INCENTIVES TO REVOLT:
AN ECONOMIC THEORY OF REVOLUTION

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Abstract

Revolutions, which constitute turning points in the human history, has long been a subject matter of social sciences. In this article, we review the approaches that analyse the incentives that bring about revolutions. While doing this, we focus on the works that uses the basic method of the modern economics, methodological individualism. In this contex, it is revealed that the most important question is on what conditions a rational, self-interest seeking individual chooses to become a revolutionary,

Keywords: Revolution, methodologic individualism, rationality.

Öz

Devrimci Güdüler: Devrimin İktisadi Teorisi

İnsanlık tarihinin önemli dönüm noktaları olan devrimler sosyal bilimlerin de önemli bir araştırma alanını oluşturmaktadır. Bu makalede, devrimleri ortaya çıkaran güdüleri analiz eden yaklaşımlar özetlenmiş, bunlardan modern iktisadın temel yaklaşımı olan metodolojik bireycilik yöntemiyle tahlil eden çalışmalara odaklanılmıştır. Bu çerçevede, yanıt bulunması gereken en önemli sorunun rasyonel ve kendi çıkarını düşünen bireyin devrimci olmaya nasıl kalkıştığı olduğu görülmektedir.

Anahtar Sözcükler: Devrim, metodolojik bireyselcilik, rasyonalite.

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INTRODUCTION

Revolutions are important turning points in the human history and understanding revolutions was always a goal of social sciences. Naturally, different branches of social sciences can hold different parts of the reality and in our opinion a comprehensive "theory of revolution" cannot be developed without bringing these different elements together. In this work, however, while briefly touching upon alternative views, we will focus on individualistic approaches by taking individuals as the basis of our analysis. Individualistic approaches constitute a main branch of the recent analytical work on revolutions. Moreover, individualistic approaches comprise a channel through which economics as a discipline penetrates into the analysis of revolutions by applying its methodological individualism. The aim of this paper is to develop an understanding of this approach and exhibit its shortcomings. What is not intended in this study is a comparative analysis of individualistic approaches and its alternatives –mainly structuralist approaches- which would require a more comprehensive work and be tried elsewhere.

Inevitably, our task becomes to explore the incentives to revolt at the individual level rather than a macro level study of structures. In this sense, our focus will be on discussing under which conditions the incentives to revolt become dominant so that a revolution occurs. At the end of the work, when we look at the results, we will have the opportunity to evaluate to what extent this approach is a sufficient one to understand the notion of revolution.

We will start with a brief review of modern approaches to incentives to revolt. After forming a basis, we get into an important problem when we study incentives to revolt in this framework: This is the problem of rationality. How can a rational individual be a revolutionary when all the literature underlining the collective action problem tells us it is irrational for him/her to be? In the next section, we will attempt to simulate the main arguments that we have covered in a more concrete and formal way. Namely, we will discuss our arguments on a number of formal models. The last part of this paper is allocated for an evaluation of the individualistic approaches and concluding remarks.

1. REVOLUTIONARY INCENTIVES: THE THEORY

1.1. Structural Approaches

Recent and modern approaches on the question of revolution can be classified in two groups. The first one is what we can call the structural approaches. These approaches assume that society is made up of structures and

it is through these structures that progress in the society takes place. There should be some objective structural causes for a trend. The role of the individual in this case is limited. An individual himself is unable to reverse a structural trend so an individual's problem becomes only to determine where to take place in the already established trends (Berejikian, 1992: 648).

Theda Skocpol's famous work *States and Social Revolution* is one of the zenith works of this approach. Skocpol argues that the great revolutions like the French, Russian or Chinese ones were of non-voluntarist character that is different groups wanted to take power but only one could. It was not the will of the revolutionary groups but the maturity of the objective material factors that gave way to revolution. The weakening of the current state structure was, for instance, a common denominator of all (Skocpol, 1979).

Skocpol, in her analysis of peasant revolts, argues that peasants are always in a revolutionary situation, that they are continuously subject to economic, political and cultural marginality and socio-economic immobility. What is needed for a revolution to occur is not the subjective will of peasants but the objective maturity of the conditions. This "maturity" is implied mainly in two conditions: First structural positioning of the peasantry as a class should have some degree of freedom of the landed elites of the society. This includes some level of solidarity and communal autonomy among peasants.

Second, there should be some relaxation in the potential coercive sanction by the state as a result of the revolt. It is collapse of this potential coercion that allows peasants to utilise their autonomy and solidarity in concerted attacks against the landed elites. In summary, combining the notion a class in permanent revolutionary condition with necessary structural conditions, Skocpol asserts that given sufficient solidarity and autonomy, a decline in sanctions would spur peasant revolt (Skocpol, 1979).

1.2. Individualistic Approaches

In the second group, there are individualistic approaches. Taylor's argument would be a proper starting point: Taylor criticises Skocpol's approach while accepting her view that no revolution was "made" by a mass mobilizing revolutionary movement and they should have structural basis. However, he accuses her of ignoring the fact that even under these assumptions; revolutionary situations can be explained by the rational choice theory (Taylor, 1989: 76). We will return to Taylor's approach once again when we discuss this rationality problem in detail. Here, we will go on with the type of explanations that takes the self-interest seeking individuals as the basis rather than a structural approach.

The first question that individualistic approaches ask is in which conditions individuals more likely to participate in the revolutions. A common sense necessitates that revolutions occur when conditions get worse. But there were instances where this was not the case. In the French Revolution, for example, the revolution occurred when first time after a long period the peasants' position was improving. In Iran, for example, the overthrow of Shah occurred in a time of relatively increasing prosperity. Interestingly, there is already a general consensus has been reached on the view that revolutions are more likely to occur in the times of relative economic improvement or political liberalization according to Coleman (Coleman, 1990: 472). We can analyse the theories in this framework in more detail.

1.2.1. Theories of Frustration

Theories of frustration in different ways state that it is a subjective understanding of revolutionary individuals that opens the way to a revolution. This subjective understanding perceives the conditions are getting worse even though objectively they might be getting better. So, a frustration theory tries to understand how this understanding works (Coleman, 1990: 473).

The Theory of Rising Expectations: According to this view, revolutions are more likely to occur during when conditions get better because when there is a certain improvement in either political or economical conditions, expectations are formed for better conditions. These expectations rise faster than the rate of improvement in the objective conditions. As resulting from the increasing gap between the two, revolution occurs (Brinton, 1965: 250).

The Theory of Short-term Setbacks: According to the theorists like Davies who support this version, the actual process is slightly different than the above. In this version, again there are rising expectations as the outcome of relative improvements in conditions but this time the revolution occurs when the improvements are interrupted for some reason (Coleman, 1990: 474).

The Theory of Relative Deprivation: This version, which was offered by Runciman and Gurr. According to this theory as long as there is no change in conditions, there is no discontent since everybody shares the same fate. But when conditions start to get better this does not happen in an equal way, some of them improve more rapidly. This perception of the gap by the lower individuals and the accompanying envy results in frustration and thus revolution (Tripathi; Srivastava, 1981).

The Theory of Status Inconsistency: The view underlines that during the periods of change a large number of status inconsistencies occur. People who

gain wealth or political power but they still realize that their political positions are unchanged. Lenski (1954) and Stone(1970) for example brings this view from their study of American, French and Russian revolutions that status inconsistencies are widespread the population will support social change. In the English Revolution for example, it was gentry's increasing education, wealth and social status, which created an inconsistency in its political position towards the king, which paved the way for a revolution (Coleman, 1990: 477).

1.2.2. Theories of Power

The other line of explanation is the theories of power. In contrast to frustration theories, power theories state that there is no need to take frustration as a pre-condition for a revolution. Power theorists like Leites, Wolf, Laqueur, Tullock and Tilly, even though having nuances at their approaches generally argue that it is easier to explain a revolution when we give up this assumption but alternatively we need to put a different behavioural model explaining how public support behind revolutionaries increase when conditions are getting better. The main argument in these theories can be explained better with the concept of individual rationality on expected gains and losses. The logic is as follows: When there is a revolutionary activity, the critical question is whether the masses who already have complaints about the system but take no action will participate or not. It is not difficult to think that they will aspire to be on the winners' side. If it is unlikely that the revolutionaries will succeed, then for such a person, it is irrational to participate since there is the danger of a strong punishment at the end. As a result, a single individual will make an expected gain and loss calculation and act according to that calculation. If his/her expected gain if the authority is overthrown is positive and the expectation of overthrowing the authority by the revolutionaries is positive then he will participate. Otherwise, he will prefer to take no action. If this line of explanation is correct, then the frustration theories are wrong since in this case improving conditions do not cause frustration, they can even decrease the level of frustration. But improving conditions increase the perceived chances of the success of the revolutionaries in the eyes of the masses (Coleman, 1990: 480-481).

In power theories it is more like psychological warfare between the revolutionaries and the authority to capture the masses. In this sense revolutionaries' concern is more about creating the image that they are powerful on the eyes of the people more than winning their support. By doing so, they can guarantee that more people will join them.

1.2.3. An Assessment: Power Theories vs. Frustration Theories

Power theories and frustration theories differ in some clear senses. Frustration theories try to bring a micro level explanation in terms of the expressed actions. They more focus on the causes of the expressed action. On the other hand, power theories base their analysis on purposive action. They more focus on the incentives on the individual level as we have briefly seen. A second but closely related difference is the frustration theorists rely on an implicit aggregation in transmission from micro to macro level. In the power theory approach it is not easy to make such a simple aggregation. We are again faced with the well-known collective action problem in this version. Actually, power theories are more in accordance with the economic approach to the problem of incentives to revolt. We have self-interest seeking individual at the center of the analysis and we try to find out the conditions that it is rational for that individual to revolt. In the next section we will get into this problem deeper. The frustration theories, on the other hand, can be claimed to be nearer to the structuralist approach. Although, in this approach there is also the effort to explain the revolutionary incentives of the individual, the direction of the causality is from macro to micro level. There are some macro dynamics going on and these are affecting individuals. In this sense the individuals' decision-making process is trivial compared to power theories. In power theories in contrast, it is possible that everything is determined at the very micro level. Thus, the power theories perceive the reality as a strategic game between revolutionaries, authority and the masses.

In our view, frustration theories are lacking a comprehensive explanatory power. Every single explanation in this family seems to hold only a limited part of the reality. In this sense, frustration theories can be useful in explaining a single revolution but every single explanation is far from being a theory of revolution. In fact, all the elements that we have demonstrated with frustration theories more or less exist in all revolutions in different parts of the society in different proportions. In this sense, the claim that one of them is the main cause of the revolution does not seem as a very strong proposition.

Power theories, on the other hand, are more internally consistent on this issue. Power theories, unlike frustration theories, do not need to explain why frustration rises when conditions are getting better because in these theories frustration has no significant explanatory role. In general, we have to state that it is necessary for at least some parts of the society -which will involve in the revolutionary activity- to live in worse conditions for a considerable time to talk about a possibility of a revolution. This proposition was confirmed by all experiences of revolutions. In this sense, the improving conditions are only a detail in the whole picture. I believe this a further reason for weakness of the

frustration theories, which spend so much time on the issue of improving conditions.

2. THE PROBLEM OF RATIONALITY

At this moment, we are in position to analyse an individual's decision-making problem more closely. As we have stated our sympathy with the power theories and we are going on the path of interest-seeking individual assumption, we need to make a cost-benefit analysis for an individual. The obvious problem we are faced with at this micro level is how such an individual be involved in revolutionary activity having in mind the classical collective action dilemma showed to us by Olson, (Olson, 1965). Revolution has a public good characteristic. It is logical to assume that one individual's participation has a little marginal effect on the outcome of the uprising. We also know very well that involving in an uprising can have huge costs if the action is unsuccessful. So, if we think in the classical collective action dilemma terms, the rational action to do for an individual is to stay at home. But we know that - at least from the successful attempts of revolution that the history witnessed - revolutions occur despite collective action problem. Do these revolutions indicate "irrationality" or there is some kind of rationality behind? In this section our aim will be to explore the reasons of this seeming inconsistency.

When we look at the very individual level, we will face with the individual's decision-making problem in the case of a revolutionary situation. If we go on the track of Coleman (1990: 491), we can define the individual's problem in terms of the costs and benefits of participating in the revolutionary action. To be specific, let us define L as the possible losses (costs) from involving in the revolutionary activity, G as the possible gains (benefits) from involving in such activity, p as the probability of the revolution will be successful estimated by the individual, q as the individual's estimate of his marginal contribution to p and finally r as the individual's estimate of the probability that he will be punished if he participates and revolution is unsuccessful. Consequently, the individual's expected benefits from engaging in revolutionary activity is qG and the expected cost of participating is r(1-p)L - (1-p)L if the punishment is certain- In this sense , it is rational for the individual to participate if and only if qG is greater than r(1-p)L. This seems not so much possible because of the nature of the decision we have mentioned: q can be expected to be very small. The three fundamental costs that we can mention here are: First the obvious cost of punishment by the authority if the revolution fails. The second fundamental cost does not depend on the success of the revolution; it is the sanctions imposed on the revolutionaries during the conflict by the authority. Finally, a third type of cost can be labelled as the personal

costs associated with the participation again independent of the success of the revolution including giving up activities, associations and friendships that becomes irrelevant by participating.

On the benefits side, we can again talk about three sets of benefits. The first set is again the obvious one: The benefit of the regime change brought by the revolution. This benefit is independent of the participation of the individual. The second one is dependent on the individual participation. This is the personal material benefits like getting a high social position in the new regime. The place for that opportunity is limited and dependent on the participation as we have mentioned. A final set of benefits can be defined as immaterial benefits. These are again independent of the success of revolution and are related to the psychology of the individual. This can be an internalized ideology or certain norms and ethics that will support the new regime. Alternatively, this can be close social environment of the individual, e.g. friends, associates who provide the individual social capital and who support the revolution.

Defining the costs and benefits in this way, we are in a position to deepen the discussion. How are the costs and benefits distributed so that the inequality will hold for the participation side? Do we need to redefine our cost and benefit concepts (since under these concepts still it does not seem rational for an individual to revolt) or should we investigate our rationality assumption? One explanation brought by Coleman himself is the role of authority divestment at a revolutionary situation. Even though people do not actively participate themselves, they may indirectly support revolution by divesting their authority from the current ruler and so that avoiding the high costs of direct participation. Actually, we observe this type loss of confidence behaviour of the masses if the revolutionary side can form right expectations about its possibility of success which happened in the major past revolutionary experiences. Yet, although this has some explanatory power we can say divestment of authority hardly explains everything. It does not explain clearly the active participation of individuals.

Is there a possibility that we can explain the rationality of the revolting behaviour when we still stick to the classical definition of rationality? This is what Taylor tries to do. For Taylor, a thin theory of rationality, which he defines as the instrumental and egoistic like in the neo-classical theory, is enough to show that the revolting behaviour was rational. As we mentioned before, he opposes Skocpol's strict structuralist view that revolutions happened because the conditions were right. He looks at the Chinese, Russian and Vietnamese cases and emphasizes the interventionist role of the communist political organisations. He shows how communists made it rational for the peasants to participate in the collective action by creating selective incentives, namely by organising village by village, by disaggregating the big overall goal of building

a revolutionary movement into many smaller ones, by facilitating conditional cooperation and by enhancing the individual peasant's appreciation of the importance of his contribution. Through these selective incentives, revolution actually becomes a by-product of the involvement in the revolutionary organisation for the individuals (Taylor, 1989; Popkin, 1979).

While accepting the significance of structures, Taylor in conclusion tries to reach a compromise on the basis of the thin theory. While stating the deficiency of the pure structuralist position, he also criticises the pure individualist position. Individuals are neither "forced" to take certain actions, which is the result of the structuralist position, nor the social structures, which have effect on individual, believes and attitudes are only the results of the individual actions which is the result of the individualistic position. He gives the example of a rebellion which starts with one single action: a soldier firing on a crowd. Now, an obvious explanation from a pure structuralist view will be denying the cause of the rebellion as this fire, because of the structural reasons the revolution would sooner or later occur. But Taylor shows actually it is very difficult to prove this. It might be the case that although there had been some underlying conditions, they were not enough for a rebellion and the fire was the sufficient condition to start the rebellion. In this sense Taylor's approach takes into account the importance of structures but still attempting to supply causal links beginning and terminating at individuals. So, even though Taylor does not pronounce it explicitly, his approach takes more a form of an attempt to establish micro foundations to seemingly structurally defined phenomena of revolution based on individual rationality.

An attack to this position and such a conceptualization of rationality might come from Arnsperger & De Ville who approaches the rationality problem in the incentives to revolt from a different side. They start the discussion on Amartya Sen's remark that the second fundamental theorem of welfare economics[1] can be a part of revolutionary's handbook. They claim that there is a significant inconsistency in this view and in all the views which try to reconcile a neo-classical rationality and revolutionary behavior. Arnspenger & De Ville launch a radical investigation of the classical economical rationality where individuals are defined as maximizers of their well-beings in a manner of "self-enclosed ignorance" which the authors believe stemming from Leibniz's conceptualization of "monads", (Arnsperger & De Ville, 2002: 10).

According to this conceptualization, which was carried to economics by British liberals individuals are considered as isolated monads whose optimizing actions were coordinated by the invisible hand of the market. Their interaction was only limited to help them to take strategic decisions. (to form a coalition for example) Arnspenger & De Ville shows that the classical tools of mainstream

economics–walrasian equilibrium, welfare theorems and cooperative equilibrium (the core)–which are based on this definition of rationality are unable to result in a radical redistribution of endowments, a revolution since there is no mechanism in this system to look up from the individual position and to compare initial endowments in the terms of some egalitarianist criteria. For the authors a consistent approach to the problem necessitates a rationality concept, which allows the individuals to rank between allocations. Such a methodological change would enhance the realism of economic analysis by allowing conflicts of interests between individuals which can as a result in a revolution in the absence of a politically feasible (cooperative solution), (Arnsperger & De Ville, 2002: 15).

One of the most comprehensive works on the problem of rationality was by Lichbach. In *Rebel's Dilemma* (1995), Lichbach defines the rationality problem as his title of the book and as a peculiar form of collective action problem. He then focuses on the different types of solutions to the problem. Lichbach classifies the solutions to the rebel's dilemma in two dimensions: whether they are planned or unplanned (the deliberative dimension) and whether the problem is entirely an individual decision problem or institutions, structures pre-exist individuals and they shape individual decision-making. (the ontological dimension) (Lichbach, 1995: 21). These different solutions are exhibited in Table 1.

Table 1. Solutions to Rebel's Dilemma Deliberation

	Unplanned order	Planned order
Spontaneous order	Market	Contract
Ontology Contingent order	Community	Hierarchy

Lichbach (1995)

Lichbach then, goes on with a detailed explanation of how different solutions work. In general market solutions emphasize totally spontaneous and unplanned side of the problem at the very individual level. An example for this can be the role zealots and fanatics for whom the marginal benefit of participation exceeds the marginal costs. Increased number of these people will

in overall increase the benefits and lower the costs for the dissidents making the collective action easier. Contract solutions still focus to the individual level while emphasizing a conscious cooperation between individuals. A typical example for a contract solution is the contractual organizations, which are spontaneously formed during the times of revolution like soviets or communes.

Community and hierarchy solutions, on the other hand, focus more on the whole picture rather than the individual level. In this sense community solutions disagree with market solutions taking an objection to perception of individuals as isolated atoms. Dissidents often have strong communal identifications based on a common belief system and mutual interdependence. An evidence for this position is "the bandwagon effect" where the participation of some dissidents triggers more participation because of this common identity. Hierarchy solutions, although sharing the basic view of the community approach about the common identity, do not accept that uprisings occur so unplanned. They emphasize the conscious role of organizations in achieving the contribution of dissidents. This entrepreneurial activity is centrally and strategically coordinated enhancing the chance of success. One way elaborated by Lichbach is administering selective incentives centrally, which makes the mobilization process more efficient and effective. In this sense, hierarchy solutions are actually quite near to the approach that we have discussed by Taylor, which was also underlining the essentiality of selective incentives.

After discussing each approach in detail the conclusion reached by Lichbach is not a very definitive one. He argues that although these different solutions to rebel's dilemma are powerful meaning "they offer many additional and true as well as different and better observations about collective dissent", in one way they are still not sufficient. Each type of solution depends the existence of some others and each of them are incomplete themselves alone. Explaining one specific case often needs a complex combination of different pure approaches, (Lichbach, 1995: 323). As a result, he underlines that there is more integration work is needed on this problem.

Before going on with an evaluation of the rationality problem, mentioning about an empirical study will be convenient. The empirical study by Snijders & Raub (1998) tries to explore the relevance of collective action problem in the hope to explain the improving conditions dilemma following Coleman. The set up is simple: Repeated two person prisoner's dilemma game is played by the subjects representing the process of a revolution. There are two types of games: The game where cooperation leads gains and the game where cooperation reduces losses with the intention to test the hypothesis that individuals are risk averse for gains but risk seeking for losses. Interestingly, the results of the study tell us that risk aversion favors cooperation for both cases

which is opposite to a straightforward intuition (Snijders & Raub, 1998: 411). This result is presented by the authors as supporting the empirical regularity discussed by Coleman in the sense that the improving conditions correspond to a more risky situation. Although this is an important result despite the explanation presented by authors is actually not a fully convincing one.

The above discussion on the rationality problem for revolutionary incentives brought us new questions. The main question is whether a classical rationality framework of mainstream economics based on interest seeking assumption is valid to explain revolutionary action or not. If it is not, what kind of a rationality assumption (or a societal behavior assumption in general) should we assume to explain revolutionary behavior? Even if we accept the classical assumption on which grounds we legitimize revolutionary action? Elaborating the topic with a formal approach will help us on this way.

3. A FORMAL APPROACH TO THE RATIONALITY OF REVOLUTION

We can come across quite many efforts to formalize the revolutionary incentives in a model of revolution especially starting with the public choice literature. The main focus is we will see is on this costs and benefits analysis of the individual faced with the collective action dilemma of participating in the revolution. In this section we will briefly cover three models, namely Mueller's basic model, Tullock's standard model and Roemer's model which has slightly different features than the first two.

3.1. Mueller's Basic Model

Let us think about an individual i's problem who is not happy with the current regime. She expects benefits worth β_i if the revolution succeeds. The probability of a revolution to occur depends on the time that i and others contribute to it: $O_{ir} = \sum_{j \neq i} t_{jr}$. Let us call this probability $\Pi(t_{ir}, O_{ir})$ In addition to this gain which has a public good character i may receive personal pleasure from participating in the revolution whether it is successful or not, $P_i(t_{ir}, O_{ir})$. I should also calculate the costs against the benefits. If i is caught and punished she will receive utility loss F_i

The probability that she will be caught is a function of the time she and others devote for revolution (t_{ir} and O_i) and the resources expended by the authority to crush the rebellions, R with expected partial derivatives

$$\frac{\partial C_i}{\partial t_{ir}} > 0 \ , \ \frac{\partial C_i}{\partial O_i} < 0 \ , \ \frac{\partial C_i}{\partial R_i} > 0 \tag{1}$$

In addition *i* forgoes income by spending her time for revolution. If w is the market wage then his opportunity cost is wt_{ir}. So the expected benefits from participating in the revolution becomes

$$E_i = \beta_i \Pi_i(t_{ir}, O_{ir}) + P_i(t_{ir}, O_{ir}) - F_i C_i(t_{ir}, O_i, R) - wt_{ir} \tag{2}$$

Maximizing (2) with respect to t_{ir} gives us,

$$\beta_i \frac{\partial \Pi_i}{\partial t_{ir}} + \frac{\partial P_i}{\partial t_{ir}} = F_i \frac{\partial C_i}{\partial t_{ir}} + w \tag{3}$$

This means that the marginal expected gain in public good benefits (β_i) from an extra hour of participation plus the marginal personal enjoyment must equal the added risk of being caught when spending another hour in the revolution plus the foregone wage from not having worked that hour, (Mueller, 2003: 205). One can easily derive results from this equation. For example as the participation increases public good character of the revolution makes *i*'s participation negligible and the private benefit for *i* becomes the decision variable. Increased resources devoted for crushing revolution and increased w will decrease participation as expected.

3.2. Tullock's Standard Model

Tullock's fictional country – Ruritania - is governed by vicious, corrupt, oppressive and inefficient ruler and revolutionaries would like to overthrow that ruler and bring a good, clean, beneficial and efficient government (Tullock, 1971). So, there is no uncertainty that the individual faces about the future when revolution successfully takes place. The individual has three alternative actions: He can join revolutionaries, he can join the ruler's forces of repression and he can remain inactive. The individual's decision problem is characterized by the pay-offs to these different alternatives. The pay-off for being inactive is

$$P_{\ln} = p_g . L_v \tag{4}$$

On the other hand the pay-off for an individual when he participates in the revolution is

$$P_r = p_g.L_v + P_g.L_i + R_i.L_v + R_i.L_i - P_i + P_i.L_V + P_i.L_i - L_w.I_r + E \text{ (simplified form) (5)}$$

This equation unlike equation (1) includes some private benefits that the individual can expect if the revolution is successful, the possible harm that the individual can get as he participates and individual's contribution to the likelihood of success. If we assume that the last for an individual is ignorable the equation (2) will take the form

$$P_r \cong p_g.L_v + R_i.L_v - P_i(1 - L_v) - L_w.I_r + E \tag{6}$$

However, the individual will be more interested in the his net pay-off which is the participation in revolution minus the pay-off he would receive if he stayed inactive which can shown as

$$G_r \cong R_i.L_v - P_i.(1 - L_v) - L_w.I_r + E \tag{7}$$

On the other side the other option for the individual is obviously to join the counter revolutionary forces of the ruler. The pay-off for this is

$$P_d = P_g(L_v - L_i) + D_i[1 - (L_v - L_i)] - P_p(L_v - L_i) - L_w.I_r + E \tag{8}$$

Again, if we assume that individual's contribution is negligible the equation takes the form

$$p_d \cong D_i(1 - L_v) - P_p.L_v - L_w.I_r + E \tag{9}$$

By making these simplifications, Tullock actually wants to show that the public good character of the decision problem is not that important compared to the private reward side. He then investigates why most of the literature focuses on this public good character rather than the private side. For him the most important reason is the apparent discrepancy between the discourse used for explaining revolutions and what exactly happens during revolutions. Although the propaganda and the discourse is always on some public good effects like patriotism, honour …etc, what actually motivates the individuals are private benefits. Thus the main point that Tullock derives from his formal analysis is the need to shift the research agenda for revolutions from a public good focus to a by-product theory of revolution based on private incentives (Tullock, 1971).

Tullock's analysis which is presented as original by himself are actually belong to the market solutions research programme which we have covered in the earlier section. But Tullock himself is far from getting into deeper to the problem beside formal analysis which clearly decreases the persuasion power of his argument and gives the reader the impression that his analysis stems more from his ideological position.

3.3. A Tale of Lenin and Tsar

Another formal approach we would like cover comes from Roemer (1988) where he uses a game theoretic approach. He formulates the revolution as a two person strategic game between the ruler (the tsar) and the revolutionary leader (Lenin). The set up of the game is as follows: The society is made up of n individuals whose support both Lenin and Tsar are dependent on and who has an original income distribution $z = (z_1, \ldots, z_n)$

Lenin's strategies consist of the set of all possible redistributions from a constant income $y = \{(y_1, \ldots, y_n) \mid \sum y_i = \sum z_i, y_i \geq 0\}$ People will join Lenin if they gain from new distribution. On the other hand, Tsar wants to prevent this. So, his strategies consists of penalties for the revolutionaries $d = (d_1, \ldots, d_n)$ where a person's penalty can be no less than zero and no greater than his income, thus the domain of the feasible penalties is $D = \{(d_1, \ldots, d_n) \mid 0 \leq d_i \leq z_i\}$ The individuals can form a revolutionary coalition according to this set up. Let us say the probability of success of a coalition S is p_s. A coalition S is formable only if the expected income of every member of it exceeds his present income, that is for all members i of S,

$$p_s . y_i + (1 - p_s)(z_i - d_i) > z_i \tag{10}$$

Here, a key assumption is each formable coalition has a possibility function $p_s(d_1, \ldots, d_n)$ where the probability of the coalition's succeeding in revolution is a non-decreasing function of the penalties announced. This assumption which we can interpret as more penalties motivate more revolutionaries is important since the tsar could prevent the revolution by simply setting the penalties to the incomes of each individual without this cost. We additionally have three technical assumptions:

Coalition Monotonicity: If coalition S contains T, then for any given penalty vector d, $p_S(d) \geq p_T(d)$

Penalty Monotonicity: For any given coalition S, if $d' \geq d$, then $p_S(d') \geq p_S(d)$

Lean and Hungry: Let S be a coalition not containing two agents i and j, and suppose $z_i \leq z_j$. Then $p_{S \cup i}(d) \geq p_{S \cup j}(d)$ That is, adding a poor person to a coalition raises the probability of success at least as much a rich person does.

The game proceeds in the following order: The Tsar announces d (penalties) and Lenin taking d, proposes and income distribution y which maximizes the probability of success of the maximal formable coalition associated with (d,y). Hence for any d, Lenin chooses y to $\max_{y} \mu(d,y)$ and hence the Tsar knowing this chooses d to $\min_{d} \max_{y} \mu(d,y)$. This finishes the technical set up of the game.

In this paper, I do not want get into to details of how we reach a solution. (As Roemer himself does in his paper) But rather I would like focus on the results that we reach by this model. First there are two important results that we derive for Tsar's strategy. If we define a Tsar to be tyrannical who sets the penalties equal to incomes , tyranny never pays in this model with our assumption of sensitivity where increasing the penalties has a cost of increasing probability of revolutionary success. The second important result is on how the severity of the penalties will be distributed by the Tsar. For this we have to define a slightly original concept of severity.

Relative Severity: If $\sigma(d_i, z_i) > \sigma(d_j, z_j)$ where σ measures perceptions of severity then for all S, $\dfrac{\partial p_s}{\partial d_i} > \dfrac{\partial p_s}{\partial d_j}$. Under this assumption of severity, the primary result about penalties is that severity of optimal penalties is monotone decreasing in incomes. This means richer people face relatively less severe penalties compared to the poor ones. The intuition for this result lies in the lean and hungry assumption: The poorer a person is, the more helpful for the revolution. Moreover, poorer people are easier for Lenin to be captured into revolution. That is why Tsar's optimal strategy necessitates that he will punish poor more severely to economize his penalties and to prevent them be captured by Lenin's ideology.

On Lenin's side the question is on the properties of his optimal redistribution schedule. Is progressivism only a property sourced from Lenin's revolutionary ideology or it is an optimal strategy as well? Actually, as Roemer shows it is not so easy to prove that the revolutionary coalition will be formed by the relatively poorer ones (poor connected) which will guarantee that the proposed schedule is progressive. For this reason he changes the assumption of lean and hungry into stronger symmetry assumption where every individual has the same weight of influencing revolutionary outcome. Roemer shows that even under this assumption only for sufficiently high probabilities of revolution it is possible that the optimal S for Lenin is poor connected. If the probability is over some threshold level, Lenin is progressive and optimal revolutionary coalition is poor connected. This is also an intuitive result: For unstable regimes where society is highly polarized between rich and poor it is more realistic that a revolution occur and it is more likely that the revolutionary coalition will be poor connected. In this case the optimal strategy for Lenin is the progressive schedule. It can be claimed that the actual progressive ideology of Lenin is only a reflection of this strategic preference and in reality Lenin had no objective pre-commitment to progressive redistribution. Roemer rejects this idea. He states that the result of the model only explains that Lenin could not have a non-progressive ideology, if he had it he would not have been a successful revolutionary but this no ground for claiming Lenin was an opportunistic leader who used this ideological position just to take masses behind him, (Roemer, 1989).

4. A CRITICAL EVALUATION OF THE INDIVIDUALISTIC APPROACHES

The most important criticisms to the individualistic line still come on the rationality problem. In our view, the classical rationality assumption of methodological individualism fails to fully account for the revolutionary behaviour for a number of reasons. Let us make these points more explicit:

A significant criticism would be on the cost-benefit calculus of a revolutionary individual under the classical rationality assumption. Purely individualistic approaches, like Tullock's, emphasize the private good character of the benefit expected from a revolution. Although it would be hard to deny that there can be some private benefits attached to the result of the revolution, in our view, it is hardly the case that the private good character of the benefits dominates the public good character. In this sense, the private good explanation is not sufficient.

Another type of explanation on the cost-benefit calculus, like Taylor's, would be emphasizing the social cost of defection on the individual. It is true

that defection may have a significant social cost under revolutionary conditions. However, this is only true when there are already a number of people above a threshold level who committed themselves to a revolution. Otherwise, the social pressure would not be effective. So, this explanation fails to reveal how and why those first revolutionaries chose that way.

A last and related criticism to the individualistic approaches would be on the role of "selective incentives". This assumption emphasized by Taylor and Popkin among others, regarding the revolutions suggests that revolutions is actually a by-product of the participation in the revolutionary organisation which occurs as a result of selective incentives –such as tax or land reforms, literacy campaigns...etc- created by the revolutionary organisation.

Here, it should be underlined that revolutionary support is a different concept than the organisational support discussed in the original by-product theory of organisational support. In our view, giving organisational support to the revolutionary organisation needs a different cost-benefit calculation than directly involving in the revolution, as they do not necessarily require each other. In this sense, although selective incentives are important in gaining organisational support, they do not explain why would an individual choose to join direct revolutionary activity as a result of the decisional calculus.

CONCLUSION

In this work our attempt was to exhibit the main ideas of some contemporary contributions towards a theory of revolution. Our approach was focusing on the work of scholars who tried to bring an economic explanation to the phenomena of revolutions. We have seen that the main problem in the study of revolutions in such a framework is to bring together the two observed facts of manner: the rational individuals and the revolting masses. Our core question was "how could a rational individual be revolutionary while the probable costs of it were so high and her individual contribution would only slightly change the matters?" We have looked at different possible explanations for this at the individual level.

Our work revealed that economic rationality alone which is implied in the methodological individualistic approaches to revolutionary behaviour fails to thoroughly account for sustained revolutionary movements. The purely individualistic approaches do not consider all social-systemic dynamics, which are central to fully understanding the revolutionary process. In this context, it is inevitable that elements from structural approaches as well as the recent developments in the rational choice theory should be incorporated into individualistic agenda to obtain a comprehensive theory of revolution.

APPENDIX

Table of Symbols for Tullock Model

Symbol	Definition
D_i	Private reward to individual for participation in putting down revolt if government wins.
E	Entertainment value of participation.
G_r	Opportunity cost (benefit) to individual from participa- tion rather than remaining neutral.
I_r	Injury suffered in action
L_i	Change in probability of revolutionary success resulting from individual participation in revolution.
L_v	Likelihood of revolutionary victory assuming subject is neutral
L_w	Likelihood of injury through participation in revolution.
P_d	Payoff to participation in revolution on government side
P_g	Public good generated by successful revolution.
P_i	Private penalty imposed on individual for participation in revolution if revolt fails.
$P_{\ln}$	Total payoff to inaction.
P_p	Private cost imposed on defenders of government if revolt succeeds.
P_r	Total payoff to subject if he joins revolution.
R_i	Private reward to individual for his participation in revolution if revolution succeeds.

Quelle: Tullock (1971)

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[1] The second fundamental theorem of welfare economics states that any Pareto optimal allocation on the contract curve can be reached as the competitive equilibrium by changing the initial endowments. So there is a set of initial endowments corresponding to any equilibrium point. This is actually a restructuring of the first theorem in the reverse way.

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