studies in relation to the non-violent demonstration of 9 October 1989 in Leipzig that was to be the starting point for the collapse of the East German regime (see, among others, Opp 1994, 1998, 2001; Opp et al. 1995). There is evidence that East German citizens believed that they could make a significant impact through their participation, causing the government to change its policies. As suggested by Langer (1975) and Taylor and Brown (1994), individuals overestimate their influence and operate under the illusion that they have more control over events than they actually do.

1 Similarly, the Viet Minh returned land to the peasants: “All communal land that formerly had been diverted to
 2 private use by notables was returned to the villages” (p. 225). More generally, Popkin shows that during the
 3 war against the French, in the villages of the liberated rural areas, the Viet Minh instituted various measures
 4 to improve the daily life of the peasants, especially the poorest. This action contributed to their popularity and
 5 also enabled them to recruit young peasants. On this point, Popkin’s statement is unambiguous: “These
 6 programs demonstrated the concern of the Viet Minh for the peasantry and were essential to the development
 7 of their armed forces. They led many young people to see a bright future with the Viet Minh, and the local
 8 cadres helped release youth for full-time participation in the struggle by taking care of their families” (p. 240).
 9 The Viet Minh’s strategy in the liberated territories was to create the conditions for an alternative state based
 10 on a policy guided by principles of social justice. In order to convince the peasants to follow them, the Viet
 11 Minh offered a taste of what the country could be like if the organisation came to power. Thus, in the case of
 12 Vietnam, a policy of public goods management (based on social justice) seems to have played at least as
 13 important a role as selective incentives, if not much more so.

15 4. Revolution and interactions

16
 17 The analysis of revolutions from the perspective of selective incentives focuses mainly on the means used by
 18 revolutionary leaders to expand their organisation. It gives only a partial view of the issues involved in forming
 19 a revolution. Once the interdependence of the different actors is taken into account, it becomes possible to
 20 understand the impact of interactions (thanks to game theory). This line of research has led scholars to develop
 21 different ways of understanding revolutions, all of which are equally original but which, as we shall see, have
 22 not satisfactorily solved the paradox of collective action.

24 4.1 Marxism and rational choice

25
 26 Even if revolutions are not the most accomplished aspect of Marx’s thought (Elster 1985),¹⁸ it is difficult to
 27 discuss them without mentioning Marx. We will not return to his work specifically so much as that of his
 28 followers, who sought to imbue it with microeconomic foundations.

¹⁸ Analysing Marx’s positions on the stakes of revolutions, Elster (1985, p. 528) concludes that “Marx never produced a theory of revolution”. Although he devoted essays to the revolts of 1848 (Marx 1952/1850, 1963/1852) and the Paris Commune (Marx 1974/1871), these works are essentially historical rather than theoretical. In *The Holy Family*, written with Friedrich Engels (1957/1845), Marx comments only briefly on the French Revolution. It is in *The Communist Manifesto*, also written with Engels (1964/1848), that we find the beginnings of a theoretical approach to revolutions. The authors demonstrate that capitalist economic development leads to a class struggle between capitalists and workers because of the exploitation to which the latter are subjected. This situation would contribute to the emergence of revolutionary contestation, especially during the market crises (i.e., short-term overproduction crises) the system causes periodically. Thus, for Marx and Engels (1964/1848), there would be a correlation between economic development and revolution, which is why they predict proletarian revolutions led by the working class in the most industrialised countries rather than peasant revolutions. This view did not prevent Marx from believing that a peaceful transition to socialism was possible. More precisely, he distinguishes between countries where the transition could be made peacefully and those where it seemed impossible. In an interview with a US journalist in May 1871, he stated: “In England, for instance, the way to show political power lies open to the working class. Insurrection would be madness where peaceful agitation

1
2 Led by, among others, the Canadian philosopher Gerry Cohen, the Norwegian politician Jon Elster and the US
3 economist John Roemer, several authors have sought to reconstruct Marxist theory on the premises of rational
4 choice, thus rejecting the holistic approach characteristic of much of Marx's work, where all reasoning is based
5 on postulated global entities, such as social classes or relations of production. As Roemer (1988a) argues,
6 Marxism cannot be distinguished from other social thought by its tools but by the questions it asks. This school
7 of thought came to be called "analytical Marxism" in 1986, following the publication of a collective work
8 edited by Roemer that presented the main orientations of the movement.

9
10 Roemer's work (1985, 1988b) is a genuine reflection on the logic behind revolutions. Although Roemer and
11 Marx agree that workers, and not peasants, play a prominent role in explaining revolutions, they differ as to
12 the reasons behind their participation. Instead of relying on exploitation to explain the origin of revolutions,
13 Roemer focuses on the presence of inequalities within society. In the absence of electoral competition, a
14 revolution against the authoritarian regime would be motivated by redistribution.

15
16 In his model, Roemer (1985) supposes two players. The first is a revolutionary agent called Lenin who
17 "possesses charisma which overcomes the free rider problem and is able to convince all members of a formable
18 coalition to organize, to overcome the prisoners' dilemma, by pointing out that if each follows his narrower
19 self-interest then all will be worse off in expected income" (Roemer 1985, p. 90). The second individual, the
20 tsar, is supposed to control the state. While Lenin seeks to maximise the probability of a revolution, the tsar
21 seeks to minimise it by threatening¹⁹ individuals with penalties if they participate in a revolutionary coalition
22 and the revolution fails. The game is supposed to be zero-sum, meaning there is a winner and a loser. The
23 probability of a revolution is assumed to be a function of the nature of the revolutionary coalition, the existing
24 distribution of national income and the set of penalties imposed on the participants in the revolution. It thus
25 differs from much work on the sociology of revolutions, which emphasises that this probability depends on
26 the military and financial capacity of the state, the willingness of elites to engage in revolutionary actions (or
27 not to support the state) and the capacity of the masses to mobilise (see Goldstone 1991 for a discussion).

28
29 Although Roemer (1985) does not specify the exact form of this probability, he makes two assumptions that
30 the probability must satisfy in order to be consistent: (1) coalition monotonicity (CM): any enlargement of the

would more swiftly and surely do the work. In France a hundred laws of repression and a mortal antagonism between classes seem to necessitate the violent solution of social war" (Elster 1985, p. 445). In a speech at a congress held in Amsterdam in 1872, he added: "We do not deny that there are countries, such as America and England, and if I was familiar with his institutions, I might include Holland, where the workers may attain the goal by peaceful means" (Elster 1985, p. 446).

¹⁹ Note that this is a notable distinction from the majority of articles in the literature that do not assume the reactionary capabilities of the incumbent government. This feature of Roemer's (1985) model allows revolutionary choice to be analysed by jointly assuming the strategies of both the revolutionary coalition and the governing coalition, thus providing a more balanced picture of the incentives in place. Another example is Holmstrom (1983) and his analysis of selective incentives.

1 revolutionary coalition (through the arrival of new members) increases the possibility of a successful
2 revolution; (2) penalty monotonicity (PM): an increase in penalties is accompanied by an increase in the
3 probability that the coalition will engage in revolution. The CM hypothesis is obvious and requires no
4 comment. However, the PM hypothesis is more controversial. The idea behind this hypothesis is that if we
5 consider the level of the penalty as a measure of the tyranny of the tsar, then the higher the penalty, the angrier
6 people are and, therefore, the more plausible the revolution. Roemer adds that a high penalty level means any
7 revolutionary coalition that forms will fight more fiercely because of the anger (against the tsar) among its
8 members.

9
10 The tsar, who plays first, chooses a set of penalties to minimise the maximum probability of a revolution that
11 Lenin could initiate. Lenin, playing second, is fully aware of the distribution of penalties and proposes a
12 redistribution of income that maximises the probability of a revolution. Analysing this game, Roemer (1985)
13 makes four main points:

- 14 - Because increasing penalties also increases the likelihood of revolution, the tsar will never impose
15 the maximum possible penalty level.
- 16 - The severity of penalties decreases monotonically with income so that people with lower incomes
17 will be most affected.
- 18 - If the revolutionary coalition includes all the poor, Lenin has an optimal strategy: to redistribute the
19 national income from the rich to the poor.
- 20 - If society can be divided into three income classes (the poor, the middle class and the rich), then the
21 poor will all be in the revolutionary coalition, the rich will all be outside the revolutionary coalition,
22 and the middle class will be either inside or outside the coalition.

23
24 It follows that if there is a revolution, it will be by the poorest, possibly supported by members of the middle
25 class, who will participate to obtain a new redistribution of wealth that will allow them to live better.

26
27 Again, the leader's motivation for overcoming the free-rider problem is not made explicit. Like Popkin (1979),
28 Maranto and Tuchman (1992), Chong (1991) and many others, Roemer assumes that a revolutionary coalition
29 exists that is capable of threatening the existing power. He assumes that "[Lenin] possesses charisma which
30 overcomes the free-rider problem and is able to convince all members of a formable coalition to organize, to
31 overcome the dilemma, by pointing out that if each follows his narrower self-interest then all will be worse off
32 in expected income" but stresses that "if this free-rider problem is not somehow overcome, I do not think
33 revolutions can happen" (p. 90). By bypassing the free-rider problem, Roemer (1985) restricts the scope of his
34 model, which – instead of studying the paradox of revolution – focuses on the problem of coordinating the
35 revolutionary coalition.

1 Elster (1985) takes an entirely different view from Roemer (1985) and defines the necessary conditions for a
2 revolution to occur. Synthesising the work of Marx, he identifies two conditions that can favour a revolution.
3 First, wages must be low enough to encourage workers to take the risk of revolutionary engagement. Second,
4 there must also be a fall in the capitalists' rate of profit, halting investments and undermining "the belief of the
5 ruling class that the system is worth defending" (Elster 1985, 528). These conditions are supported by Petith
6 (2000) on the basis of a growth model that includes a technical change in which land is assumed to be a factor
7 of production and labour supply is a function of wages. The author shows that if the threshold of technical
8 change is not sufficient, then profits and wages fall until they reach zero, making revolution inevitable as a last
9 resort option. One could also assume that as profits fall, so does capitalists' bargaining power. This loss of
10 power could be an opportunity for employees to negotiate rather than revolt in order to ensure a regime shift,
11 possibly by threatening power holders with revolution.

12
13 Although Petith (2000) does not propose this outcome, he does envisage it, claiming that "the model suggests
14 a new way in which trade union activity may be associated with revolutions ... [it] opens the interesting
15 modelling possibility of adding a bargaining model and showing that the occurrence of revolution depends on
16 union bargaining strength" (p. 187). An alternative proposed by Cohen (1988) is that employees would engage
17 in revolutionary action because they are guided by a sense of duty that leads them to lighten the burden borne
18 by others. However, this argument is problematic in that it is not known how an individual comes to have such
19 a sense of duty, especially how it spreads to other employees. Moreover, it contradicts Marx, who argues that
20 workers do not embrace socialism in response to a moral duty but because it corresponds to their (class)
21 interests.

22 23 4.2. Revolution and asymmetric information 24

25 In the work of analytical Marxists, the regime and revolutionaries are able to know with certainty the conditions
26 under which a revolution occurs and can, therefore, anticipate and prepare for it. Kuran (1989, 1991, 1995), in
27 examining the French Revolution of 1789, the Russian Revolution of 1917, the Iranian Revolution of 1978–
28 1979 and the democratic revolutions in Eastern Europe, notes that they all occurred without anyone expecting
29 them. These revolutions surprised the incumbents, the opposition, all foreign observers and the participants
30 themselves, making the unpredictability of revolutions a key topic.

31
32 The surprise effect of each of these revolutions can be illustrated by the intervention of King Louis XVI, who,
33 when the Bastille was taken by revolutionaries on 14 July 1789 (an event that inaugurated the French
34 Revolution), asked the question: "But is it a revolt?" The Duke of Liancourt replied: "No, sire, it is a
35 revolution" (Chaussinand-Nogaret 1988, p. 102). Thus, the king of France and his advisors did not perceive
36 the acute discontent of the people. The same goes for those who would become the leaders of the revolution
37 (such as Robespierre, Danton and Brissot) – they did not expect it any more than the king did, and this was
38 even less the case for the people of Paris, who had not prepared for nor anticipated the uprising.

1
2 For Kuran (1989, 1991, 1995), citizens living under an authoritarian regime tend to falsify their preferences.
3 More specifically, fearing repression by the regime, they behave in public as if they were adhering to it in order
4 to avoid revealing themselves. Even if a person recognises the need for change, he will never publicly display
5 behaviour or words that might reveal his true aspirations; at best, he will discuss them privately with trusted
6 people. In other words, the gap between a citizen's private views and those expressed publicly can be
7 considerable, placing the citizenry at large in a situation of collective ignorance.²⁰ Despite the existence of an
8 opposition, each person feels isolated and, therefore, does not dare to speak out (for fear of being denounced
9 to the authorities).

10
11 Kuran (1995) also reveals that preference falsification does not prevent the regime from knowing whether a
12 population likes it or not – there are always opponents who criticise the regime (even if they are very few in
13 number). The real problem facing the regime is that preference falsification prevents it from determining the
14 distribution of what Kuran calls individual revolutionary thresholds. For an individual, this threshold is the
15 difference between the cost of asserting loyalty to the regime and the cost of expressing opposition to it. The
16 distribution of thresholds is not common knowledge, and “a major implication is that, in any given society,
17 cognitive, economic, and social processes may be making it ever easier to spark a revolutionary bandwagon
18 without anyone sensing the potential for social change. The society may be on the verge of a massive explosion,
19 therefore, with everyone continuing to believe – and indeed its members continuing to claim – that it is quite
20 stable” (Kuran 1995, p. 1533). Thus, the smallest event, no matter how insignificant, can lead to a revolutionary
21 bandwagon that pushes more and more people to join the movement, encouraged by the fact that the stronger
22 the commitment, the lower the costs of joining it and the more likely the victory of the revolutionary coalition.
23 If the movement takes the form of a revolution, it will also be joined by supporters of the overthrown regime.
24 Indeed, anticipating possible persecution by the revolutionaries, they would claim that their support for the
25 regime was only a façade to protect themselves (from possible repression). They would also have falsified
26 their preferences, revealing that the regime was not (in reality) as strong as everyone thought.

27
28 By linking the unpredictability of revolutions to the falsification of preferences, Kuran offers an explanation
29 of revolutions that applies not only to peasant and urban revolutions but also to violent and democratic
30 revolutions. In particular, although he explains that it is difficult to obtain data on peasant revolutions, he
31 claims that his theory applies to them by relying on two studies by James Scott, whose fieldwork confirms the
32 relevance of preference falsification: “the political scientist James Scott (1985, 1990) has shown [...] through
33 his own fieldwork in Malaysia [...] that poor peasants deliberately and routinely mislead their landlords and
34 government officials about their knowledge, aspirations, and resentments” (Kuran 1995, p. 1542).²¹

²⁰ Kuran (1991) uses the social psychological term “pluralistic ignorance”.

²¹ Note that there are works in the literature on peasant revolts that rely on a preference falsification approach. Bhaumik (2002), for example, expresses this view regarding the peasant revolts in Bengal at the end of the nineteenth century.

1

2 While Kuran's approach has the advantage of justifying the unpredictability of revolution (due to preference
3 falsification) and explaining the dynamics by which a revolutionary movement forms, it does not explain how
4 the revolution ignites. Indeed, Kuran assumes that "each individual member must choose whether to support
5 the government in public or oppose it" (Kuran 1991, p. 17), but he presupposes that the first opponents to
6 oppose the regime publicly are willing to sacrifice themselves in the sense that they bear a priori costs that
7 exceed the benefits they can expect. In justification, Kuran borrows two hypotheses from Finkel et al. (1989).
8 The first is based on a cognitive illusion according to which an individual overestimates their personal political
9 influence. Individuals would be convinced that their involvement would produce a cascade effect that would
10 reduce the risk of their involvement as the movement developed. The second rests on ethical commitments,
11 according to which some individuals feel compelled to do their fair share to attain a jointly desired outcome.
12 They would thus be willing to sacrifice themselves for their cause and would, in fact, ignore the costs of the
13 commitment.

14

15 In either case, there is a logical inconsistency. Consider the first hypothesis. Since individuals are locked in
16 collective ignorance, how could the first to engage in a protest reasonably anticipate that by doing so, they
17 would lead others to do the same? One cannot have individuals who know they are alone because they know
18 nothing about the true preferences of others and, at the same time, assume that some can anticipate a cascade
19 effect. Either individuals know nothing about others and cannot anticipate a cascade effect, or there is no actual
20 falsification of preferences (or on a relatively small scale) and individuals (depending on their beliefs) are then
21 able to anticipate the behaviour of others.

22

23 As for the second hypothesis, we can assume, as Roemer (1985), that some people are willing to sacrifice
24 themselves for their cause. To do this, they need the 'spark' mentioned by Kuran, that insignificant spark (or
25 event) that signals that it is the right time to rise up. It is also that spark that followers are waiting for (hoping
26 that some will join the movement first). If there was a need for a signal for those willing to sacrifice for their
27 cause to get involved, it is that they may not have been so willing to sacrifice. For if they were, they could
28 have done so at any time, not just when a cascade effect was likely to occur.

29

30 While Kuran's approach does not provide a convincing explanation of the genesis of a revolution, the
31 originality of his work lies in the fact that he is the first to consider that individuals have an interest in
32 concealing information about themselves. So far, all representations of revolutions from the point of view of
33 rational choice have been developed under the assumption of perfect information. Since Kuran's work, a
34 growing body of work has analysed participation in revolutions under the assumption of asymmetric
35 information. These include Lohmann (1993, 1994), Yin (1998), Ginkel and Smith (1999), Leeson (2010),

1 Shadmehr and Bernhardt (2011), Shadmehr (2014) and many others.²² This research agenda is what Tullock
2 (1995, p. 116–117) wanted to change in his original 1971 model and in his words, “I am compelled to agree
3 that my original article is incomplete. [...] I have also become much less enamored with the perfect information
4 assumption”.

5
6 Among the major advances in this strand of literature, Ginkel and Smith (1999) study a model in which the
7 regime in power knows whether or not it has the capacity to survive a revolution. Citizens have no information
8 about the regime’s ability to resist, while the information held by the rebels lies between these two extremes.
9 Given the asymmetric information in favour of the regime, the rebel group acts based on its beliefs about the
10 characteristics of the regime. As the regime is repressive, citizens never express their opinions in public or to
11 their neighbours for fear of punishment, and therefore, neither the regime nor the rebel group is aware of the
12 genuine aspirations of the masses. For the authors, two conditions must be met for a revolution to take place:
13 (1) the citizens must be convinced of the possible success of the revolution; (2) the rebels must be able to
14 coordinate the revolt. It is this coordination problem that determines the outcome of the revolution game. When
15 the rebels warn citizens that the regime is weak, this will not necessarily translate into mass mobilisation, as
16 citizens know that the rebels may have an interest in distorting the information, given their strong desire to
17 overthrow the regime. Therefore, their participation will depend on the credibility of the rebels. If the rebels’
18 message is perceived as credible, citizens will join the revolt. If not, they will have no interest in risking a
19 confrontation with the regime. It follows that the rebels will be the first to commit themselves when they are
20 guaranteed to be followed by the citizens.

21
22 Perhaps the answer to this small group’s commitment lies in the figure of the leader, as suggested by Hermalin
23 (1998), i.e., a leader by “example”. Although Hermalin’s proposed application is to teamwork, the figure he
24 uses to illustrate leadership by example is Dr Martin Luther King Jr., due to his ability to lead civil rights
25 marches. He also cites the example of Joseph Stalin, who, by choosing to remain in Moscow, encouraged
26 Muscovites to resist the German army during the siege of Moscow. At the heart of leadership by example is
27 the idea that an individual, through their behaviour, can convince others to follow them, thus creating a
28 bandwagon effect. To model it, Hermalin considers a team whose production depends on the effort of each
29 member and is subsequently shared among them. One member is assumed to have private information about
30 the return from efforts, and it is this information that makes them a leader. The challenge for this leader is to
31 ensure that everyone achieves the level of effort that will lead to the highest level of output. The leader knows

²² The literature that seeks to explain the importance of youth in rebellion movements is an exception. Although it does not take into account the problem of information asymmetries, it shows that the link between youth and revolution has to do with institutional constraints (such as restricted access to the labour market). These constraints reduce the opportunity cost of engaging in a revolution (Apolte and Gerling 2018). This literature also emphasises that rebelling is costly and risky for both older and younger people in the face of a repressive state. For young people, however, the success of the revolution will benefit them over a long period of time, which makes them much more likely to rebel (Shadmehr and Haschke 2016).

1 that any announcement they make about the performance of the effort will have no impact. Indeed, since others
2 know that it may be in the leader's interest to lie, they are less likely to believe the announcement. The only
3 way for them to determine the value of the return on effort is to observe the effort the leader makes. If they put
4 in a higher level of effort than they would with complete information, the other members will do the same.
5 Thus, the greater the effort made by the leader, the greater the effort made by the team, resulting in higher
6 collective welfare than in the case of complete information. In short, by setting an example, the leader
7 encourages other team members to expand their efforts, which at the same time contributes to improving the
8 share of the output they will get.

9
10 It is interesting to note that Hermalin's leader does not meet either of the two facets of leadership defined by
11 Aminzade et al. (2001). Indeed, this leader cannot be a "prophet" because a "prophet" has to propose a coherent
12 and convincing alternative, whereas Hermalin's leader is untrustworthy. The team takes into account the
13 behaviour of the leader, not the announcement.²³ Nor does this leader belong to the category of those whose
14 aim is to define the strategy that best achieves the desired objective. Indeed, they are listened to before they
15 act, while in Hermalin's model, the leader is not listened to and, therefore, must act. In revolutions, it is rather
16 a person who, in order to set an example, would be the first to throw themselves into the battle and would be
17 inclined to take daring risks.

18
19 Nevertheless, can we really expect such a leader to have an impact regardless of the size of the group? If the
20 group is small, a leader can, by acting first and taking risks, motivate other members, especially when the
21 context is unfavourable and the outcome uncertain. But a small group is far from representative of a revolution.
22 If the starting group is potentially large, likely to be thousands of people, the leader(s) is/are more likely to be
23 regular army officers who have joined the rebels or people from civil society who are known to be active in
24 the opposition. These leaders do not need to lead by example, as their reputation speaks for itself. In other
25 words, Hermalin's leader is, at best, representative of leadership in a small group, which makes it a peculiar
26 case since the vast majority of revolutions have been led by thousands of men and women.

27
28 This critique also applies to Leeson's (2010) analysis, which is unique in that it adopts a contractual perspective
29 to rebellion (in the sense of agency theory). Leeson (2010) addresses the two problems of the initiation and
30 formation of revolutionary coalitions. The example he uses is that of mutinies – it is inspired by contracts
31 between sailors, the round robin, aimed at removing the information asymmetries that make mutinies costly.
32 The underlying idea is simple. Seamen have no incentive to mutiny because an isolated act is strongly

²³ In this regard, it is surprising that Dr Martin Luther King Jr. was the example from which Hermalin (1998) built his model. As a leader, King gained his reputation, in large part, due to his speeches and convictions, including the famous "I Have a Dream" speech. He also organised marches, but this does not constitute the real specificity of his commitment – protest marches have been one of the preferred actions of social movements in the United States since the nineteenth century. Moreover, the first marches against racial discrimination date back to the early 1930s and were organised by the Communist Party and the Black organisation NAACP (National Association for the Advancement of Coloured People).

1 repressed. The lack of information about the willingness of other crew members to participate in the mutiny is
2 thus the main obstacle to mobilisation. As in Kuran (1991), it is assumed that the greater the participation in
3 the mutiny, the less costly the individual commitment. The challenge is in understanding the motivations of
4 first-movers for whom the costs of commitment are higher than the expected benefits. The solution presented
5 by Leeson (2010) consists of setting up a contract among seamen behind the back of the ship's captain. Those
6 ready to mutiny write their names on this contract, which they sign and pass on to all the crew members in
7 turn. Like a public good game with a participation threshold (Okada 1993; Courtois and Haeringer 2012),
8 mutiny can occur once a commitment threshold is reached. Because the contract is itself susceptible to
9 discovery by the ship captain, being the initiator is risky, and the first-mover issue is thus not immediately
10 resolved. The round-robin innovation is used by sailors to remedy this, where the signature of the contract is
11 written in circular form to hide the identity of the first-mover. Leeson's (2010) contribution is remarkable
12 because it is based on an in praxis modality explaining coordinated commitment, including that of the first
13 mover. However, the author notes that such contracts have been observed for a crew of about twenty sailors,
14 but it is difficult to find illustrations on a larger scale.

15 4.3. Recent advances in the role of revolutionary leaders and how they mobilise

16
17 The above-mentioned literature generally assumes that revolutions are led by individuals whose main function
18 is to organise the collective action of the rebellion. Leaders do this either by providing selective incentives or
19 public goods (see, for example, Popkin 1979), by asserting themselves through their charisma (as in Roemer
20 1985) or by acting by example (as in Hermalin 1998). Nevertheless, this literature fails to clarify the inherent
21 characteristics of leaders.
22

23
24 Who are revolutionary leaders, and how do they mobilise mass movements? This question is far from
25 straightforward because the position of leaders is particularly risky. The sanctions they are likely to face are
26 far greater than those faced by the rebels who make up the masses. Bueno de Mesquita (2010) provides an
27 original response by defining revolutionary leaders as revolutionary vanguards. While being a vanguard
28 member means taking risks if the revolution fails, it also means greater gains if it succeeds. The author analyses
29 revolution as a global game, i.e., a coordination game with incomplete information in which the revolution
30 occurs as soon as a sufficiently large number of rebels join the movement against the current regime. The game
31 involves a vanguard and a large number of individuals, each of whom is characterised by an anti-government
32 feeling. Everyone knows whether they are close to the threshold that would lead them to revolt, but no one
33 knows where the population stands in this respect. It is accepted that the vanguard has no private information
34 (on the type of regime) and that its action lies in choosing the level of violence it will use.²⁴ Observing the
35 level of violence of the vanguard, each individual decides whether or not to engage in violent action. Once a
36 threshold of (greater than or equal to) T individuals have joined the movement, the regime falls; otherwise, the

²⁴ This could be a terrorist attack or a guerrilla operation.

1 revolution fails.²⁵ The author shows that the violence of the vanguard has an informative effect: the more
2 violence the vanguard uses, the more the population believes that anti-government feelings are high, which
3 encourages them to join the revolution.²⁶ In other words, to encourage large-scale mobilisation, the vanguard
4 must publicise that they are engaging in a costly action.

5
6 The author offers an explanation to justify the incentive of the leader and to explain how the mobilisation of
7 the masses takes place. He does not, however, explain who decides whether or not to lead. Furthermore, the
8 sanction is approached in an exogenous manner in that the regime is not a strategic actor. As such, it could
9 punish violent vanguards more severely, thereby containing them or limiting their impact on the masses. It
10 could also manipulate information to discourage the population from joining a mass movement.

11
12 Hendrickson and Salter (2016) examine the respective cost-benefit thresholds for a leader and follower to
13 revolt. While by definition, the authors assume that there is no paradox of revolution by assuming that a non-
14 participating agent does not benefit from it, their contribution is interesting in that it focuses on the
15 characteristics of the leader. The authors distinguish between leaders who are average citizens and those they
16 describe as ruthless, the latter having lower costs of revolt (i.e., the revolutionary entrepreneurs considered by
17 Bueno de Mesquita (2010)), while the former are more easily followed because they are more credible. The
18 problem is supposed to be a game in which two players sequentially choose to engage in a revolutionary action.
19 The revolutionary commitment is akin to an investment (as in an option game), and the question is when it is
20 best to commit (i.e. invest), as competition creates a first-mover advantage that may offset the cost of
21 repression. Critical cost-benefit thresholds are discussed, and the conditions for a revolution to be led by
22 average citizens rather than ruthless individuals are examined.

23
24 From a related perspective but including information asymmetries, as in Bueno de Mesquita (2010), Shadmehr
25 and Bernhardt (2019) analyse the endogenous choice to become a revolutionary vanguard distinguishing
26 between professional and spontaneous leaders. Based on a modelling structure related to that of Bueno de
27 Mesquita (2010), the authors compare incentive structures where the leaders are either Leninist vanguards,
28 qualified activists dedicated to revolutionary leadership, or easy-rider vanguards who emerge spontaneously
29 during collective movements. They first consider a sequential two-player game in which a Leninist vanguard
30 chooses whether or not to initiate a revolutionary movement that only succeeds if the representative citizen
31 follows it. The vanguard decides not only whether to revolt but also its level of radicalism. Accounting for it,

²⁵ In this respect, Bueno de Mesquita's framework is close to that of Ginkel and Smith (1999). The difference between the two is that, in Bueno de Mesquita, the members of society are heterogeneous (in the sense that they are not necessarily characterised by the same level of anti-government feelings), and the vanguard does not possess better information than other members of society.

²⁶ In complementary work, Chen and Suen (2021) show that information asymmetry causes citizens to reject radical leaders who exaggerate and mislead, which, paradoxically, leads the latter to become even more radicalised in order to exacerbate citizens' discontent with the regime.

1 the citizen chooses whether or not to follow. Uncertainty about the relative values of the cost-benefit of
2 revolutionary action is key to the decision problem. This cost-benefit includes both an uncertain component
3 affecting the two players, who each receive a private signal, and a certain component that is only available to
4 the vanguard and which determines its level of radicalism. Conditions on the payoff structure for a revolution
5 to take place are examined, and one major result is that if a representative citizen sees their status quo payoff
6 deteriorate, a radical vanguard is then preferred. Considering next a two-player game in which two
7 representative citizens choose whether or not to revolt, the endogenous choice to become a leader is studied.
8 Once again, the revolution is a success only if both are committed, but this time, the leader receives no extra
9 benefit. By becoming a leader, the citizen takes a risk but passes on to the other a positive signal about the
10 gains they can expect if they join the revolution. If the follower joins in, they will suffer less repression if the
11 revolution fails. The conditions for one of the two citizens to spontaneously emerge as a leader are examined
12 in terms of the structure of payoffs and information.

13
14 The comparison of the two leadership cases shows that in the presence of a Leninist vanguard, the revolution
15 is more likely to occur, even if it will be followed less closely by the masses than a movement led by an early-
16 riser vanguard. Therefore, in the latter case, the probability of the revolution's success is greatest. As in Bueno
17 de Mesquita (2010), the regime is not a game player. However, the authors examine the regime's preferences
18 and strategy, particularly concerning sanctions. It is shown that it can be in a regime's interest to have
19 professional leaders present. Although threatening, they are less attractive to the population and, therefore, less
20 likely to ensure the success of the revolution. Therefore, the regime must impose few sanctions in order to
21 maintain their presence.

22
23 The article offers a possible response to the first-mover paradox. However, albeit different from Hendrikson
24 and Salter (2016), it overlooks the paradox of revolution itself in that, by definition, a revolution is assumed
25 to occur when both stakeholders revolt. As in Leeson (2010), the framework is that of a public good with a
26 participation threshold: Either the citizens revolt together and obtain the gains associated with regime change;
27 or they do not revolt, and the revolution does not take place; or they revolt alone, and the revolution ends in
28 failure. No situation exists where a citizen can free-ride and benefit from a regime change.

29
30 Assuming a related modelling structure in which an individual who does not participate in the revolt cannot
31 benefit from it and where rewards are contingent on the success of the revolution, Bueno de Mesquita and
32 Shadmehr (2023) focus on the nature of a revolutionary's motivation and how this affects repression and the
33 success of the revolution. Reminiscent of the work of Popkin (1979), Wood (2003) or Pearlman (2013), the
34 authors distinguish between material and immaterial (psychological) motivations of revolutionaries. The main
35 distinction between the two is that material motivation is a rival good, whereas immaterial motivation is a non-
36 rival good. It follows that the success of the revolution increases with the number of revolutionaries in both
37 cases. However, the material reward decreases with the number of revolutionaries, while the immaterial reward

1 remains constant. A major implication is that the repression of a group with a material motivation will be less
2 effective insofar as the dissuasive effect of the repression is partially offset by the increase in reward.

3
4 While the vast majority of the articles discussed above assume that violent revolutions are systematically
5 promoted by leaders, it is important to note that this is not always the case. Indeed, leaders did not always
6 initiate the mass movement, even if they later found a way to take the lead. An example is the French
7 Revolution, which began with the storming of the Bastille on 14 July 1789. As claimed by Sewell Jr (1996, p.
8 854), “when the National Assembly learned of the taking of the Bastille on the evening of the 14th, the deputies
9 did not rejoice that the people had risen up and struck a great blow against the royal forces. According to the
10 minutes of the Assembly, the taking of the Bastille was initially regarded as ‘disastrous news’, which produced
11 in the Assembly the most mournful impression”. Yet it was these same deputies, including Maximilien
12 Robespierre and François Buzot, who would later become the leaders of the revolution and justify the use of
13 violence. It was thus the masses who first embarked on a violent revolution, with the political elite then taking
14 a radical lead despite their initial reluctance. The same was observed with the Mexican Revolution of 1911,
15 where, according to Tannenbaum (1937), no organised party presided over its birth, as it was initially the work
16 of anonymous people. It was only later that leaders emerged who once again took up the cause of violence.
17 These examples demonstrate a form of revolution in which the masses engage in violence, pushing (potential)
18 leaders to adopt very radical behaviour. Although this aspect has received little attention in the literature, it is
19 an element in explaining leadership, with a conception of revolution that forges revolutionaries and their
20 leaders and not vice versa.

21 22 4.4. Collective rationality

23
24 As Roemer (1985) reveals, revolutions are characterised by an abrupt change in the preferences of participants.
25 He defines this as “a change in worldview from individual to collective rationality” (Roemer 1979, p. 764).
26 People would live their lives adopting individually rational solutions and suddenly change their behaviour to
27 find themselves collectively in the same movement of solidarity, acting as one. To illustrate his point, Roemer
28 (1985) uses the figure of Lenin as the one capable of privileging a group logic because of his talent in
29 convincing others and organising group movements. While this explanation is more of a simplification than a
30 true analysis of the reasons for this change in worldview, the question of collective rationality concomitant to
31 any revolution is worth asking.²⁷

²⁷ The question of collective rationality is one of Roemer’s leitmotifs for examining the question of revolutions. He writes: “With the paradigm of collective rationality, it becomes much easier to explain the actions of leaders, of workers who will die for some collective goal, of revolutionaries. Again, it is possible to explain such behaviour in the individualist model – some people have perverse utility functions, or they derive pleasure from helping others. A much simpler explanation is that certain people have more class consciousness, a consciousness which has been learned and which is a form of social adaptation necessary if that class is to advance. Learning, of course, should not be narrowly interpreted as being only from one’s own experience” (Roemer 1978, p. 155).

1 Goldstone (1994) focuses on revolutionary involvement in groups. Rejecting the idea that individuals choose
 2 whether or not to participate in a revolt, he assumes that groups of individuals make this choice. Drawing on
 3 numerous examples of revolutions and rebellion movements, including the French, American and Russian
 4 Revolutions, but also apparently spontaneous movements such as the Tiananmen and Leipzig protests,
 5 Goldstone (1994) argues that these actions are primarily the work of pre-existing groups rather than isolated
 6 individuals.²⁸ Through identification with collective norms, individuals first join groups that then collectively
 7 decide whether or not to participate in a revolution. The process thus takes place in two phases: (1) the choice
 8 to participate in a group; (2) the choice of that group to participate in a rebellion. The first phase is modelled
 9 as a coordination problem. Like Roemer (1985), Chong (1991) or Leeson (2010), Goldstone assumes that the
 10 choice to participate in a group is an insurance game. In this game, individuals have no incentive to free-ride
 11 but face a multiplicity of equilibria according to which a group is formed or not. For Goldstone (1994),
 12 commitment to the group would be mainly motivated by social norms. Because participation in a group is more
 13 profitable for an individual, group formation is a focal point (Schelling 1960).

14
 15 The next question is why the group – or rather a multitude of groups – would decide to participate in a
 16 revolution. The second phase raises the question of whether groups choose to engage in revolution. While this
 17 could be analysed as a paradox of revolution, with groups incentivised to free-ride on each other, this is not
 18 the route Goldstone (1994) takes. He again relies on social norms and assumes that groups are primarily
 19 motivated by the effectiveness of their actions. For him, “sociabilization helps promote the norm of active
 20 contribution to the effectiveness of group action and teach the lesson that free-riding can undermine group
 21 effectiveness” (Goldstone 1994, p. 145). The group’s choice to participate in the rebellion is explained by the
 22 efficiency assessed by the expected net gain of this action given its probability of success, all else being equal.
 23 It follows that while the approach is original in that it assumes that individuals are loyal to their group and
 24 focus on the group’s utility rather than their own utility, the group’s choice is not strategic because it ignores
 25 possible opportunistic alternatives.

26
 27 Beyond revolutions, the idea of collective rationality echoes the work of various authors on collective action.
 28 Among them, the philosopher Derek Parfit (1984) argues that even if the probability of an event is low, once
 29 the outcome is considerable, the expected value of the action cannot be ignored. Adapting this argument to
 30 Tullock’s model, the V term measuring the incentive to participate in a collective rebellion can be interpreted
 31 as a net benefit to all those affected by the decision rather than as a personal benefit. Despite the low value of
 32 p_2 , the product p_2V could be high enough to exceed $E(C)$ because of the high value of V . This argument
 33 implies a form of altruism. But according to Tullock (1983, 1995), altruists are too few to represent a mass

²⁸ Several authors stress that pre-existing networks made it easier for their members to recruit participants, including Moore (1966), Tilly (1973), Scott (1976), Calhoun (1988) and Taylor (1988, p. 77), who argues that “the pre-existing rural community [makes it] rational for the individual farmer to participate in ... collective action” because the community can more easily control individual behaviour. Recently, Petersen (2001) has shown how pre-existing networks played an instrumental role in the democratic revolutions in Eastern Europe.

1 movement. The author estimates altruists at 5%, hence the term “5% rule” by Lichbach (1995b), who states:
 2 “I agree with Tullock that what might be called the 5% Rule holds for protests and rebellions: there is 5%
 3 cooperation and people are 5% altruistic” (Lichbach 1995b, p. 126). This figure needs to be conceptualised
 4 more clearly – while we know that not everyone is altruistic, the question of whether there is a threshold
 5 beyond which there are too few to create a mass movement remains open.

6
 7 The change in preferences could also be explained by the fact that the poor influence of individuals on the
 8 outcome of collective action could lead them to abandon their selfish preferences to comply with a moral
 9 obligation to participate (in collective action).²⁹ Building on the work of Harrod (1936), Harsanyi (1980)
 10 characterises any moral decision as a (aggregate utility) maximisation problem under constraints. Borrowing
 11 the terminology introduced by the philosopher Brandt (1959), Harsanyi (1980) assumes that this maximisation
 12 problem can be modelled by considering that individuals are either act-utilitarian or rule-utilitarian. Under act-
 13 utilitarianism, the individual maximises aggregate utility (i.e., the sum of the utilities of the members of
 14 society) by considering the strategies of others as given. In contrast, under rule-utilitarianism, the individual
 15 maximises aggregate utility by assuming that all others do the same. Harsanyi (1980) argues for the superiority
 16 of the latter as it promotes a higher level of coordination (in the absence of communication). Indeed, an act-
 17 utilitarian individual will be prone to act non-cooperatively in situations that require a number of people to
 18 engage in the same behaviour (or action) to achieve the desired outcome. It follows that if other people act in
 19 order to achieve that outcome, their contribution is not necessary; if other people do not act, the individual will
 20 not do so either, evaluating the situation as a lost cause. Conversely, the rule-utilitarian individual will likely
 21 act because it is the right rule to follow in order to maximise aggregate utility. Coate and Conlin (2004) apply
 22 a rule-utilitarian model to the voting paradox (which follows a similar logic to the revolution paradox) and
 23 show that rule-utilitarian behaviour solves the paradox. However, their model was only tested on referendums
 24 with low participation and they showed mixed results.³⁰

25
 26 More recently, several concepts have been discussed to illustrate a form of collective rationality. Inspired by
 27 the work of the French mathematician Claude Berge (1957), the concept of Berge equilibrium describes a
 28 mutual support equilibrium in that “every player i maximizes the utilities of the co-players $N \setminus \{i\}$, and i 's utility
 29 is simultaneously maximized by those co-players” (Colman et al. 2011, p. 168).³¹ Building on Gauthier (1986)

²⁹ Goodin and Roberts (1975) maintain that individuals have both selfish and ethical preferences. For them, the same cause can make it irrational for a selfish individual to participate in collective action while making it rational for an ethical individual to participate in collective action. The idea they seek to defend is that by being unable to have a rational impact on the outcome of the revolution, a rebel will be guided by their ethical preferences, having oriented their discourse to encourage the expression of such preferences.

³⁰ The model was tested using data from local referendums held in the state of Texas between 1976 and 1996. Of the 526 referendums studied, 363 were selected. The average participation rate was 36%. There were a few cases where participation exceeded 75%, but in the majority of cases, it was less than one-third of the voting-age population.

³¹ To put the Berge equilibrium and its specific features into perspective, Crettez (2017) compares it to Sugden's mutually beneficial practice, Crettez and Musy (2021) compare it to the additive Kantian equilibrium à la Roemer, and Unreven et al. (2023) compare it to the multiplicative Kantian equilibrium à la Roemer.

1 and Vanberg (2008), Courtois et al. (2015) propose a formal framework to determine when it is rational for a
2 player to play Berge rather than Nash and vice versa. This framework is said to be situational, and the
3 underlying idea is that, before choosing their strategy, players first choose the behaviour rule they follow,
4 either Nash's rule (NR) or Berge's rule (BR). An NR player is a traditional utility-maximiser that best responds
5 to the optimal choice of others. Instead, a BR player is situational in that they play Nash against Nash players
6 but Berge against Berge players. Because players are rational, they choose the behaviour rule that yields the
7 highest expected utility given the behaviour rules others adopt. In other words, a player chooses one behaviour
8 rule rather than another if it is in their interest to do so.³² The authors show that it is rational for players to
9 adopt BR and that the result holds under certain conditions in the presence of asymmetric information about
10 the type of the other player. However, a limitation of the approach is that all results are obtained for two-player
11 games. There is still no situational framework for games with more than two players, which does not guarantee
12 the validity of the results in the context of a large population, a fortiori revolutions. The fact remains that the
13 individual choice to participate in a revolutionary group, as envisaged by Goldstone (1994), can very well be
14 explained by a situational concept such as that proposed by Courtois et al. (2015) since this group could have
15 the particularity of being essentially composed of BR players.

17 5. Conclusion

18 The theory of rational choice comes up against the paradox that individual interest is difficult to reconcile with
19 revolutionary commitment. Beyond the resolution of this apparent paradox, the overview of fifty years of
20 research on the subject shows the multiple avenues that have been explored to answer it and how this allows
21 us to better understand the making of revolutions. Two main findings result from this work. The first is that
22 the literature on the paradox has raised more questions than it has answered. Attempts to find answers led to
23 other equally paradoxical questions. Among them, while selective incentives are part of the answer to the
24 paradox, they lead to another one, the first-mover paradox, which questions the incentives to be a revolutionary
25 leader. Since selective incentives are distributed and not received by these leaders, one can question their
26 ability to overcome the free-rider problem. We come to suppose that these are disinterested individuals or that
27 leaders enjoy additional material or immaterial benefits. If we now assume that this group of leaders is in place,
28 the problem of explaining the coordination of revolutionary action arises. Indeed, if, thanks to selective
29 incentives or because of bandwagon effects, this group manages to trigger a mass movement, the question is
30 when and how this will happen. The evidence shows that this prediction is complex, which means that certain
31 motivations or coordination mechanisms remain poorly understood, leading to other questions and other
32 approaches. The role of information asymmetries, contractual mechanisms or other forms of rationality is part

³² Individuals act according to rules based on "if-then" instructions. The "if" component identifies the type of situation that individuals face, and the "then" component indicates the type of action to be taken. Returning to the paradox of revolution, the interpretation would be that if acting in one's own interest does not explain participation in an act of collective rebellion, it is because some individuals find it rational to adopt another rule of behaviour – in this case, Berge rule.

1 of the reflection. However, these are only some ingredients among others in a complex process. This
 2 broadening of the research agenda is rich, and if it is impossible to agree on a solution to the initial paradox, it
 3 should be seen as the starting point for a theory of revolutions rather than as a closed question requiring a
 4 closed answer.

5
 6 The second result concerns what this critical discussion tells us about the making of revolutions. What can we
 7 retain from the main messages that this literature addresses? The outline of the article is indicative of our
 8 position on the subject. The foundations of rational choice lead us first to question the utility function of
 9 revolutionaries. They should only commit if it is in their interest to do so. This postulate leads us to question
 10 the distribution of the costs and benefits of the revolution, but also the whole incentive structure that can
 11 modify these costs and benefits. Participation in a revolution will be more likely if the benefits to the
 12 revolutionary outweigh the costs, and an immediate consequence is that carrot-and-stick strategies à la Axelrod
 13 (1984) should be beneficial for coalition building. The problem, however, is that of a game, with interacting
 14 players having interdependent utility functions. The manipulation of information and the introduction of non-
 15 rational players with objectives other than the maximisation of their individual utility may provide insights
 16 into the realisation of some revolutions. However, these will be idiosyncratic rather than universal
 17 explanations.

18
 19 For future research perspectives on the subject, while it is clear that much remains to be said about revolutions
 20 based on strategic approaches, a crucial point that we have sought to highlight is that of taking better account
 21 of heterogeneities. Revolutions often rely on distinct groups. Urban or peasant, young or intellectual, this
 22 heterogeneity of revolutionaries and forms of revolutions is, in our view, one of the key points for a better
 23 understanding of the processes at work.

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