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REPEATED EXPROPRIATION CONTESTS AND FOREIGN DIRECT INVESTMENT

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ABSTRACT

Repeated Expropriation Contests and Foreign Direct Investment

This Paper considers the incentives for foreign direct investment in transformation countries if actual expropriation is the possible result of a conflict between multinational firms and local or national governments. The Paper compares threats of complete expropriation and of repeated period revenue confiscation. The Paper also shows that the timing of efforts in the contests is essential for the size of underinvestment. Short-term commitment as regards timing can lead to first-best investment levels.

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NON-TECHNICAL SUMMARY

The large inflows of foreign direct investment into the countries of Central and Eastern Europe that many economists expected to take place when these countries started to transform their economic systems did not take place. Why was the flow of investment so moderate, and what caused the considerable differences in the size of investment?

This Paper considers a theoretical explanation for these empirical observations, based on the lack of security of property rights and the fractionalization of power in these countries. Investors face threats of possible nationalization, confiscatory taxation, or extortion by organized crime. There is a difference between these countries and dictatorships in other developing countries that could also expropriate by nationalization or confiscatory taxation: There is no group that is endowed with supreme power to fully control and (re-)allocate property rights. Instead, there are competing groups, such as local governments and agencies, provincial and central government, criminal gangs and organized crime. It is argued in this Paper that this fractionalization is responsible for the particularly poor investment performance of these countries. If there is a supreme power, the problem is whether this supreme power decides whether or not to nationalize or confiscate. This power takes into account long term considerations, and the decision is a unilateral one. With fractionalized power groups, there are several problems. Each power group that may try to appropriate foreign property has to fight for this, and the foreign investor can spend resources fighting against it. For instance, the investor can try to buy the support of other power groups. Hence, appropriation becomes the outcome of a contest in which both sides, the owner of the investment and the appropriator, spend resources in order to achieve their respective goals. An implication of these contests is that investment does not become particularly attractive. Even if an investor manages to stay in possession of the investment, and its returns, the investor has to spend resources in order to achieve this, and these additional costs make the investment unattractive in the first place.

The Paper distinguishes two types of expropriation contests in a dynamic context. In one type, expropriation is irreversible and permanent once it occurs, in a second type the multinational and the government fight only about the investment returns that accrue in each single period. Both cases can be relevant and are treated separately. Suppose the multinational investor wards off an expropriation attempt in some period t. The expropriation threat will most likely reappear in the periods to follow. Whereas, if expropriation occurred at a certain period, the multinational may have little or no hope of re-entering the contest and most likely has to simply write off the investment. This is the once-and-for-all expropriation contest, in which there is considerable asymmetry between the owner and the expropriator, because

the investor would have to fight each period in which the investor stays in possession of the investment, whereas the expropriator, once the expropriation attempt is successful, is likely to be in a position with more secure property rights. With period-wise contests, the multinational and the firm simply contest for the period revenues in each period. It turns out that timing is particularly important in the latter case of expropriation contests. In particular, if an expropriator must spend contest resources first in order to make a serious confiscation attempt, this may solve the underinvestment problem.

Repeated Expropriation Contests and Foreign Direct Investment

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February 9, 2001

Abstract

This paper considers the incentives for foreign direct investment in transformation countries if actual expropriation is the possible result of a conflict between multinational firms and local or national governments. The paper compares threats of complete expropriation and of repeated period-revenue confiscation. The paper also shows that the timing of efforts in the contests is essential for the size of underinvestment. Short term commitment as regards timing can lead to first-best investment levels.

Keywords: foreign direct investment, conflict, expropriation, nationalization, confiscatory taxation.

JEL classification numbers: F21, F23, G15, H87

1 Introduction

When the former socialist countries in Central and Eastern Europe started to transform their economic systems, many observers expected large inflows of foreign direct investment and a quick catch up. However, in most of

these countries the investment boom has not taken place. Some countries did reasonably well whereas others performed very poorly. The cumulative FDI (gross) inflow 1988-1998 in Eastern European, Baltic and European CIS countries was USD 235 per capita. The figures for Hungary (USD 1720) and the Czech Republic (USD 1010) were about sixteen and nine times that of the Russian Federation (USD 111). The Russian Federation still did more than twice as well as Ukraine (UNECE, 1999, p. 170). In comparison, FDI inflow 1990-1998 into the U.S. was USD 2241 per capita, almost ten times the aggregate per capita inflow for 10 years in transforming countries of Central and Eastern Europe (see OECD 1999).

A central problem in these countries that may explain these figures is the lack of security of property rights. Investors face threats of possible nationalization, possible confiscatory taxation that amounts to a *de facto* expropriation[1] and the threat of extortion by private protection agencies such as the Russian mafia and similar structures.[2] Typically there is no group that is endowed with supreme power to fully control and (re-)allocate property rights. Also, private protection agencies enter the picture and assume the role of private types of government. Johnson, Kaufmann, McMillan and Woodruff (2000), for instance, report that firms report that they suffer extortion from bureaucrats, but also from criminal gangs. According to their survey, around 90 percent of the managers in Russia and Ukraine said firms in their industry pay for 'protection' of their activities.

Extortion generates a serious hold-up problem for investment. Once the initial foreign direct investment has been made, power groups (including the government) spend effort in order to expropriate the investor or confiscate the revenue, whereas the investor spends effort to ward off expropriation. This can be illustrated by an example. The investment of KNAUF (a German building materials firm) in Russia illustrates the nature of such conflict (see *The Moscow Times*, October 15, 1998). KNAUF battled with the tax police about whether a given investment of USD 1.68 million was tax free or not, where the tax police tried to collect a penalty including a minor collection fee that sums up to USD 10.8 million. KNAUF officials hinted the tax police

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[1]Non-discrimination principles in OECD countries are designed to reduce the extent to which foreign direct investors' profits can be confiscated by taxation. However, governments can find many ways to target particular firms, by way of specific import duties on particular inputs, and licence fees. See Konrad and Lommerud (1999) for a discussion.

[2]For a theoretical and empirical analysis of the mafia and further references, see Skaperdas (1999).

collaborated with a third party that tries to attain control of the factory. The same firm had trouble with another of their factories (Kubansky Gips - KNAUF, at Psebai near the Georgian border). *The Moskow Times* in a series of articles (November 29, 1997, December 9, 1997, February 10, March 10, 1998,) reports the story where the local employees tried to gain control of KNAUF's factory, kicking out the company's German owners. The local director Alim Sergiyenko physically prevented employees of KNAUF to enter the factory for about two years. According to *The Moskow Times*, (February 10, 1998) Sergiyenko had the support of the local administration head and arbitration judges. Moskow authorities finally helped install a legally elected director. Similar stories are reported for other firms.[3]

These examples illustrate that extortion and expropriation contests can take many forms. The type of effort in expropriation contests depends on the nature of the expropriation threat. Expropriation may lack a legal basis in which case violence and investments in credibility to carry out threats may be used, whereas the foreign investor may invest in various types of self protection.[4] Sometimes the government may try to bend existing national or international laws in order to expropriate an investor. In this case both sides may invest resources to achieve favorable changes in the legal, institutional or contractual framework, and in the legal dispute. In this paper, the precise nature of the different types of games will not be modelled. Instead, a general model of conflict is used to describe the nature of the expropriation contest that has been applied in many contexts more recently.[5]

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[3]The KNAUF case is not unique. As Jeanne Whalen points out in an article in *The Moscow Times* (January 13, 1998): "U.S.-Russian Cable venture Kosmos TV and German building materials manufacturer Knauf spent a good part of the year battling for control of their companies against general directors they'd hired to run those enterprises. Both foreign investors reported their executives had turned into Frankensteins, kicking the owners out of their offices, dipping into the company till and wreaking havoc on business in general. Working through official channels hasn't helped either party. A series of court rulings have upheld the right of Kosmos TV's general director to continue running the company. Although two federal courts have empowered Knauf to take back its factory and fire its general director, the Germans have been unable to enforce the decisions."

[4]This type of contest has taken an interesting direction for Frantisek Mojzs, former owner of a USD 150 million-a-year business company, which he signed over to the Roman Catholic Church rather than taking in a mob front man as a silent partner. (*International Herald Tribune*, March 6, 1998). Clearly, it needs some resources to threaten a company of that size, and also, the shelter of the Roman Catholic Church is a protection service that is, most likely, not free of charge.

[5]Conflict as an important mechanism has been emphasized in many contexts for de-

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The problem of possible nationalization in foreign direct investment has been discussed with respect to the nationalization that took place in many developing countries between the mid fifties and the late seventies (for empirical evidence and further references see, e.g., Andersson (1991)).[6] However, the confiscation/expropriation threats in transformation countries today are qualitatively different from these nationalization threats. In the transforming countries the structure of governance is fragmented. The goverments in the sixties essentially made a decision whether or not to expropriate foreign investors. In transformation countries today, several groups exert some governance; they all may have an incentive to expropriate, but it needs effort to put such policies into effect. In turn, the investors spend resources to make expropriation more difficult. Resources are wasted in this distributional conflict and the outcome is uncertain. Accordingly an investor has to take into account that he will earn the returns of the investment only with some positive probability, and that he will have to spend resources to defend the investment and its returns from expropriation.

An important distinction in a dynamic context is whether expropriation is irreversible and permanent once it occurs, or whether the multinational and the government fight only about the investment returns that accrue in each single period. Both cases can be relevant and are treated in sections

terminating resource allocation in the absence of well-defined property rights. See, e.,g., Skaperdas (1992) and Garfinkel and Skaperdas (1996) on the allocation of property rights in social conflict more generally, Wärneryd (1998) for interregional conflict in fiscal federalism, Müller and Wärneryd (1999) on conflict and the internal allocation of surplus within partnerships and corporations, Wärneryd (1997) on law suits, Bester and Wärneryd (1999) on mechanism design for the resolution of conflict, and Baye, Kovenock and deVries (1998) for a unified approach and further applications.

[6]Eaton and Gersovitz (1984), and many other researchers considered expropriation as a choice made at free will by the host government. The governments' ability to expropriate generates a hold-up problem: the government may have an incentive to expropriate a foreign investor once the investment has been made. Because investors anticipate this, in the extreme case no investment takes place and high-yield investment opportunities are not used unless the government can commit itself not to fully confiscate the returns on this investment. Hence, the problem was typically seen as a commitment problem. The government is considered to make a free decision whether or not to expropriate the foreign direct investor, and it does not expropriate investors if the present value of the costs of an expropriation exceeds the benefits, or if the government was able to commit itself not to expropriate the investor. For some theoretical analyses of commitment considering repeated games, see, for instance, Cole and English (1991, 1992), Thomas and Worrall (1994), Cohen and Michel (1991). Further commitment devices are discussed in Schnitzer (1995), Konrad and Lommerud (1999), and Boadway and Keen (1998).

2 and 3, respectively. Suppose the multinational investor wards off an expropriation attempt in some period t. The expropriation threat will most likely re-appear in the periods to follow. Whereas, if expropriation occured at some period, the multinational may have little or no hope to re-enter the contest and most likely simply has to write off the investment. This is the "complete expropriation" threat considered in section 2. In section 3, the expropriation problem without this asymmetry between the multinational and the government is considered. The multinational and the firm simply contest for the period revenues in each period. The analysis reveals the factors that determine whether contests for complete expropriation or confiscation contests generate a stronger hold-up problem.

Section 4 considers a different timing of moves in the contests. Timing is crucial and determines the amount of underinvestment that is induced by the lack of secure property rights. Even if the investment takes place once and for all and yields a flow of returns in an infinite number of periods, for full efficiency in foreign direct investment it may be sufficient if the government can commit itself to choose its expropriation effort in each period prior to the foreign direct investor's choice.

2 Complete expropriaton

Consider the following framework. A multinational firm considers whether to establish an affiliate in a host country (investment stage) in period $t = 0$ and chooses $k \geq 0$, the amount of investment. The investment is a durable capital good, it is observable and irreversible. Should the multinational one day in the future decide to shut down the affiliate, this investment is lost.

The investment generates a flow of revenue in this and in all future periods, $t = 0, 1, 2, ...$ The revenue in each period t depends on the amount of capital invested, and on whether the parent company or the national government controls the firm in that period. It is a strictly concave function of investment. The marginal revenue of the first unit of investment is sufficiently high to rule out trivial corner solutions. That is, revenue is $f(k)$, with $f(0) = 0$, $f'(k) > 0$, $\lim_{k \to 0} f'(k) = \infty$ and $f''(k) < 0$, if the parent controls the affiliate. Revenue is only $\alpha f(k)$ if the government controls the firm in that period, with $\alpha \in (0, 1]$. For instance, if the government controls the affiliate, the parent firm may withdraw some intangible factors, causing a loss in managerial or production efficiency.

Before the affiliate generates revenue in period 0, but after the investment has been made, the government attempts to expropriate the multinational and the multinational tries to ward off this attempt. This expropriation conflict can be seen as a contest for ownership and control rights in the affiliate. The parent firm and the government spend efforts, $e_0 \geq 0$ and $\bar{e}_0 \geq 0$, respectively, and the control of the firm (including the revenue generated in the affiliate) will be allocated according to a contest success function, the same for all periods $t = 0, 1, ...$, for which the probability $q_t = q(e_t, \bar{e}_t)$ that the parent firm continues to control the firm and earn its revenues is

$$
q(e_t, \bar{e}_t) = \left\{ \begin{array}{c} 1 \\ 1/2 \\ 0 \end{array} \right\} if \left\{ \begin{array}{c} e_t > b\bar{e}_t \\ e_t = b\bar{e}_t \\ e_t < b\bar{e}_t \end{array} \right\} \text{ for } t = 0, 1, 2, ... \tag{1}
$$

The government wins the contest with the residual probability $1 - q_t$.

If $b = 1$, the contest success function is perfectly symmetric. However, one contestant may have an effectiveness advantage, measured by the parameter $b \in (0, \infty)$. If, for instance, $b < 1$ the firm needs less effort to match the effect of a given effort of the government. However, $b > 1$ is also possible, if it is relatively easy for the goverment to confiscate or nationalize a firm. In general, effectiveness differences between the parent firm and the government may have many reasons which I do not consider in detail here, and take the overall effect b as given.

This type of contest could be given many microeconomic underpinnings. I briefly discussed some of them in the introduction. They all have two elements in common: first, both sides have a cost of effort that cannot be recovered, even if they lose the expropriation game, and second, each side can improve its chances for winning if it uses more effort. These are the two central features of a contest. A general contest model can generate some insights that can be expected to apply if the contest is replaced by a more detailed expropriation game in a specific institutional context.

The contest success function as in (1) is frequently used in models of conflict.[7] In the symmetric case with complete information, (1) is revenue equivalent to a standard second price auction or Bertrand competition, which

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[7]Variants of this contest success function are used to describe contests in various fields ranging from R&D, lotteries, advertizing and sales contests and litigation to lobbying and political campaigns. See, e.g., Hirshleifer and Riley (1978, 1992), Hillman and Riley (1989), Ellingsen (1991), Baye, Kovenock and deVries (1998) and Konrad (1999) for examples and further references. Also, most other types of contest functions (e.g., those axiomatized in
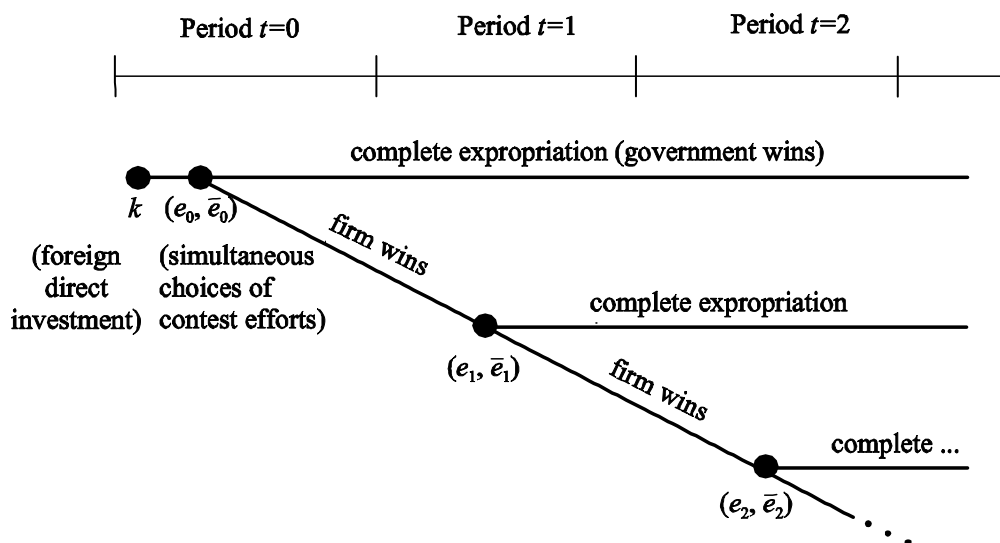
Figure 1: Complete expropriation.

is an attractive property. But results generalize qualitatively to broader sets of contest success functions.

Returning to the game structure: if the government has expropriated the foreign multinational in period $t = 0$, it will run the firm in this and all future periods and has a flow of revenue of $\alpha f(k)$ in each period. If the government did not win the expropriation contest, the foreign multinational will earn and repatriate the revenue $f(k)$ in period 0. Then, in period 1, the government will make a new expropriation attempt, leading to a contest with efforts e_1 and $\bar{e}_1$ and an outcome determined by the contest success function as in (1), with $t = 1$. Revenue in period t will be $f(k)$ if the multinational wins again, and $\alpha f(k)$ if the government wins. If the government wins it will continue to run the affiliate for all future periods and earn the revenue $\alpha f(k)$ in each future period. If the firm wins, it receives $f(k)$ and has to enter the next contest in period $t = 2$, and so on. The game structure and the timing of moves is illustrated in Figure 1.

Skaperdas 1996) converge towards this type of contest success function if the contest becomes sufficiently discriminatory.

7

The payoff of the multinational firm in period 0 can be written as

$$V_0 - k = -e_0 + q(e_0, \bar{e}_0)[f(k) + \delta V_1^*] - k \tag{2}$$

with V_1^* a value function that represents the multinational's value of not being expropriated at the beginning of period 1, and $\delta \in (0, 1)$ the multinational's discount factor which is exogenous here and constant across periods for simplicity. Accordingly, the multinational's valuation of winning the contest in period 0 is

$$B_0 \equiv f(k) + \delta V_1^* \tag{3}$$

with the equilibrium value V_1^* of not being expropriated at the beginning of period 1 yet to be determined.

Similarly, the payoff of the host government in period 0 can be written

$$\bar{V}_0 = -\bar{e}_0 + (1 - q(e_0, \bar{e}_0)) \frac{\alpha f(k)}{1 - \bar{\delta}} + q(e_0, \bar{e}_0) \bar{\delta} \bar{V}_1^*. \tag{4}$$

The government spends effort $\bar{e}_0$ in period 0. This effort is sunk, whether the government's attempt is successful or not. It wins with probability $(1 - q)$ and receives the present value of an infinite flow of revenue $\alpha f(k)$ which is calculated using the government's discount factor $\bar{\delta} \in (0, 1)$ which may or may not be the same as for the foreign multinational. With the remaining probability q the expropriation attempt in period 0 is not successful. The government attributes value $\bar{V}_1^*$ to being able to continue to attempt to expropriate the firm in period 1, and this value is also discounted to its present value in period 0 using the government's discount factor $\bar{\delta}$. (4) can be rewritten as

$$\bar{V}_0 = -\bar{e}_0 + \frac{\alpha f(k)}{1 - \bar{\delta}} + q(e_0, \bar{e}_0)(\bar{\delta} \bar{V}_1^* - \frac{\alpha f(k)}{1 - \bar{\delta}}). \tag{5}$$

Accordingly, the host government's valuation of winning the contest in period 0 is

$$\bar{B}_0 \equiv \frac{\alpha f(k)}{1 - \bar{\delta}} - \bar{\delta} \bar{V}_1^*. \tag{6}$$

Before we solve the whole game we characterize the solution of a contest between the multinational and the government for some given valuations B and $\bar{B}$ of winning the contest:

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Proposition 1 *Let B and $\bar{B}$ be the multinational's and the government's valuations of winning a contest with a contest success function (1). (i) Let $b\bar{B} < B$. Then the contest equilibrium is unique and described by equilibrium cumulative density functions of effort*

$$F(e) = \frac{e}{b\bar{B}} \ for \ e \in (0, b\bar{B}) \tag{7}$$

and

$$\bar{F}(\bar{e}) = (1 - \frac{b\bar{B}}{B}) + \frac{b\bar{e}}{B} \ for \ \bar{e} \in (0, \bar{B}). \tag{8}$$

(ii) Let $b\bar{B} \geq B$. Then the contest equilibrium is unique and described by equilibrium cumulative density functions of effort

$$F(e) = (1 - \frac{B}{b\bar{B}}) + \frac{e}{b\bar{B}} \ for \ e \in (0, B) \tag{9}$$

and

$$\bar{F}(\bar{e}) = \frac{b\bar{e}}{B} \ for \ \bar{e} \in (0, \frac{B}{b}). \tag{10}$$

A proof of Proposition 1 is in the appendix. To make the contest equilibrium intuitively plausible, note first that a pure strategy equilibrium cannot exist.[8] Second, note that no contestant will spend effort that exceeds its valuation of winning. The multinational will not spend more than B and the government will not spend more than $\bar{B}$ and none will spend more than is needed to top this maximum effort that the other contestant may choose. This explains the upper limits of the equilibrium mixed strategy supports. Finally, note that the probability density must be uniformly distributed in the interval $(0, \min\{B, b\bar{B}\})$ for the multinational and $(0, \min\{B/b, \bar{B}\})$ for the government. For instance, for the multinational it must hold that it is indifferent whether it increases its effort marginally or not, for all effort choices from this interval. The cost of an additional marginal unit of effort is 1. The benefit of this marginal unit is the multinational's valuation B of winning, times the increase in the probability for winning the contest. This additional

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[8] Zero effort $e = \bar{e} = 0$ is not an equilibrium. Hence, let the equilibrium be $(e^*, \bar{e}^*)$ with some strictly positive effort by at least one contestant, say, $e^* > 0$. The rival's optimal response is $\bar{e}(e^*) = 0$, or $\bar{e}(e^*) = \frac{e^*}{b} + \varepsilon$ for some arbitrarily small positive ε. But in this case, $e^* > 0$ is not an optimal response to $\bar{e}(e^*) = 0$, nor to $\bar{e}(e^*) = \frac{e^*}{b} + \varepsilon$. This shows that $(e^*, \bar{e}^*)$ is not an equilibrium.

probability is equal to $\bar{F}'(\bar{e})\frac{1}{b}$. Accordingly, equalization of marginal cost and marginal benefit requires $\bar{F}'(\bar{e}) = b/B$. Similar reasoning applies to the government and requires uniform distribution of the multinational's effort.

Solving for Markov-perfect equilibria in the dynamic game now, we can make use of two properties of the equilibrium. First, the stationarity of the problem yields that the value function of the multinational is the same in each period if it has not been expropriated up to that period, that is, for the equilibrium payoff V_0^*, it must hold that $V_0^* = V_1^* \equiv V^*$, and similarly, the government's value function is the same in each period if it has not succeeded in expropriating the multinational up to that period, that is, $\bar{V}_0^* = \bar{V}_1^* \equiv \bar{V}^*$. Further, Proposition 1 characterizes the equilibrium strategies in the contest in each period, particularly also in period 0.

Consider first the case $b\bar{B} < B$, or, by (3) and (6),

$$ b \left[\frac{\alpha f(k)}{1 - \bar{\delta}} - \bar{\delta}\bar{V}^* \right] < f(k) + \delta V^*. \tag{11} $$

By Proposition 1, given that $\bar{e}_0 = 0$ is in the support of the government's equilibrium mixed strategy and that the government wins with probability zero if it chooses this strategy, substitution of these results into equation (5) yields $\bar{V}^* = 0$ in the equilibrium. The multinational's equilibrium payoff can be calculated using $\bar{V}^* = 0$, equation (2), and the fact that $e_0 = b\bar{B}$ is in the support of the multinational's equilibrium mixed strategy and yields a win probability equal to 1. This yields

$$ V^* = \frac{1}{1 - \delta} \left[f(k) - b\frac{\alpha f(k)}{1 - \bar{\delta}} \right]. \tag{12} $$

In stage 1, when choosing the direct investment, the multinational maximizes $V^* - k$. Therefore, the marginal condition determining foreign direct investment is

$$ f'(k) = \frac{(1 - \delta)(1 - \bar{\delta})}{1 - \bar{\delta} - b\alpha}. \tag{13} $$

Inserting $\bar{V}^* = 0$ and (13) in (11) yields $b\frac{\alpha f(k)}{1-\bar{\delta}} < f(k) + \delta\frac{1}{1-\delta}\left[f(k) - b\frac{\alpha f(k)}{1-\bar{\delta}}\right]$ which simplifies to $1 - \bar{\delta} > \alpha b$. Accordingly, positive investment is likely to take place if the government discounts the future heavily, if the multinational firm has an advantage in operating the affiliate and if the multinational has an effectiveness advantage in the contest. Note that only the government's

discount factor, not that of the multinational investor, matters for this condition.

There are several reasons why, in Central and Eastern European countries the government's discount factor could be small. For instance, the government's valuation of the firm's future revenue depends on the security of the government's own property rights. A Russian "mafia don" who has taken over the control of a firm may face competition with other mafia families in future periods, and this discounts his expected benefits of the affiliate's future revenues. Thus, competition between rivaling providers of protection can be beneficial for foreign direct investment because it can reduce the hold-up problem.

Consider next the case $b\bar{B} > B$. In this case the fact that $e_0 = B = f(k) + \delta V^*$ is in the support of the multinational's equilibrium mixed strategy and makes the multinational win with probability 1 can be used in (2) to obtain $V^* = 0$. The fact that $\bar{e}_0 = B/b$ with $B = f(k)$ is in the support of the equilibrium mixed strategy of the government and yields a win probability $(1 - q) = 1$ can be used in equation (4) to calculate $\bar{V}^* = (\frac{1}{1-\bar{\delta}} - \frac{1}{\alpha b})\alpha f(k)$.

In stage 1, when the multinational chooses the amount of investment, the fact that $V^* = 0$ for all k implies that the multinational maximizes its profit if it chooses zero investment. In turn, this implies that also the government has zero payoff in the equilibrium.

It remains to determine more precisely the parameter range in which $b\bar{B} > B$ applies. Consider $b\left[\frac{\alpha f(k)}{1-\bar{\delta}} - \bar{\delta}\bar{V}^*\right] \geq f(k) + \delta V^*$. For $V^* = 0$ and $\bar{V}^* = (\frac{1}{1-\bar{\delta}} - \frac{1}{\alpha b})\alpha f(k)$, this condition becomes equivalent to $b\alpha \geq 1 - \bar{\delta}$.

These results are summarized as

Proposition 2 *(i) If $1 - \bar{\delta} \leq \alpha b$ no foreign direct investment takes place in the Markov-perfect equilibrium. (ii) If $1 - \bar{\delta} > \alpha b$ the equilibrium amount of foreign direct investment is determined by (13).*

The single-period case can be extracted from this analysis as a special case, simply by assuming that $\bar{\delta} = \delta = 0$. Accordingly

Corollary 1 *If $\bar{\delta} = \delta = 0$, or if there is only one production period, the multinational invests if and only if $1 > b\alpha$. If the investment is positive, it is determined by the condition*

$$f'(k) = \frac{1}{1 - b\alpha}. \tag{14}$$

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This result can be contrasted with the investment incentives if expropriation occurs with an exogenously given probability. Suppose a firm in a one-period context faces an exogenous expropriation probability equal to $q = 1/2$. Marginal investment incentives would be determined by $(1-q)f'(k) = 1$ such that marginal expected return taking into account the possibility of expropriation equals marginal investment cost. Instead, if expropriation is the outcome of a contest, for instance, if $\alpha b \to 1$, expropriation also occurs with an equilibrium probability $E(1-q) \to 1/2$. However, the marginal condition determining investment is (14) and hence, for $\alpha b \to 1$ zero investment would take place, even if $\lim_{k \to 0} f'(k) = \infty$. This example shows that considerations based on an exogenous expropriation probability can considerably underestimate the actual underinvestment problem that is generated by insecure property rights.

3 Period-wise confiscation

Often the firm and the government contest not about complete expropriation, but about current revenue. For instance, protection money that can be collected every period, or confiscatory taxation are means by which typically only current revenue can be expropriated. Figure 2 characterizes the timing of moves in this case. The multinational decides about initial investment. Then, at the beginning of each period, the multinational and the government contest for the period revenue of the investment. In order to characterize a benchmark case that is, in some sense, the opposite extreme of the case considered in section 2, for the contest in each period it is assumed that it does not matter which contestant was winning the contest in the previous period.

The contest success function determining the winner in each period is unchanged. Proposition 1 again yields a characterization of the contest equilibrium in each period, $t = 0, 1, ...$ If $\alpha_c f(k)$ is the period revenue obtained if the government confiscates this period's revenue, and $f(k)$ is the period revenue obtained if the multinational controls the firm and earns the period revenue, the multinational's payoff is

$$V_0 - k = \frac{1}{1 - \delta}[\max\{0, B - b\bar{B}\}] - k \tag{15}$$

with $B = f(k)$, and $\bar{B} = \alpha_c f(k)$. The value of α_c may differ from α in section 2. Whether the outcome of a confiscation contest in period t also affects
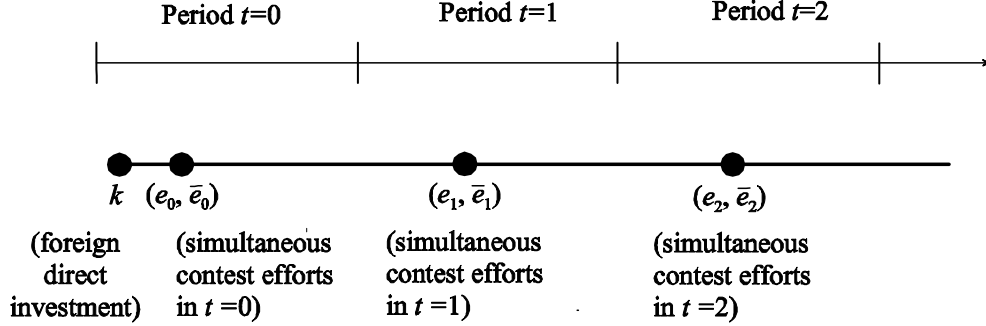
Figure 2: Period-wise confiscation.

the revenue of the firm in that period depends on the institutional context. The contest may, for instance, be a conflict between the tax authorities and the affiliate's accounting department, but may leave the control right unaffected. This difference in control rights and its impact on revenues has been highlighted in Schnitzer (1995). Equation (15) is obtained as follows. By Proposition 1, the multinational has a payoff of $\max\{0, B - b\bar{B}\}$ in each period from taking part in the contest if B and $\bar{B}$ are the multinational's and the government's valuations of winning. Accordingly, this payoff is zero if $\alpha_c b \geq 1$, and the multinational will not invest in this case.

The multinational's payoff is equal to

$$\frac{1 - \alpha_c b}{1 - \delta} f(k) - k$$

if $\alpha_c b < 1$, and the marginal condition that determines the amount of investment in this case is

$$f'(k) = \frac{1 - \delta}{1 - \alpha_c b}. \tag{16}$$

The condition $\alpha_c b < 1$ for strictly positive investment here can be more or less restrictive than $(1 - \bar{\delta}) > \alpha b$, the relevant condition for strictly positive investment in case of a threat of complete expropriation. Also, a comparison between the condition (13) and condition (16) shows that there are two effects at work. The fact that a government does not have to enter a contest period

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once complete expropriation has taken place makes complete expropriation more harmful: If positive investment occurs in both types of expropriation, for $\alpha = \alpha_c$, investment is higher in case of a period-wise confiscation threat than with a threat of complete expropriation. But a comparison of these conditions also reveals that $\alpha_c > \alpha$ can reverse the result. This is summarized as

Proposition 3 *A threat of period-wise confiscation of revenues may lead to a more serious hold-up problem than a permanent threat of complete expropriation.*

4　Timing of contest effort

A policy implication of the results in sections 2 and 3 is that observed cases of expropriation and confiscation may poorly reveal the underinvestment problem of expropriation threats. This becomes even more evident if a change in the order of moves in the contest in stage 2 is considered. For instance, suppose that a firm takes precautionary measures in order to make expropriation more difficult, that is, the firm chooses protection effort first and then the government decides whether to spend sufficient effort to achieve expropriation. In principle, complete expropriation and period-wise confiscation as in sections 2 and 3 have to be treated separately. However, it may be sufficient to consider the threat of repeated period-wise confiscation. Hence, I consider a game with the same timing as in section 3, except for replacing the simultaneous contest contributions $(e_t, \bar{e}_t)$ in each period's contest by sequential effort choices, with the multinational firm or the government being the Stackelberg leader. More precisely, the outcome in the contest at period t is determined by e_t and $\bar{e}_t$, with one contestant's effort being chosen and observed by the other contestant prior to this investor's own choice of effort.[9]

Proposition 4 *Consider period-wise confiscation threats with the multinational investor as the Stackelberg leader in each period contest. (i) If $b\alpha_c < 1$, then investment determined by $f'(k) = \frac{1-\delta}{1-b\alpha_c}$ and contest efforts $e_t = b\alpha_c f(k)$ and $\bar{e}_t = 0$ for $t = 0, 1, \ldots$ constitute a Markov-perfect Stackelberg equilibrium. (ii) If $b\alpha_c \geq 1$, then $k = e_t = \bar{e}_t = 0$ for $t = 0, 1, \ldots$ constitutes a Markov-perfect Stackelberg equilibrium.*

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[9]In a continuous time model, this is possible if the effort needs some time to become effective, with a larger time lag for one contestant than for the other.

A proof is in the appendix.

Proposition 4 shows that firms invest extremely little, even though they can be sure that, in equilibrium, their investment returns will never be confiscated. If, for instance, $\alpha_c b$ is smaller but close to 1, the multinational's investment will not be confiscated in any of the future periods in the equilibrium. However, the precautionary effort needed to achieve this is so high that almost all future revenues are dissipated by this effort. Accordingly, the returns of investment net of these cost of precautionary effort are extremely low, and so the ex-ante incentive to invest is low.

An even more interesting outcome is obtained if the order of effort choices is reversed.

Proposition 5 *Consider period-wise confiscation threats. Suppose that the government can choose a contest effort level at the beginning of each period just before the multinational chooses its own effort in that period. (i) If $b\alpha_c < 1$, then investment determined by $f'(k) = 1 - \delta$ and contest efforts $e_t = \bar{e}_t = 0$ for $t = 0, 1, ...$ constitute a Markov-perfect Stackelberg equilibrium. (ii) If $b\alpha_c \geq 1$, then $k = e_t = \bar{e}_t = 0$ for $t = 0, 1, ...$ constitutes a Markov-perfect Stackelberg equilibrium.*

A proof of Proposition 5 follows similar lines as Proposition 4 and is in the Appendix. Proposition 5 describes a condition for which foreign direct investment is fully efficient, as if there were no expropriation threat at all, and with no contest effort in the equilibrium. Two conditions have to be fulfilled for this result. First, the investor must have some advantage in the contest in the sense that either it has an effectiveness advantage, or that the investment revenue in a period with successful confiscation is lower than without confiscation. Also, in each period, the host government must be able to choose its contest effort prior to the multinational and commit itself not to increase its effort within the same period as a response to the multinational's effort choice.

Proposition 5 shows that very little commitment is necessary to achieve first-best incentives for foreign direct investment. Even though the investment takes place only once and generates returns in an infinite number of future periods, it is sufficient for efficient investment incentives if the government can commit itself always at the beginning of each period to choose its expropriation activities in that period before the multinational investor chooses its protection effort. This is much less than a multi-period long

term commitment. Long term commitment is probably not feasible even in advanced countries. But the period-wise commitment on contest effort is sufficient and may be feasible, for instance, by public institutions that are sufficiently slow.

5 Conclusions

Actual expropriation of a foreign direct investor by a host government can be seen as the outcome of distributional conflict between the foreign investor and "government" in the host country. Particularly in countries with weak and fragmented government, the host government cannot simply compare the advantages and disadvantages of possible expropriation and then decide whether to expropriate or not. Instead, the host government - or quasi-government in the case of a private market for protection, as in the transforming countries in Central and Eastern Europe - spends effort, attempting to appropriate the revenues from investment, whereas the investor tries to fend off this attempt. Accordingly, whether expropriation occurs or not is the outcome of a distributional conflict in which the investor and the government spend resources to improve their odds. This distributional conflict affects an investor's incentives to invest.

The investment incentives of a foreign direct investor depend on various aspects of the conflict. An important aspect is whether the expropriation threat concerns period revenues, as is the case with confiscatory taxation or with extortion by organized crime, or all future revenues as is the case with nationalization.

Other aspects determining investment conditions are the discount rate of the host government which can be seen as a proxy for the government's own security of property rights, whether the contest is symmetric or whether it grants an effectiveness advantage to one of the contestants, and whether the government can run the expropriated firm as efficiently as the foreign direct investor. Investment conditions are more favorable if the foreign direct investor has an effectiveness advantage in the contest, if the government is less efficient in operating the expropriated firm, and if the government's discount rate is high.

A central result in this paper is that short term commitment can yield first-best incentives for foreign direct investment even if this investment generates revenues for many periods. The order of moves in the contest games

in each period is crucial for the initial investment incentive. If the multinational investor chooses its contest effort prior to the government in each period, then the initial investment is as inefficient as with simultaneous contest effort choices in all periods. If, instead, the government commits at the beginning of each period to choose its expropriation effort prior to the multinational foreign investor in that period, full efficiency is obtained if the multinational firm has some advantage in the contest or in operating the firm. Hence, short-term commitment may be sufficient to overcome the expropriation problem in long term foreign direct investment.

6   Appendix

For a proof of Proposition 1 consider the multinational's payoff $q(e, \bar{e})B - e$ and the government's payoff $(1 - q(e, \bar{e}))\bar{B} - \bar{e}$. Define $\tilde{e} \equiv b\bar{e}$. Multiply the government's payoff by b and substitute $\tilde{e}$ for $b\bar{e}$ in this payoff function and in the contest success function (1) that becomes

$$\tilde{q}(e, \tilde{e}) = \left\{ \begin{array}{c} 1 \\ 1/2 \\ 0 \end{array} \right\} if \left\{ \begin{array}{c} e > \tilde{e} \\ e = \tilde{e} \\ e > \tilde{e} \end{array} \right\}. \tag{17}$$

Accordingly, the contest game is equivalent to a contest with a perfectly symmetric contest success function (17), efforts e and $\tilde{e}$, and valuations of winning the contest of B for the multinational firm and $b\bar{B}$ for the government. Accordingly, Theorem 3 in Baye, Kovenock and deVries (1996) applies and yields a unique equilibrium characterized by (7) and (8) if $b\bar{B} < B$, and (9) and (10) if $b\bar{B} \geq B$. $\square$

For a proof of Proposition 4 consider first the contest equilibrium with valuations B and $\bar{B}$ of winning. The government's reaction function is

$$\bar{e}(e) = \left\{ \begin{array}{c} e/b + \varepsilon \text{ for sufficiently small but positive } \varepsilon \text{ if } e < b\bar{B} \\ 0 \text{ if } e \geq b\bar{B}. \end{array} \right. \tag{18}$$

The technical problem that the government chooses ε from an open interval $(0, \infty)$ as close as possible to zero is disregarded here. The problem could be solved explicitly by assuming smallest possible effort units, or by a tie-breaking rule in the Stackelberg case by which the Stackelberg follower wins with probability 1 if both contestants choose the same effort.

By (18), the multinational's contest payoff is equal to $-e$ in the range $0 \leq e < b\bar{B}$, and equal to $B - e$ for $e \geq b\bar{B}$. This payoff is maximal for $e = b\bar{B}$ if $B \geq b\bar{B}$ and for $e = 0$ if $B \leq b\bar{B}$. Therefore, $e = b\bar{B}$ and $\bar{e} = 0$ constitute the Stackelberg equilibrium in the contest if $B > b\bar{B}$ and $e = 0$ and $\bar{e} = \varepsilon$ constitute the Stackelberg equilibrium in the contest if $B < b\bar{B}$. If $B = b\bar{B}$ both these equilibria exist, but $e = 0$ and $\bar{e} = \varepsilon$ Pareto dominates the other equilibrium.

The multinational has payoff equal to $\max[0, B - b\bar{B}]$ in each period, if B and $\bar{B}$ are the multinational's and the government's valuation of winning the contest in a single period. With period-wise confiscation, the contest games are independent of each other if Markov-perfect strategies are assumed, because neither the rules of the contest nor the period revenue in a period t or any future period depend on contest efforts and the contest outcomes in previous periods. Hence, $B = f(k)$, and $\bar{B} = \alpha_c f(k)$ in each period and hence, $e_t = b\alpha_c f(k)$ and $\bar{e}_t = 0$ for $t = 0, 1, ...$ constitute a Markov-perfect Stackelberg equilibrium in the contest game if $b\alpha_c < 1$, implying that the multinational's present value of contest payoffs is $\frac{f(k)(1-b\alpha_c)}{1-\delta}$, and, hence, investment is determined by $f'(k) = \frac{1-\delta}{1-b\alpha_c}$. If, instead, $b\alpha_c \geq 1$, the multinational's present value of contest payoffs is zero, and hence, it has no incentive to invest a positive amount. $\square$

For a proof of Proposition 5 consider first the contest equilibrium with valuations B and $\bar{B}$ of winning. The multinational's reaction function is[10]

$$e(\bar{e}) = \begin{cases} be + \varepsilon \text{ for sufficiently small but positive } \varepsilon \text{ if } \bar{e} < B/b \\ 0 \text{ if } \bar{e} \geq B/b. \end{cases} \qquad (19)$$

By (19), the government's contest payoff is equal to $-\bar{e}$ in the range $0 \leq e < B/b$, and equal to $\bar{B} - \bar{e}$ for $\bar{e} \geq B/b$. This payoff is maximal for $\bar{e} = B/b$ if $b\bar{B} \geq B$ and for $\bar{e} = 0$ if $b\bar{B} \leq B$. Therefore, $\bar{e} = B/b$ and $e = 0$ constitute the Stackelberg equilibrium in the contest if $b\bar{B} > B$, and $\bar{e} = 0$ and $e = \varepsilon$ constitute the Stackelberg equilibrium in the contest if $b\bar{B} < B$. If $B = b\bar{B}$ both these equilibria exist.

The multinational has payoff equal to B in each period if $B > b\bar{B}$ if B and $\bar{B}$ are the multinational's and the government's valuation of winning the contest in a single period, and payoff equal to zero in each contest game

if $B < b\bar{B}$. For $B = b\bar{B}$ the multinational's payoff is equal to zero or B, depending which equilibrium is chosen.

With period-wise confiscation, the contest games are independent of each other if Markov-perfect strategies are assumed, because neither the rules of the contest nor the period revenue in a period t or any future period depend on contest efforts and the contest outcomes in previous periods. Hence, $B = f(k)$, and $\bar{B} = \alpha_c f(k)$ in each period. Accordingly, $\bar{e}_t = 0$ and $e_t = \varepsilon$ for $t = 0, 1, ...$ constitute a Markov-perfect Stackelberg equilibrium in the contest game if $b\alpha_c < 1$, implying that the multinational's present value of contest payoffs is $\frac{f(k)}{1-\delta}$, and hence, investment is determined by $f'(k) = 1 - \delta$. If, instead, $b\alpha_c > 1$, the multinational's present value of contest payoffs is zero, and hence, it has no incentive to invest a positive amount. For $b\alpha_c = 1$ both these equilibria exist. $\square$

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