Political institutions and economic reforms in Central and Eastern Europe: a snowball effect

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Abstract

The purpose of this paper is to analyze the elements that can lead to a snowball effect during the process of transition. We develop a political economy model showing that when rulers of a country in one region opt for resigning and moving over to democratic rule, the other countries in the region are influenced to do the same. In other words, the decision of one country influences the type of equilibrium chosen by other countries in the region. A *snowball effect* is thus produced that reinforces the path to privatization. Our analysis defines parameters in the technology of political repression of one country that may be affected by decisions in neighboring countries. Regional political spillovers affecting these parameters are conducive to snowball effects.
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1. Introduction

One of the most notable features of the latter part of the 20th century is undoubtedly the collapse of communist regimes in Central and Eastern Europe in the late 1980s and the democratization process that followed. Within a historical perspective, two distinct facts seem to have characterized this process. First, while democratization did not occur simultaneously in all communist countries in Central and Eastern Europe, it did occur in a continuous and sequential process. One after the other, each country democratized, in some cases only a few weeks after a neighboring country had done so.

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Table 1
History of transition

	End of communism	Free elections
Hungary	June 1989	25 March 1990
Poland	4 June 1989	16 August 1989
East Germany	9 November 1989	March 1990
Bulgaria	10 November 1989	17 June 1990
Czechoslovakia	17 November 1989	20 June 1990
Romania	21 December 1989	20 May 1990
Yugoslavia	22 January 1990	3 July 1990 (end of unity of Yugoslavia)

Source: Jeffries (1993).

Table 1 presents the historical facts that suggest a sequential process of democratization, or a *snowball effect* in the transition process. Indeed, the first country to make the move, Hungary, did so in 1989. Hungary was then followed by Poland and East Germany later in 1989. Bulgaria ended the monopoly of the Communist Party in 1990, followed by Czechoslovakia, Romania, and Yugoslavia.

A second common characteristic of this transition process seems to have been that not only have all countries in question democratized, but they also all adopted similar economic reforms. We are not referring here to the macroeconomic stabilization process that includes price and trade liberalization, but rather to the fundamental reforms of privatizing the state-owned companies, or the privatization process.

The rulers of almost all countries in Central and Eastern Europe engaged in some sort of privatization, and despite some differences between the processes that took place in the various countries, the *nomenklatura* received the most benefits of privatization in all of them. Former communist rulers essentially drafted for themselves title deeds to state property. This type of reform included not only so-called "spontaneous privatization", but also sale of assets to outside owners or even to foreigners, so that the ex-communist political elite obtained substantial pecuniary benefits from the transaction. This type of reform has been termed *nomenklatura privatization* (see Hare, 1994, p. 35).

Interestingly, while all Eastern European countries opted for rapid democratization and *nomenklatura privatization*, communist regimes in other parts of the world have followed a quite different trajectory. China and Vietnam in Asia have adopted a very different path than that followed in Central and Eastern Europe, both politically and economically. Indeed, on the political plane, Asian communist dictatorships show no signs of weakening. On the economic plane, while the Asian countries have introduced market-oriented privatizing reforms, the type of reforms undertaken entail the establishment of private enterprises while leaving the public sector essentially untouched by privatization reforms.

Indeed, in Asian regimes, while there has been no disruption of the state sector, a private market has been created alongside the state sector, thereby promoting output growth (see Nolan and Xiaoqing, 1999). In contrast, in Central and Eastern Europe, the privatization process served to eliminate the state-owned companies, thereby generating significant output disruption.

Why are these transition outcomes regionally correlated? The aim of this paper is to attempt to answer this question. The paper provides some explanation of the contrasting

experience between Eastern Europe regarding economic reforms associated with the collapse of communist regimes, and Asia with its market-oriented economic reforms unaccompanied by political reforms.

The basic idea set forth herein is to analyze the elements that can lead to a snowball effect during the process of transition. We show that these elements are related to the nature of the economic reforms chosen at the time of democratization, and that the parameters affecting these political and economic decisions are in turn affected by decisions made in neighboring countries. This interaction may then generate some snowball effect.

The model first determines the general equilibrium of privatization and political outcome in a single communist country. More precisely, it investigates the nature of the links between political changes and economic reform, and shows that the essential difference between those communist regimes surviving economic reform and those that do not lies in the nature of the privatization reform introduced by the communist leadership. We show that for a communist regime, political decisions are related to the types of privatization adopted; yet both are endogenous and are a function of the probability of a given regime's collapse. The latter is itself a function of allocation of resources to the repression apparatus, the size of which is related to particular parameters reflecting the *effectiveness of the repression sector*.

We go on to show that when rulers of some of the Eastern European autocracies opted to resign and adopt democratic rule, this may have affected the value of the repression effectiveness parameters of other countries in the region, possibly suddenly increasing their incentives to choose a similar political strategy. In other words, the choice of one country may modify the type of political and economic equilibrium chosen by neighboring countries through an externality at the level of the apparatus of repression. This phenomenon can produce a snowball effect that reinforces the chosen path to privatization.

More specifically, Fig. 1 underlines the basic relationship between the various parameters presented in this paper. We show that when the means of repression at the disposal of the rulers are relatively weak and the probability of regime collapse is high, the rulers choose to "resign", retaining the assets that they privatize. The benefit for the rulers is that in case of regime collapse, they do not end up with nothing but the privatized assets. In other words, the purpose of this economic choice is to ensure that, should the regime collapse, the communist rulers of today become the rich capitalists of tomorrow's democracy. This scenario was emphasized thus by Batt (1994, p. 87): "Many have seized the opportunity presented by sketchy legislation to convert their politically secured positions into secure legal ownership of state firms". Therefore, *nomenklatura* privatization is chosen by such rulers, and it is optimal for them to resign and democratize.

However, if the means of repression are strong enough such that the probability of continued communist dictatorship is high, the type of privatization chosen is that chosen by the regimes in Asia: permitting the establishment of private enterprises, but with the state sector left fundamentally unreformed (see Qian and Xue, 1993; Qian et al., 1999). Such privatization is optimal, since as those in political power at the onset of this process, the rulers also profit as entrepreneurs from the growth of the private sector, although they lose their grip on some of the allocation of the country's resources. This type of economic reform will be
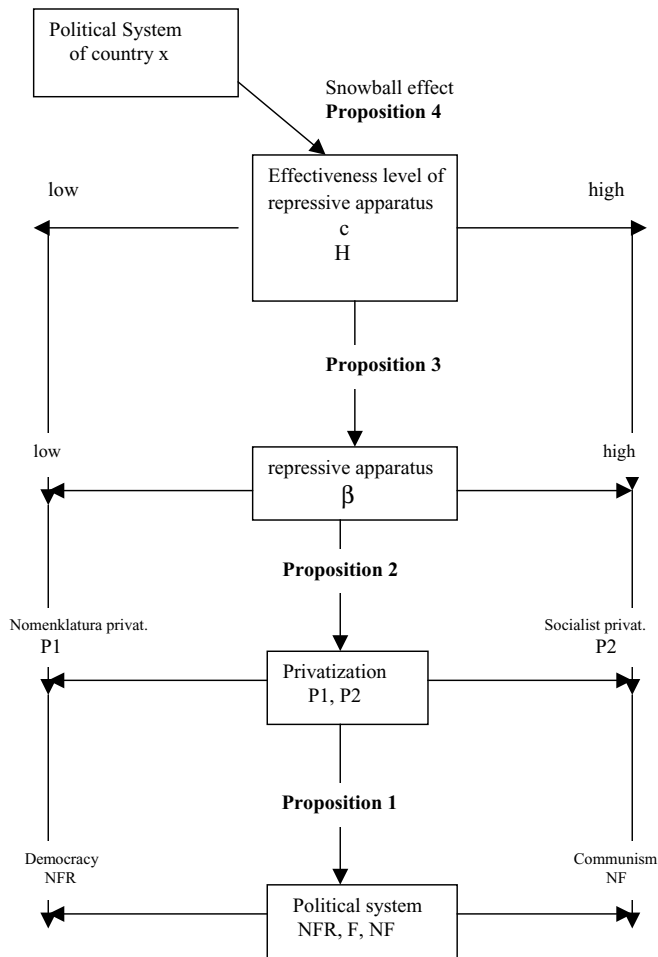
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┌─────────────────┐
│ Political System │
│  of country x    │
└─────────────────┘
              \         Snowball effect
               \        Proposition 4
                \
                 ↘
          ┌──────────────────────┐
  low     │ Effectiveness level of │      high
◄─────────│  repressive apparatus  │─────────►
          │          c             │
          │          H             │
          └──────────────────────┘
                     │
                     │ Proposition 3
                     ↓
  low     ┌──────────────────────┐      high
◄─────────│  repressive apparatus  │─────────►
          │          β             │
          └──────────────────────┘
                     │
                     │ Proposition 2
                     ↓
Nomenklatura privat.                    Socialist privat.
P1        ┌──────────────────────┐      P2
◄─────────│     Privatization      │─────────►
          │        P1, P2          │
          └──────────────────────┘
                     │
                     │ Proposition 1
                     ↓
Democracy                               Communism
NFR       ┌──────────────────────┐      NF
◄─────────│   Political system     │─────────►
          │      NFR, F, NF        │
          └──────────────────────┘
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Fig. 1. The relationship between the different variables in country *y*.

termed herein *socialist privatization*. We will show that when the means of repression are substantial, socialist privatization is chosen, and the rulers do not choose to democratize but rather to stay in power.

The repression apparatus is not exogenously determined; it is itself endogenous, and its size depends on the *effectiveness of the repression sector*. This effectiveness is affected by two parameters. First, *the punitive level for workers* if they revolt. Indeed, when workers are less afraid to revolt because they have less to lose, then the effectiveness of the means of repression is reduced. Consequently, rulers are better off not trying to maintain a strong repression apparatus. (In fact, they may go for the extreme of not retaining a repression apparatus at all.) Such a situation means that the rulers will choose nomenklatura privatization and will ultimately opt for democratization.

The second parameter that affects the effectiveness of the repressive sector is the *costs* of the means of repression. If the costs are high, then the effectiveness of the repressive sector is low, and therefore will also lead to the choice of nomenklatura privatization and in turn to democratization.

The effectiveness of the repressive apparatus and its associated parameters—*punitive level for workers* and *costs*—are the key element of this model since these parameters are affected by the political choices of neighboring countries. The main premise raised in this paper is that the choice of political regime of one country may affect the choice of political and economic regimes in neighboring countries. This phenomenon occurs because the choice made in a given country affects the parameters characterizing the effectiveness of the neighboring countries' repression apparatuses.

Indeed, the rise of democratization in one country affects the repression apparatus effectiveness level in another, since dissident workers can more easily emigrate to the second country, and are therefore less vulnerable to retaliation on the part of the autocratic rulers. In other words, the *punitive reservation level of workers* in the case of a failed revolution decreases when the neighboring country has become a democracy. Also, governments of democratic countries may, for foreign policy reasons, be concerned about having autocratic neighbors. They may then exert diplomatic and moral pressure (i.e., human rights condemnations) on the rulers of these regimes, placing the latter in jeopardized relations with the international community. They may also provide logistics and organizational support to the dissidents, thereby increasing the cost of an effective level of repressive apparatus.

Even if neighboring democratic countries do not actively support the opposition to an autocratic regime, significant cross-national informational and learning effects may spill over their borders. Indeed, by observing the functioning of democratic institutions and all the benefits enjoyed by their citizens, workers in a neighboring autocratic regime may feel more frustrated with their own situation, and may therefore be more willing to revolt against the system. Again, regional proximity may reinforce the importance of these learning effects, especially in the case of poor economies that do not have easy access to long-distance and rapid communication technologies.

The best example of the effects of democratization in one country on the punitive level in another neighboring country is the effect of Hungary on East Germany. Hungary democratized in June 1989 by diluting the powers of then-General Secretary Gosz (see Table 1). On 16 August 1989, the Hungarian government set up tents at a campsite near Budapest for East Germans wishing to emigrate to the West (see Held, 1992). On 10 September 1989, Gyula Horn, speaking for the Hungarian government, announced that East Germans who desired to emigrate to the West through Hungary were free to do so, and that Hungary was temporarily suspending its 1969 agreement with East Germany that prohibited such a step. This example also underlines the pressure applied by Western countries: Chancellor Helmut Kohl expressed his thanks to Hungary for this gesture. Finally, on 9 November 1989, the Berlin wall fell.[1]

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[1] Another example is Czechoslovakia. On 27 August 1989, Czechoslovakia Radio called Lech Walesa "a threat to socialism everywhere", but 2 weeks after the fall of the Berlin wall, Czechoslovakia democratized. In fact, on 17 November, single-party rule ended and the communist regime collapsed (see Table 1).

Similarly, the *costs* dimension of the technology of repression may be affected by a neighboring country's political strategy as soldiers and police, facing international moral pressure, may become less motivated to do their job efficiently. Alternatively, for an authoritarian country surrounded by democracies less willing to cooperate and trade with it, buying weapons and military equipment may also become more costly.

For all the reasons presented earlier, the *effectiveness level of the repression apparatus* in an autocratic country is likely to diminish if some of its neighbors begin a political transition that leads to the choice of a nomenklatura privatization strategy. Thus, when the processes of political liberalization and nomenklatura privatization are triggered in one country, it may cause a chain reaction in the surrounding economies. Conversely, democratization may fail to spread in a given region simply because when the opportunity arose for the first time in a given country, the process was not accommodated or was successfully repressed by the rulers of that country. These two scenarios are the subject of the paper.

Our model is different than the models analyzing privatization from a purely economic standpoint (see Bolton and Roland, 1992; Lipton and Sachs, 1990; Blanchard et al., 1994). On the other hand, it has in common with Wintrobe (1990), Schnytzer (1994), Ferrero (2001), and Brezis and Schnytzer (1998, 2003), the relationship between privatization and political reforms. Our model does, however, integrate a snowball effect, which has not been done thus far. Indeed, a snowball effect on the process of privatization has seldom been analyzed. Lohmann (2000) examined the phenomenon of snowball effects and cascades in a general context, but not specifically regarding the political systems of communist countries.

The paper is divided into three sections. The model is described in Section 2. In Section 2.1, we describe the parameters that are affected by the snowball effect. In Section 2.2, we present the decisions made by a single communist country, or the *single-country equilibrium*. In Section 2.3, we present the *two-country equilibrium*. Section 3 is the conclusion.

2. The model

2.1. The general framework of snowball effect

Consider two countries, each with a Communist Party that has a monopoly on political power, and in both of which the means of production are state-owned. In each country, there are the rulers (i.e., the nomenklatura) and the workers. The equilibrium is of a Stackelberg type, and the rulers are the first to make decisions. First, they determine the size of the repressive apparatus, which is needed to prevent the workers from uprising. Second, they decide about: (i) the distribution of goods among workers, and themselves; (ii) the type of privatization to undertake; and (iii) whether to stay in power. The workers then decide either to revolt or not.

In our model, three factors influence the decision of the worker to revolt: (i) the probability that the revolt will succeed, p, which is a function of the size of the repression apparatus, β; (ii) the level of harassment and punishment if the upheaval fails, H; and (iii) the costs

for the rulers of keeping the repressive apparatus, c. More specifically, c is the cost per an efficiency unit of repressive apparatus, β.

Each country decides for itself its optimal equilibrium. However, there is a feedback from the equilibrium of one country to the other. Let us suppose that country x in the region has decided to democratize. How will this affect the decision of country y in its neighborhood? We assume that the political structure in one country may affect the parameters determining the political choices in the other country.

Indeed, two of the parameters that influence the decision of upheaval are affected by the neighbor political choice. The first is the level of harassment and punishment if the revolt has failed, H. We assume that it is harder for an authoritarian regime effectively to repress its workers when it is close to a country with a more liberal or democratic regime. This may first of all be due to the fact that the government and the citizens of the democratic country dislike having an authoritarian regime as a neighbor. They may then implicitly support workers revolting against the rulers of the authoritarian regime. They may do this passively by allowing hidden or informal protection to the dissident of the regime. A typical case would be to allow free migration and political asylum to the regime's dissidents. So the punitive and harassment level of workers in country y in the case of a failed revolution is reduced when the other country x has become a democracy. As mentioned earlier, this captures the idea that dissident workers can more easily migrate to this country x and therefore are less vulnerable to retaliation of the authoritarian rulers of country y.

The second parameter, which is influenced by the political structure of the neighboring country, is the costs of the repressive apparatus, c. When the neighbor country democratizes, the cost per an efficiency unit of repressive apparatus goes up, since less motivation may be observed from soldiers and repression forces. They may even be afraid of retaliation in the future, and therefore do not do the job as effectively as in the past.

Indeed, during the transition process, the reports in Radio Free Europe presented a decrease in the number of people arrested brutally during protests in all CEE countries in 1989 (Radio Free Europe, 1989). For instance, while in Czechoslovakia in January 1989, the demonstrators were brutally dispersed by the police and even Vaclav Havel was arrested; during November 1989 the demonstrations of thousands of people went on without arrests, leading later on to the velvet revolution (see Jeffries, 1993).

The way we capture these two aspects is by assuming that when the neighboring country x, is becoming democratic (i.e., the rulers of that country have resigned), then in country y, the cost per an efficiency unit of repressive apparatus (c_y) is increasing, and the punitive and harassment level of workers (H_y) is reduced for country y. So,

$$c_y = \frac{C_y^0}{S_x}, \tag{1}$$

$$H_y = H_y^0 S_x, \tag{2}$$

where H_y^0 and C_y^0 are, respectively, the initial punitive reservation level and the initial costs of an effective unit of repressive apparatus in country y, with $S_x = 1$ when the country x's rulers have not resigned, and $S_x = s < 1$ when the country x's rulers have resigned.

Hence, the capacity to punish dissident workers H_y is reduced in country y, if the other neighboring country x becomes democratic. In the same way the costs of an efficiency unit of apparatus c_y goes up when the neighboring country becomes democratic.

In Section 2.2, we now turn to the presentation of the equilibrium in each country and then, in Section 2.3, we present the equilibrium in country y depending on the outcome in country x.

2.2. The equilibrium in a single country

2.2.1. Timing of decisions

The timing is described in Fig. 2. There are three stages. First, in each country, the rulers have to choose a certain level of repression β which has a linear resource cost $C(\beta) = c\beta$ with $c > 0$ being a positive constant (and function of the snowball effect as described before). In a second stage, the rulers have to take three decisions: they decide whether to stay in power or to resign (thereby opting for an end to a communist monopoly of political power). They also decide on which type of privatization to choose and the amount of privatization. Moreover, if they do not resign, they decide upon the distribution of output—they decide how much output to allocate to the workers.
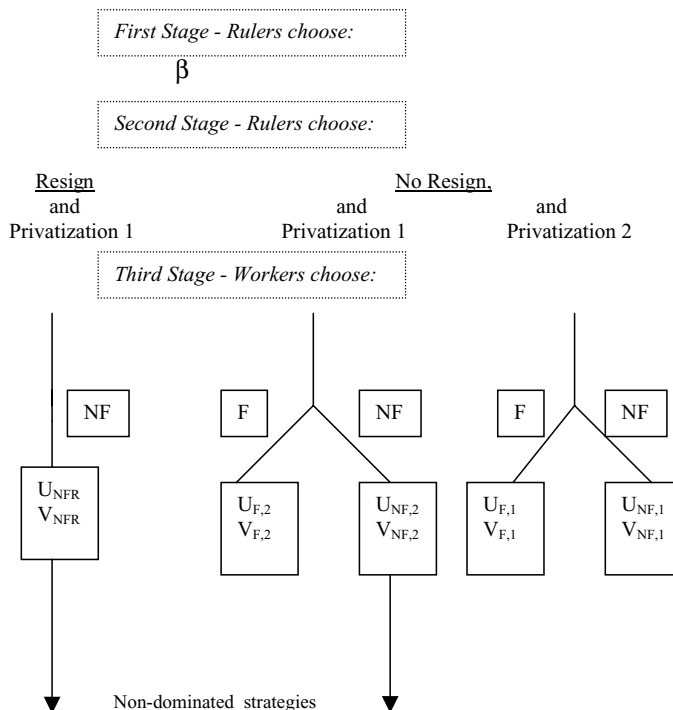

Fig. 2. The strategies and payoffs in country y.

Given their share of output, workers in the third stage then decide whether or not to fight the regime, depending on the relative payoffs under fight and no-fight. Equilibrium in the model is, therefore, the outcome of a Stackelberg game.

2.2.2. Privatization

The choice of privatization strategy is endogenously determined by the rulers, and they choose between two possible reform policies.[2] The first possible method of privatization, *nomenklatura privatization*, is simply to sell all state property to the private market. Enterprise managers, who are members of the ruling elite, restructure state enterprises so as to reduce their notional market value, and then buy the enterprises at very low prices. Even after democratization, this situation has occurred: "Also, in several countries there is great concern to avoid a situation where former members of the nomenklatura become the private owners of most state-owned property. In practice, . . . , it may be hard to avoid such an outcome" (Hare, 1994, p. 33). In other words: "The result is a pervasive degree of uncoordinated rent-seeking by insiders" (Perotti, 1994, p. 56).

The second type of privatization that can be implemented by the rulers is carried out by keeping the extant state sector non-privatized, but to allow citizens to open private firms, or what is termed *socialist privatization*. This policy implies that there is no internal disruption of the state sector, but simply the parallel creation of a new privatized economy. State enterprises are not privatized; thus, the free market operates parallel to the state sector, and some workers receive their salaries from working at state enterprises while others own private enterprises.

Privatization, as with any decision made by the rulers, has consequences for the allocation and level of output. Indeed, we assume that nomenklatura privatization implies not only a change in decision-making power, but also massive changes that lead to a disruption of established links within the economy (Desai, 1997). In other words, the reallocation of control rights ". . . disrupted the standard supply chains, since state firms could no longer count on deliveries from other state firms, which simply sold their product on the black market" (Boycko et al., 1995, pp. 39–40). This scenario is also called the *disorganization effect* (Blanchard and Kremer, 1997; Roland and Verdier, 1999). We therefore assume, as do Brezis and Schnytzer (2003), that the greater the number of firms privatized, the greater the disruption.[3]

In socialist privatization, there is no disruption of the economy. On the contrary, the private sectors show higher productivity. This has been explained essentially by greater

[2] In fact, many forms of privatization are referred to in the literature (see Estrin, 1994; Blanchard et al., 1994), but if we consider only those implemented by a communist nomenklatura in power, we are left with these two types of privatization: a regime's either selling property to itself, or keeping state property and allowing new private firms. Recall that the nomenklatura is trying to maximize its utility. Therefore, when in power, it will never choose to implement privatization by vouchers. This was done in Czechoslovakia, Russia, and elsewhere after the communist regimes' loss of power. We therefore ignore this option and consider only the two types of privatization optimal for the nomenklatura.

[3] This view on the relationship between privatization and output focuses only on the supply side. There is also an opposite view, according to which the sharp decline in output is due more to demand rather than supply shocks (see Berg and Blanchard, 1994).

competition (see Gelb and Singh, 1994). In consequence, the size of the privatization has a positive effect on output.

2.2.3. Output

We include in our definition of output, Y, all resources available including foreign transfers. As emphasized earlier, output is a function of the type of privatization chosen. The nomenklatura privatization will be denoted privatization 1 (and output Y_1), and the socialist privatization will be denoted privatization 2 (and output Y_2).

In the case of privatization 1, output is a negative function of the proportion of assets privatized. Therefore, we assume that:[4]

$$Y_1 = Y_1(\gamma_1), \tag{3}$$

where $Y' < 0$ and γ_1 is the proportion of state assets privatized under nomenklatura privatization.

In the case of privatization 2, the output in the economy is produced in two different sectors: the original state sector and the new market economy. We define γ_2 as the ratio of workers working in the free enterprise sector, i.e., the proportion of privatization in the economy. So,

$$L_s = (1 - \gamma_2)L \quad \text{and} \quad L_m = \gamma_2 L, \tag{4}$$

where L is the labor force normalized to 1. L_s and L_m are the workers in the state and private enterprises, respectively.

We assume that the productivity of workers in the state sector, A_s, is constant and smaller that the productivity, A_m, of workers in the private sector of the economy. So total output is:

$$Y_2(\gamma_2) = A_s L_s + A_m L_m, \quad \text{where } Y' > 0 \text{ and } Y'' = 0. \tag{5}$$

To be consistent, we finally assume that the two privatization strategies start from the same initial point (i.e., $Y_1(0) = Y_2(0) = A_s$).

2.2.4. Allocation of output

The rulers determine the allocation of output. We assume that the rulers cannot give workers less than some bundle that is the minimum necessary for subsistence normalized to 0. The rulers' rents R is written as:

$$R = Y - W, \quad \text{where } W \geq 0, \tag{6}$$

where W is the allocation of output to workers.

In the case of the socialist privatization, one has to describe the allocation of output between the two sectors. We assume that wages differ between the state and private sectors.[5] The rulers determine the wages in the state sector, W_s. In private enterprise, workers obtain their output (since there is only one factor of production), but the rulers receive a proportion

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[4] Since we are now analyzing the equilibrium in only one country, we take off the subscript for the country.

[5] Indeed there will inevitably be some barriers to entry, since not every worker will receive the right to engage in private enterprise (for example, well-known "enemies" of the regime).

$t(\gamma_2)$ of the output of the private sector. We assume that this proportion falls as the size of the private sector increases, i.e., $0 < t < 1$, $t' < 0$, and $t'' < 0$.[6] The income earned by the workers in the private sector is then:

$$W_m = A_m[1 - t(\gamma_2)]. \tag{7}$$

Thus, we have that the allocation of output to workers is:

$$W = W_s(1 - \gamma_2) + \gamma_2 W_m. \tag{8}$$

2.2.5. Payoffs in the second stage of the game

There are three possible sets of payoffs as shown in Fig. 2. The first set follows rulers' decision to give up political power. We define the payoffs to workers and rulers in this case as, respectively: V_{NFR} and U_{NFR} (the subscript NFR denotes no-fight and resign).[7] The second arises when rulers choose to remain in power but workers fight, the payoffs to workers and rulers, respectively, being V_F and U_F (the subscript F is fight). The third set arises when rulers stay in power and workers do not fight, with payoffs V_{NF} and U_{NF}.

(i) First, in the event of resignation, the payoffs are as explained earlier: rulers keep assets which have been privatized, and the workers get the rest. In the case of resignation, the rulers cannot decide after resigning the allocation of output between rulers and workers. In other words, the only possible type of privatization undertaken by a ruler deciding to resign is the first type of privatization, and in this case the payoffs in case of resignation and no-fight are therefore:

$$U_{NFR,1} = \gamma_1 Y_1(\gamma_1), \tag{9}$$

$$V_{NFR,1} = (1 - \gamma_1) Y_1(\gamma_1). \tag{10}$$

(ii) When rulers decide to stay in power and distribute output, if the workers do not fight, they receive wages, W, and their payoff is:

$$V_{NF} = W, \tag{11}$$

while the rulers get the rents R and the payoff is:

$$U_{NF} = R. \tag{12}$$

(iii) If the workers fight, then with probability, p, they overthrow the regime. Assume that p, defined on the closed interval $[0, 1]$, is a negative function of the means of repression, β:

$$p = p(\beta), \quad p' < 0 \quad \text{and} \quad p'' > 0.$$

This function is convex and decreasing in β. Assume further that $p(1) = 0$, and $p(0) = 1$.

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[6] As the major capital holders in the society, the rulers have an evident advantage in the private sector when it is first introduced. However, as the market grows the extent of this advantage decreases.

[7] The node 'resign and fight' is never chosen, and therefore we do not present the payoffs for this node.

Should the revolution be successful, workers seize all output, while the rulers' payoff is zero. Conversely, a failed revolution leaves workers with their original consumption bundle, but they are harassed and punished so that their utility is set to the level $-H$ (when is a positive number) for having tried to overthrow the regime. The payoffs for workers and rulers in consequence of a fight are:

$$V_F = pY - (1 - p)H, \tag{13}$$

$$U_F = (1 - p)R = (1 - p)(Y - W). \tag{14}$$

In the case of privatization 2, we assume that if the workers in the state sector decide to fight, those in the private sector join them. As before, when workers fight, should the revolution be successful, workers seize all state output, while the rulers' payoff is zero.[8] Eq. (13) in case of privatization 2 is therefore:

$$V_{F,2} = pA_s L_s - (1 - p)H. \tag{13'}$$

We can now determine the equilibrium in one single country without taking into account the snowball effect from neighbor countries. Recall that an equilibrium is a set of decisions by the rulers (in the first stage, a level of repression β, in the second stage the decision to resign, the amount of privatization and the allocation of output), and by the workers (in the third stage to choose between fight (F), or no-fight (NF)) which maximizes their utility.

Since the equilibrium is the outcome of a Stackelberg game, we solve it by backward induction. The following proposition outlines the optimal decision of rulers.

Proposition 1.

(i) *From all the optimal payoffs under the various strategies presented in* Fig. 2, *the only two possible equilibria that are not dominated are the decisions* (NFR) *and* (NF, 2).

(ii) *In the equilibrium* (NFR) *in which privatization 1 is chosen and rulers resign, the extent of privatization is γ_1^* (different than zero). In the equilibrium* (NF, 2) *in which privatization 2 is chosen and rulers do not resign, the extent of privatization is γ_2^* (different than zero).*

Proof.

(ii) In the event of resignation (NFR), the extent of privatization that maximizes the rulers' payoff, denoted γ_1^*, is simply the argmax of (9), since $Y_1' < 0$, and therefore, it is different than zero.

The payoffs in equilibrium in the case of NFR, in which rulers resign are:

$$U_{NFR,1}^* = \gamma_1^* Y(\gamma_1^*), \tag{15}$$

$$V_{NFR,1}^* = (1 - \gamma_1^*)Y(\gamma_1^*). \tag{16}$$

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[8] In the case of a revolution, it seems reasonable to assume that also the private output in the hands of the rulers will be appropriated. Since the state workers decide to fight upon taking into account the allocation of state output (and not private output), we assume implicitly that the rulers' private assets are left in the hands of the private workers.

About the other cases, by solving backward, we present in Appendix A, the optimal allocation of output to workers, and the various payoffs.

We show in Appendix A that the optimal payoffs for the rulers when choosing privatization 1 in cases of no-fight and fight are, respectively:

$$U_{\text{NF},1}^* = [1 - p(\beta)][A_\text{s} + H], \tag{17}$$

$$U_{\text{F},1}^* = [1 - p(\beta)]A_\text{s}. \tag{18}$$

Hence, no-fight dominates fight, since $H > 0$.

The optimal payoffs for the rulers when choosing privatization 2 in cases of no-fight and fight are, respectively (see Appendix A):

$$U_{\text{NF},2} = (1 - \gamma_2)[1 - p(\beta)](A_\text{s} + H) + \gamma_2 t(\gamma_2)A_\text{m}, \tag{19}$$

$$U_{\text{F},2} = (1 - p(\beta))[A_\text{s}(1 - \gamma_2) + \gamma_2 t(\gamma_2)A_\text{m}]. \tag{20}$$

Note that γ_2 is necessarily shown to be different than zero (see Appendix A), since both payoffs $U_{\text{NF},2}$ and $U_{\text{F},2}$ have an inverted U-shape as a function of γ_2. The intuition underlying this solution is that in the case of privatization of type 2, the rulers receive the output remaining after paying workers. Thus, this form of privatization has two conflicting effects on the rulers' payoffs. On one hand, it leads to an increase in rents owing to an increase in output. On the other hand, part of the output now accrues to workers, independently of the rulers. There is, therefore, an optimal extent of privatization greater than zero.

For privatization 1, the reason why there is a non-zero optimal amount of privatization is different. "Nomenklatura privatization", on the one hand, has a negative impact on the rents since it reduces output. On the other hand, since the rulers keep those assets that have been privatized if they take the resignation option, privatization has a positive impact on rents.

(i) When comparing the payoffs, it is immediately apparent that the strategy "privatization type 1 and no-fight" (NF, 1) is dominated by "privatization type 2 and no-fight" (NF, 2) (otherwise γ_2 would not be strictly positive). Also for any $\gamma_2 > 0$:

$$(1 - p)[A_\text{s}(1 - \gamma_2) + \gamma_2 t(\gamma_2)A_\text{m}] < (1 - \gamma_2)[1 - p][A_\text{s} + H] + \gamma_2 t(\gamma_2)A_\text{m}. \tag{21}$$

Hence, $U_{\text{F},2}$, the left-hand side of (21) is smaller than $U_{\text{NF},2}$, the right-hand side of (21). And no-fight dominates fight for the type 2 privatization strategy.

In consequence, the characterization of the equilibrium solution of the second stage of the game then only involves the comparison between the payoffs $U_{\text{NFR},1}$ (resign and privatization strategy of type 1) and $U_{\text{NF},2}$ (no-fight and privatization strategy of type 2).

Finally, the optimal level of privatization of type 2, γ_2^* corresponds to the value of γ_2 which maximizes $U_{\text{NF},2}$. Denote this maximum value as $U_{\text{NF},2}^*(\beta, H)$.

The two curves are represented in Fig. 3 as a function of the size of the repressive apparatus, β. $U_{\text{NFR},1}^*$ is a flat curve independent from β, and $U_{\text{NF},2}^*(\beta, H)$ is an increasing concave function of β.[9]   □

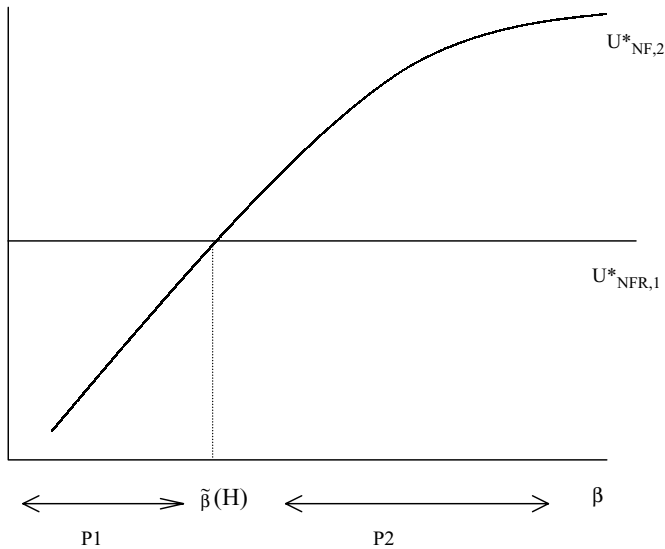[9] Since we assumed that the absolute elasticity of t with respect to γ_2 is greater than 1.

Fig. 3. The ruler's payoffs for non-dominated strategies.

Proposition 1 can be interpreted in the light of Fig. 1. It claims that when the rulers are choosing "nomenklatura privatization", then the only equilibrium that is not dominated is to choose to resign and democratize (what we have termed NFR). If, on the other hand, rulers are choosing "socialist privatization", then the only equilibrium that is not dominated is to choose to stay in power, and there is no-fight.

Between these two decisions, how are the rulers going to decide which one is preferable? In the next proposition we show that it depends on the size of the repressive apparatus.

Let us then make the following assumption for $U_{\text{NF},2}^*(\beta, H)$ and $U_{\text{NFR},1}^*$:

Assumption (I) : $U_{\text{NF},2}^*(1, 0) > U_{\text{NFR},1}^* > U_{\text{NF},2}^*(0, H) = \gamma_2^* t(\gamma_2^*) A_{\text{m}}$.

The second inequality in Assumption (I) simply means that "nomenklatura privatization" is better for the rulers than "socialist privatization" with no-fight when the probability of a revolution to succeed is close to 1, that is when β is close to zero. Given that $U_{\text{NF},2}^*(\beta, H)$ is increasing in the punitive level H, the first inequality in Assumption (I) asserts, on the contrary, that for all positive values of H "socialist privatization" with no-fight is better than "nomenklatura privatization" when revolutions have zero probability to succeed, due to β close to one. This seems to be quite a reasonable assumption.[10] Given such an assumption, we may then state formally the following result characterizing the equilibrium privatization strategy.

Proposition 2. *Under* Assumption (I), *there exists a threshold level for the repressive apparatus*, $\tilde{\beta}$ *such that*:

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[10] Assuming that $A_{\text{m}} > A_{\text{s}}/t(\gamma_2^*)$, the first inequality always holds.

(i) *If $\beta < \tilde{\beta}$, the equilibrium privatization strategy is privatization of type 1 and resign.*

(ii) *If $\beta > \tilde{\beta}$, the equilibrium privatization strategy is privatization of type 2, and stay in power.*

(iii) *The threshold $\tilde{\beta} = \tilde{\beta}(H)$ is decreasing in the punitive level H.*

Proof.

(i) and (ii)   From Assumption (I), $U_{NF,2}^*(0, H) < U_{NFR,1}^* < U_{NF,2}^*(1, H)$ for all $H > 0$. As $U_{NF,2}(\beta, H)$ is an increasing function in β, there exists a unique $\tilde{\beta}$ in $]0, 1[$ such that $U_{NF,2}^*(\tilde{\beta}, H) = U_{NFR,1}^*$. For $\beta > \tilde{\beta}$, type 2 privatization strategy dominates type 1 privatization strategy and conversely for $\beta < \tilde{\beta}$ (see Fig. 3).

(iii)   Moreover, as $U_{NF,2}(\beta, H)$ is increasing in H, then it follows that $\tilde{\beta}$ is decreasing in H. $\square$

Remains now to consider the first stage of the game, namely the optimal choice of the size of the repressive apparatus β, as shown in Fig. 1. From Propositions 1 and 2, the net payoff structure for the rulers at that stage can be written as:

$$U(\beta) = \gamma_1^* Y(\gamma_1^*) - c\beta, \quad \text{for } \beta < \tilde{\beta}, \tag{22}$$

$$U(\beta) = U_{NF,2}^*(\beta, H) - c\beta, \quad \text{for } \beta > \tilde{\beta}. \tag{23}$$

We saw that the gross payoff $U_{NF,2}(\beta, H)$ is increasing and concave in β. The resource cost of repression, $c\beta$ is a straight line going through the origin. As is shown in Fig. 4, the choice of optimal repression will depend on the value of the cost of repression c. More precisely we have the following proposition.
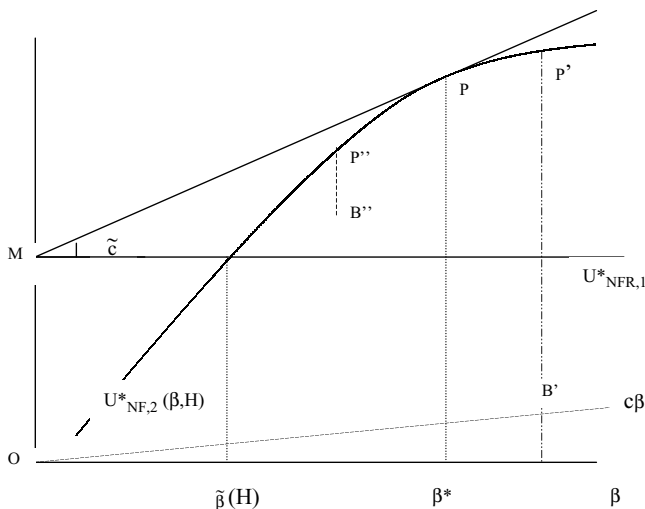

Fig. 4. Optimal level of repressive apparatus.

Proposition 3. *For H given, there exists a threshold cost level $\tilde{c}$ such that*:

(i) *For $c < \tilde{c}$, the optimal level of the repressive apparatus β^* is strictly positive and equal to* $\text{argmax}_\beta \ U^*_{\text{NF},2}(\beta, H) - c\beta$. *The rulers undertake a type 2 privatization strategy with no-fight.*

(ii) *For $c > \tilde{c}$, the optimal level of the repressive apparatus β is $\beta^* = 0$. The rulers undertake a type 1 privatization strategy and resign.*

In the same manner, for c given, there exists a threshold cost level $\tilde{H}$ such that:

(i) *For $H > \tilde{H}$, the rulers undertake a type 2 privatization strategy with no-fight and β^* is strictly positive.*

(ii) *For $H < \tilde{H}$, the optimal level of the repressive apparatus β^* is $\beta^* = 0$; the rulers undertake a type 1 privatization strategy and resign.*

Proof. The proof can be described graphically in Fig. 4. Consider the line going through point M with coordinates $(0, \gamma_1^* Y(\gamma_1^*))$ and tangent to the gross payoff function $U_{\text{NF},2}(\beta, H)$ at some point P. Denote by $\tilde{c}$ the slope of such a line. Clearly, for all cost level c, the value of the optimal choice of repression under the privatization of type 2 strategy is β^*.

(i) When c is less than $\tilde{c}$, the point P′, which is characterized as such that the slope of its tangent is c, is therefore on the right-hand side of P. Let us construct the line OB′ as parallel to the tangent at point P′ (with an angle of size c). Therefore, the net value $U_{\text{NF},2}(\beta, H) - c\beta$ for the rulers of such a strategy is given by the distance B′P′ which is larger than the distance OM (reflecting the type 1 privatization strategy, no repression and resignation). Hence, type 2 privatization with positive repression is optimal.

(ii) When c is larger than $\tilde{c}$, point P″ (that its tangent has an angle of size c) is on the left-hand side of P and the net value $U_{\text{NF},2}(\beta, H) - c\beta$ for the rulers of such a strategy is given by the distance B″P″ which is smaller than the distance OM (reflecting the type 1 privatization strategy, no repression and resignation). Hence, type 1 privatization with zero repression is optimal.

The proof for H stems directly from the proof for c, by noting that when the punitive value H increases, the gross payoff of repression under privatization of type 2, $U_{\text{NF},2}(\beta, H)$ is shifted up with a larger slope at each point β. It follows that point P (point at which the line passing through M is tangent to $U_{\text{NF},2}(\beta, H)$) is shifted to the left and the associated slope $\tilde{c}$ is steeper.   □

All three propositions that are summarized in Fig. 1 imply that for each country, the size of two parameters c and H have a direct impact on the economic reforms as well as on the type of political system chosen by the rulers. If c is small and H is big, that is, the effectiveness level of the repressive apparatus is high, then the country will choose a high level of repressive apparatus, a privatization of "socialist" type and will stay in power. If, on the contrary, c is high or H small, then the effectiveness level of the repressive apparatus is low and in consequence, the country chooses to have no repressive apparatus, a privatization of "nomenklatura" type and let the country democratize.

In Section 2.3, we will show how one country's choice has an impact on the neighbor country.

2.3. The two-country equilibrium and the snowball effect

Let us now consider the model as applied to two countries (named x and y). For each country, we have the same game structure as before. More precisely, in each country, there are initially rulers who have a monopoly on political decisions. They can determine their levels of repression β_i for $i = x, y$, their privatization strategies P_i (type 1 or 2), and when they do not resign, they determine the allocation of output between workers and themselves. Given the level of the repression apparatus and what has been proposed to them, workers decide on fight or no-fight.

For simplicity, consider the case in which the two countries are identical regarding production technologies and the resource cost of the repression apparatus ($L_i = 1$, $Y_{1i}(\gamma_1) = Y_1(\gamma_1)$, $A_{si} = A_s$, $A_{mi} = A_m$, $t_i(\gamma_2) = t(\gamma_2)$).

We have shown that one country's decision can affect the two parameters, H and c of the other country and we have that:

$$c_y = \frac{C_y^0}{S_x}, \tag{1}$$

$$H_y = H_y^0 S_x, \tag{2}$$

where H_y^0 is the initial punitive reservation level in country y, and C_y^0 is the initial effective cost of the repressive apparatus in country y, and $S_x = 1$ when country x's rulers have not resigned, while $S_x = s < 1$ when country x's rulers have resigned.

2.3.1. Timing of the game

The sequence of moves is then as follows: Countries play sequentially (country x before country y). The first country, x, plays the three-stage game (repression choice β_x, privatization strategy, and output allocation) and workers' reaction (fight or no-fight). Then comes country y's turn, with the same three-stage game, given the realization of the game played in the first country x. We look for a perfect Nash equilibrium between rulers of the two countries, with rulers playing themselves as Stackelberg leaders with their workers within each country.[11]

Let us therefore start with the decision-making problem of rulers of the second country y. Two states of nature are possible at this stage. In the first state, state XN—country x is still non-democratic, i.e., its rulers did not resign, and workers either did not fight or fought without success, so that $S_x = 1$.

In the second state, state XD, country x is now democratic (rulers either resigned or did not resign but were successfully overthrown by their workers), so that $S_x = s < 1$.

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[11] As there are no forward-looking interactions, the rulers of country x will make their choice independent of what occurs in country y, while on the contrary, the choice of the rulers of country y is dependent upon the choice of the rulers in country x.

From here, it follows that the effective costs of the repressive apparatus and the punitive reservation level of workers in country y can be expressed as:

$$c_y = C_y^0 \quad \text{and} \quad H_y = H_y^0, \quad \text{in state XN,}$$

$$c_y = \frac{C_y^0}{s} \quad \text{and} \quad H_y = H_y^0 s, \quad \text{in state XD,}$$

where $s < 1$.

The equilibrium choice of the repression and privatization strategies of country x is quite obvious. As country x is the first to play the game, the nature of the equilibrium is similar to that in a single country as described in Proposition 3. That is, for small c and high H (less than $\tilde{c}$ and greater than $\tilde{H}$), the rulers of country x undertake a type 2 privatization strategy, and if not, they undertake a type 1 privatization strategy and resign.

Applying the analysis of Section 2.2 to country y shows us the nature of the equilibrium path given the situation in the other country x as shown in Proposition 4.

We denote $\tilde{H}_{y,\text{XN}}^0$ and $\tilde{H}_{y,\text{XD}}^0$ the thresholds of the initial punitive reservation level in country y in state XN and XD, respectively, and $\tilde{C}_{y,\text{XN}}^0$ and $\tilde{C}_{y,\text{XD}}^0$ the thresholds of the initial effective cost of the repressive apparatus in country y, in state XN and XD, respectively.

Proposition 4.

(i) *We have that $\tilde{C}_{y,\text{XD}}^0 < \tilde{C}_{y,\text{XN}}^0$, and $\tilde{H}_{y,\text{XN}}^0 < \tilde{H}_{y,\text{XD}}^0$.*

(ii) *For a set of parameters (C_y^0, H_y^0) in country y such that $\tilde{C}_{y,\text{XD}}^0 < C_y^0 < \tilde{C}_{y,\text{XN}}^0$, or $\tilde{H}_{y,\text{XN}}^0 < H_y^0 < \tilde{H}_{y,\text{XD}}^0$, there is a snowball effect from country x to country y.*

(iii) *Otherwise, there is no snowball effect, and the outcomes in country y are independent of country x and derived directly from Proposition 3.*

Proof.

(i) The threshold in Proposition 3 for H and c are, respectively: $\tilde{H}_y$ and $\tilde{c}_y$, and they are independent of the states XN or XD. Therefore, we have that:

$$\tilde{H}_y = \tilde{H}_{y,\text{XN}}^0 = s.\tilde{H}_{y,\text{XD}}^0, \tag{24}$$

$$\tilde{c}_y = \tilde{C}_{y,\text{XN}}^0 = \frac{\tilde{C}_{y,\text{XD}}^0}{s}, \tag{25}$$

and since $s < 1$, we get that:

$$\tilde{C}_{y,\text{XD}}^0 < \tilde{C}_{y,\text{XN}}^0 \quad \text{and} \quad \tilde{H}_{y,\text{XN}}^0 < \tilde{H}_{y,\text{XD}}^0. \tag{26}$$

(ii) Note from Proposition 3, that for $c_y > \tilde{c}_y$, there is democratization, otherwise the communist regime stays in power. Therefore, if $\tilde{C}_{y,\text{XD}}^0 < C_y^0 < \tilde{C}_{y,\text{XN}}^0$, then when country x does not privatize, the state is XN, and the relevant inequality is $C_y^0 < \tilde{C}_{y,\text{XN}}^0$ (when $C_y^0 = c_y$ and $\tilde{C}_{y,\text{XN}}^0 = \tilde{c}_y$), which from Proposition 3, it follows that there is no democratization in country y. However, if country x democratizes, the state is XD

and therefore the relevant inequality is $\tilde{C}^0_{y,\mathrm{XD}} < C^0_y$, then there is democratization in country y. Hence, there is a snowball effect. The proof is equivalent for H. Part (iii) stems directly from Proposition 3. □

Proposition 4 states that for a country y with parameters C^0_y, H^0_y such as in part (ii) of the proposition, the optimal political and privatization strategy depends pivotally on the outcome of the same process in the other country. Indeed, for such a configuration of parameters, if there is no political transition in country x, then a political transition will not take place in country y. On the contrary, if the elite resigned in country x or democracy came after a successful revolution by workers, then the elite in country y will resign and adopt a type 1 privatization strategy. It follows that there is a possibility of a snowball effect from one country to the neighboring one in such a range of parameters. More specifically, the various outcomes of this game are described in Fig. 5a and b.

In Fig. 5a and b, we depict in gray the snowball regions for parameter c and H respectively. Let us focus on parameter H in Fig. 5b. For country y we have two straight horizontal lines
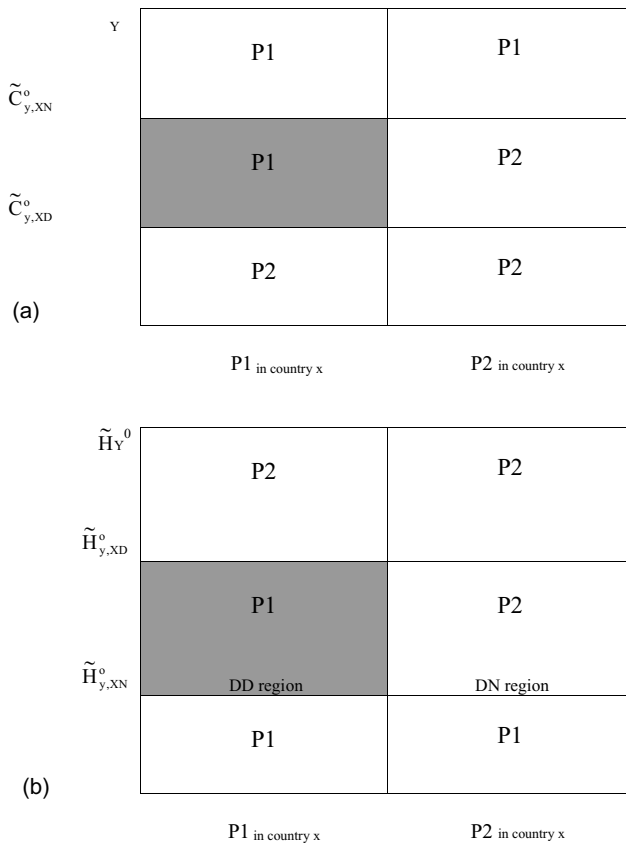

Fig. 5. Snowball effect.

$\tilde{H}^0_{y,\text{XN}}$ and $\tilde{H}^0_{y,\text{XD}}$. Above $\tilde{H}^0_{y,\text{XD}}$, whatever the result of the privatization and political transition in country x, country y's rulers choose a type 2 privatization strategy and remain in power. Similarly, below $\tilde{H}^0_{y,\text{XN}}$, rulers in country y always choose a type 1 privatization strategy and decide to resign.

In between the two lines lies the region of the snowball effect. In the gray region DD, as country x democratizes, resignation of the rulers in country y is also implied. Although it would not have been, had country x remained autocratic, as shown in region DN, in which rulers in country x do not resign, and country y also remains autocratic with type 2 privatization implemented.

3. Conclusion

The aim of this paper is to examine the propagation mechanism of communist regime collapse among Eastern European countries. During the diffusion of democratization during the years 1989–1991, the pattern displayed is a continuous movement of collapse starting with Hungary and Poland. Arguments that democratization in one country affects the democratic process in neighboring ones must therefore incorporate a regional dimension. Therefore, the structure of this paper incorporates a snowball effect that has a regional dimension.

We have shown that democratization in one specific country may affect the choice of political regime in the neighboring countries. This is so because decisions made in one country affect the relative effectiveness of the repression apparatus in the others. The size of the repression apparatus is the key element determining political and economic regimes. Therefore, when the effectiveness of the repression apparatus is reduced due to democratization in the neighboring countries, it in turn affects the decisions made by autocratic rulers, possibly leading them to resign. This scenario occurred in Eastern Europe.

Yet in Asia, due to the fact that China did not choose nomenklatura privatization, there was no snowball effect on Vietnam that influenced it to change its regime. We claim in our paper that if the rulers of China had resigned after the events in Tienanmen Square, their resignation might have affected the choices of the rulers of Vietnam.

The essential element of this model is that the type of economic reform adopted by a communist government depends critically on the size of the repression apparatus employed by the regime to stay in power at the time in which reform is being contemplated. When the effectiveness of the repression apparatus is low, the optimal action is for the rulers to relinquish political power.

This paper focuses on the propagation mechanism of regime collapse. It assumes that the first country in a given region to undergo regime change experiences some exogenous shocks that lead to the decision to opt for nomenklatura privatization and to democratize. Yet, the structure of our model can also shed some light on this matter. While the repression apparatuses in the Eastern European countries included military assistance from the Soviet Union, their respective distances from Moscow affected the efficiency of those means of repression: the greater the distance, the less efficient the repression factor. When the efficiency of Soviet military assistance began to deteriorate, geographical distance should have an influence on the first country to start the snowball process.

In conclusion, we have presented a simple model that incorporates a regional dimension. It has been shown that one country's choices can affect the choices of its neighbors. There are countries in Eastern Europe where a priori the elite did not have a reason to give up power, yet the collapse of communism in a neighboring country modified the effectiveness of the repression apparatus, and as a consequence, the optimal outcome changed. It became preferable for the rulers of the autocratic country to resign, democratize, and, via privatization, ensure that they became the rich capitalists of tomorrow.

Acknowledgements

Appendix A

The following lemma outlines the optimal decision of rulers as a function of the worker's decision, since we solve the equilibrium by backward induction.

Lemma.

(i) *When in the third stage workers do not fight, in the second stage the workers' allocation of output that is optimal for rulers is*: $W = p(\beta)Y_1 - [1 - p(\beta)]H$ *in the case of privatization 1 and* $W_s = p(\beta)A_s - [1 - p(\beta)]H$ *in the case of privatization 2.*
(ii) *When in the third stage workers fight, the rulers' best response in the second stage is giving them the lowest allowable payoff; that is,* $W = 0$.
(iii) *When privatization 1 is chosen, and the rulers do not resign and stay in power, there is no privatization ($\gamma_1 = 0$) and the rulers strictly prefer the workers not to fight.*
(iv) *The equilibrium rate of privatization 2 is γ_2^* and is not zero.*

Proof.

(i) For a non-fighting outcome to be an equilibrium it is necessary that:

$$V_{NF} \geq V_F.$$

The rulers' best response is to choose the smallest W that satisfies Eq. (13), that is:

$$W = p(\beta)Y_1 - [1 - p(\beta)]H, \quad \text{in the case of privatization 1,} \tag{A.1}$$

and

$$W_s = p(\beta)A_s - [1 - p(\beta)]H, \quad \text{in the case of privatization 2.} \tag{A.2}$$

(ii) In case of a fighting equilibrium, the allocation that maximizes (A.1) is to give the workers the minimum, i.e., 0.

(iii) Consider the cases where rulers do not resign. The payoffs in cases of no-fight and fight are, respectively:

$$U_{\mathrm{NF},1} = [1 - p(\beta)][Y_1 + H], \tag{A.3}$$

and

$$U_{\mathrm{F},1} = [1 - p(\beta)]Y_1. \tag{A.4}$$

Hence, no-fight dominates fight when $H > 0$ and in both cases, the payoffs are a negative function of γ_1. Therefore, the optimal extent of privatization for the rulers, if they do not resign, is zero, and as $Y_1(0) = A_s$, we finally get:

$$U^*_{\mathrm{NF},1} = [1 - p(\beta)][A_s + H], \tag{17}$$

and

$$U^*_{\mathrm{F},1} = [1 - p(\beta)]A_s. \tag{18}$$

(iv) About the last part of the lemma, for a non-fighting outcome to be an equilibrium it is necessary that the workers in the public sector are paid at least what they would receive if fighting:

$$W_s = p(\beta)A_s - [1 - p(\beta)]H, \tag{A.5}$$

then substituting into (6) and (12) we get:

$$U_{\mathrm{NF},2} = (1 - \gamma_2)[1 - p(\beta)](A_s + H) + \gamma_2 t(\gamma_2)A_m. \tag{A.6}$$

Under a fight, workers are paid the minimum, $W_s = 0$. Substituting into (14), the rulers' payoff becomes:

$$U_{\mathrm{F},2} = [1 - p(\beta)][A_s(1 - \gamma_2) + \gamma_2 t(\gamma_2)A_m]. \tag{A.7}$$

It is easy to see that for any $\gamma_2 > 0$, $U_{\mathrm{F},2}$ is smaller than $U_{\mathrm{NF},2}$ and no-fight dominates fight for the type 2 privatization strategy.

   The extent of privatization that maximizes the rulers' payoff in case of NF, denoted γ_2^*, is such that:

$$-[1 - p(\beta)](A_s + H) + [t(\gamma_2) + \gamma_2 t'(\gamma_2)]A_m = 0. \tag{A.8}$$

$U_{\mathrm{NF},2}$ has an inverted U-shape as a function of γ_2. The intuition underlying this equilibrium is that privatization leads to growth of output, which benefits the rulers. However, for too high a rate of privatization, rents fall. Therefore, there is an optimal extent of privatization. As opposed to the case of privatization of type γ_1, where if the rulers did not resign the optimal value is 0, here under both NF and F, the optimal γ_2 is greater than zero.

   Substituting the optimal amount of privatization, γ_2^* in Eq. (A.6) the optimal payoff for the rulers when choosing privatization 2 is then:

$$U^*_{\mathrm{NF},2} = (1 - \gamma_2^*)[1 - p(\beta)](A_s + H) + \gamma_2^* t(\gamma_2^*)A_m. \qquad \square \tag{19}$$

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