

**OLIGARCHIC PROPERTY RIGHTS  
AND THE TRANSITION TO A MARKET ECONOMY IN RUSSIA**

by Serguey Braguinsky and Roger Myerson\*

**Abstract**

We present a model in which capital assets can only be owned by members of a small politically-connected elite ("the oligarchs"), each member of which faces a given risk of being expropriated, and we investigate the implications of such an imperfection of property rights for the transition to a market economy. At the start of the transition, the oligarchs are long on local capital assets but short on safe deposits abroad. This causes a depression phase characterized by acute liquidity constraints and large capital outflows at the same time. As the oligarchs acquire enough safe deposits, the economy enters a recovery phase, still accompanied by capital outflows. The model can explain both the steep decline suffered by the Russian economy in the first 7 years of the transition to a market economy and the subsequent turnaround without relying on external factors. The decline could be avoided by allowing foreigners to own some domestic capital assets but home-country oligarchs may not be able to credibly collectively commit to such a reform.

[JEL classification numbers: F43, O10, P14]

February, 2006

---

\* Department of Economics, State University of New York at Buffalo and Department of Economics, the University of Chicago. We thank Gerard Roland for helpful comments and Vitaly Shvydko for expertise and help with the data. All errors are ours.

## **1. Introduction: the assumption of oligarchic property rights**

Soviet Communism imposed irrational constraints on the Russian economy, and the fall of the Soviet Union relaxed these constraints. So economists in 1992 saw good reason to predict that the transition to a market economy should have been followed by sustained economic growth in the former Soviet Union (see Roland, 2000, p. 3). The profound failure of this prediction suggests that some important factor was overlooked, although this factor might not be such a mystery. Most economic models assume perfect protection of property rights, and this limitation is widely recognized. Economic historians have argued that differences in the enforcement of property rights can account for the great differences of economic performance across nations and historical eras (see North, 1981). This logic clearly applies to the case of Russian transition.

Merely recognizing the importance of property-rights enforcement, however, does not necessarily bring it into the analysis. Even models with imperfect property rights have regularly assumed that an individual's economic options depend only on his or her wealth or endowment, and not any other aspect of social status (see, for example, Polishchuk and Savvateev, 2004; Sonin, 2003; Hafer, 2006). But in the first few decades of the Soviet Union, having wealth could only be a source of trouble, as the totalitarian regime deliberately and relentlessly crushed all potential sources of independent power. In the later decades, wealth in the form of money started playing an increasing role in the relationship among the members of an elite politically-connected oligarchy, but it could still be used only conditional on being a member of such an oligarchy (see Braguinsky and Yavlinsky, 2000, Part I for a detailed discussion). An outsider could not simply purchase his membership with money; in fact, offering money at the start of a relationship “would constitute the crudest breach of etiquette and lead to a career nosedive, even to prison” (Vaksberg, 1991, p. 7). Instead, relationships had to be gradually cultivated, through a series of token gestures, through Komsomol (Youth Communist League) and party booze-ups where future oligarchs “would make friends, get used to each other, and from there begin to push their own kind into the cushy jobs” (*ibid.*).

Thus, in its twilight years, the economy of the former USSR largely fell under the control of the “Soviet Mafia”, where protection of ownership rights was a scarce asset allocated by political leaders as a reward to their active supporters. But both protection and political support require costly efforts that cannot be perfectly observed, still less openly disclosed and verified.

Hence, promises to exchange protection for support were credible only among individuals who had valuable reputations for honoring such agreements. In a companion paper (Braguinsky and Myerson, 2006), we call this “oligarchic property rights”.<sup>1</sup>

An all-important feature of such an equilibrium is political insecurity. Since protection depends on the unverifiable perception of personal loyalty, the appearance of having violated a political agreement can occur with positive probability, even in an equilibrium where nobody actually chooses to violate any agreement. In our model below we capture this political risk by making an individual oligarch face a Poisson rate of expropriation (ostracism)  $\lambda$ . Taking explicit account of individual political risk distinguishes our approach from several other models of oligarchic property rights. In particular, in Acemoglu (2004), oligarchs face no expropriation risk, while in Alesina and Tabellini (1988), they face expropriation risk as a class.<sup>2</sup>

The model of oligarchic property rights we offer in this paper is consistent with stylized facts about Russian transition: steep economic decline, harsh liquidity constraint and large capital outflows for most of the first decade, followed by a relaxation of the liquidity constraint and an economic turnaround still, however, accompanied by capital outflows. To the best of our knowledge, our model is the only one proposed so far that can simultaneously explain all these phenomena without relying on external factors.

The basic logic is simple. The perception of political risk had already been influencing the behavior of Soviet oligarchs prior to the collapse of the communist system. To quote again from Vaksberg (1991): “the old saying ‘money isn’t everything’ was slightly off the mark if taken literally. When dismissal could be followed by a camps sentence or ‘elimination’, money certainly wasn’t everything. ... But, finding themselves free and not fearing a bullet in the neck, today’s retiring *apparatchiks* realize they have lost all their usual material blessings. What can

---

<sup>1</sup> This is how Vaksberg in his “Soviet Mafia” (1991) describes this system where certain kinds of property were protected only for a limited group of people who had privileged relationships with political leaders: “[W]henever there was the smell of money, of ‘special facilities’ or career enhancement, you only found the so-called ‘reliable’ people. ... Wherever the newly-emerging Soviet businessman found support from party and state functionaries, both sides flourished. If separate groups of clever dealers were bold enough to try to operate independently, not sharing with or relying upon the ruling elite, they usually got it in the neck. The violence that was meted out in these cases seemed to the uninitiated both strange and incomprehensible.” (Vaksberg, 1991, pp. 22-23)

<sup>2</sup> In Braguinsky and Myerson (2006) we show that in general, there would be a non-zero individual political risk associated with maximizing oligarchs’ welfare as a class.

they fall back on? Each of them may have felt the insecurity of his position, but that position, when he held it, opened the way for easy material accumulation. Simple worldly logic dictates: you must exploit your position to the maximum, and hurry, hurry, hurry..." (p. 23).

After the collapse of communism, a different strategy became available: the oligarchs could seek retirement insurance in safe foreign banking accounts. Safe assets abroad suddenly became the most valuable scarce resource, as the oligarchs found themselves long on capital assets in Russia but short on foreign currency. Vladimir Gusinsky, one of the most prominent Russian "oligarchs" of the 1990s, said in a private conversation in 1994 that he would happily give up 60% of his total wealth if only he could feel really secure about the remaining 40%.<sup>3</sup>

This situation led to a deep depression. After falling by an average of about 9% a year in the two final years of the Soviet Union, Russian GDP declined even more steeply in the first three years of transition (the average annual decline rate was 12% in 1992-94). The decline continued in 1995-98, albeit at a slower rate (about 3% per year on the average). The investment component was particularly hurt: gross fixed capital formation had declined by over 80% in real terms in 1990-98 while the average age of industrial equipment had increased from less than 11 years to over 17 years in the same period.<sup>4</sup>

At the same time, oligarchs' behavior implied a tight liquidity constraint: the share of barter in sales of industrial enterprises in the mid-1990s reached 40-50%<sup>5</sup> and wage, tax and other payment arrears were rampant. One possible explanation is overall capital shortage, but this flies in the face of the fact that Russia was also experiencing huge capital flight (Boycko, Shliefer and Vishny, 1993, p. 161; see also below, Section 6). Russian oligarchs *were* liquidity-constrained, but *not* for the purpose of investing into reconstructing the domestic economy.

Our model implies that it was the need to accumulate safe assets abroad that put pressure on all kinds of liquid wealth that could be exchanged for foreign currency. Although it is possible to sell capital equipment as metal scrap (as it sometimes happened in the early 1990s in Russia), the fraction of the value that can be recovered by such a method is generally too small.

---

<sup>3</sup> He was ostracized in 2000 and now lives in Israel off whatever wealth he had managed to save abroad.

<sup>4</sup> Unless explicitly noted otherwise, all the data presented in this paper are calculated from official Russian sources: the Federal State Statistics Service (former Goskomstat), the Central Bank of Russia, etc. The GDP data already include the Russian authorities' best estimate of unregistered economic activity.

<sup>5</sup> See, for example, Russian Economic Barometer (2004, p. 57).

The oligarchs had to wait for capital to depreciate, hence, in equilibrium, the price of capital assets had to fall just enough to make them willing to do so. Consider, for example, the case of Uralmash, one of the largest machinery factories in Russia. When it was acquired in 1993, its total dollar value estimated from the acquisition price was just \$3.9 million (Boycko, Shleifer and Vishny, 1993, p. 160). By the time the liquidity constraint disappeared and domestic capital investment and growth were about to resume, its market capitalization had increased to over \$20 million (*Indikator*, Moscow Interbank Foreign Currency Exchange, Vol. 1 (20), 1999, p. 12).<sup>6</sup> Uralmash is a rare good example for our purposes, because it was acquired early by one major oligarch, an outsider to the factory at the time, and has been owned by him until very recently, so we do not have to worry about expropriation of shareholders by stakeholders.<sup>7</sup>

Since the turnaround began in 1999, the Russian economy has on the average been growing at the annual growth rate of 6.8%. While this has sometimes been attributed to changes in political leadership bringing more stability, it should be noted that in 1999, which already saw a growth rate of GDP of 6.4%, President Yeltsin was still in power; moreover, he had changed three Prime-Ministers in the course of that year (his eventual successor, Vladimir Putin became the last and final pick only in early fall). Similarly, although higher oil prices definitely helped, the recovery has been broad-based and the growth rate in 2001 (when oil prices fell sharply) was still a decent 5.1%. But the recovery has also been accompanied by continued capital outflows, and many observers view it as slow and weak. All this evidence is consistent with the explanation proposed in our model.<sup>8</sup>

While our model can thus generate implications broadly consistent with evidence, there still remains a question of how realistic it is. In other words, is there enough micro evidence of oligarchic property rights in Russia and the basic assumptions we are making about them? While a full answer to these questions lies outside the scope of the present paper, in Section 2 we present some anecdotal evidence to support our hypotheses. Section 3, then, reviews a model of

---

<sup>6</sup> In 1998 the stock market in Russia first rose sharply and then crashed. The value of \$20 million above refers to a post-crash low; at the peak that year, Uralmash's market value exceeded \$500 million.

<sup>7</sup> Boycko, Shleifer and Vishny (1993, p. 161) offered such expropriation as a primary reason for low market value of Russian assets in the early 1990s, and they were no doubt right in a vast majority of other cases.

<sup>8</sup> Most other former Soviet republics experienced a similar turnaround at about the same time. This includes those that had neither significant oil reserves nor political change at the turn of the century (for example, Ukraine).

the optimal investment problem for a politically insecure individual oligarch, as formulated previously by Braguinsky and Myerson (2006). In Section 4 we develop a dynamic general equilibrium model of an oligarchic economy with immobile capital in which oligarchs suddenly acquire a chance to build up personal assets abroad, and we show that this model can explain both the depression phase after the collapse of Communism and the recovery that has followed it. This model differs from Braguinsky and Myerson (2006) in that capital is immobile. In Section 5 we show that allowing outsiders to own even a limited fraction of local capital assets would help to avoid the transitional depression. But while the workers and the economy as a whole would have benefited if Russia could also open up to foreign investment, the oligarchs may be unable to commit themselves from expropriating foreign investments. Section 6 contains the discussion of the ability of our model to fit some macroeconomic data and investment-related evidence from Russia. Section 7 concludes. Estimations and data sources are provided in the on-line spreadsheet and in the Appendix.

## **2. Oligarchic property rights in Russia**

### **2.1 What are Russian oligarchs and where did they come from?**

In some recent literature on Russian transition, oligarchs have been defined as a “few tycoons” who acquired large formerly state-owned assets at privatization auctions (Shleifer and Treisman, 2005, p. 160-161). In this paper, however, we follow the theoretical concept in Braguinsky and Myerson (2006), so that in our definition, “oligarchs” are all owners of valuable assets whose ownership is protected by a system of political support. Our “oligarchs” also include politicians and government officials offering such protection, both on the national and regional (local) levels. Thus, according to our definition, the manager of a local factory in the provincial city of Perm who wards off racketeers by relying on his personal relationship with the local militia (Varese, 2001, p. 94) is an oligarch, as is a government official who participates in providing protection and in reallocating property rights from ostracized oligarchs.

The nature of this protection can be understood by seeing what actually happened in the particular case mentioned in the previous paragraph. After the businessman complained to his friends in the police, they summoned the racketeer and told him, in a “civilized” manner, that he “had knocked on the wrong door”. The racketeer acknowledged his mistake and departed amicably (*ibid.*). The fact that the police showed no interest in taking the racketeer off the street

once he promised to stay away from the politically connected businessman is a perfect illustration of our concept – even official police protection does not extend beyond a politically-connected oligarchy.

As already noted, the roots of oligarchic property rights in the Russian economy can be traced back at least a few decades before the formal collapse of the planned economy. Vaksberg (1991) documents many striking examples of an elaborate web of illegal businesses, comprised of de facto owners of what was still formally state-owned assets, local party bosses and part of the leadership in Moscow. In one such example, a tractor factory was contemplated in Central Russia, at a site somewhat away from river Volga, the major transport artery for essential supplies. A single-track railway line was to be built from the port to the building zone. “An estimate was prepared and Moscow allocated money and resources. In due course, a formal report was submitted notifying completion ... [but] nobody had ever actually seen this line with their own eyes. It had vanished into thin air. ... Deception on that scale can only be undertaken by someone absolutely certain of immunity” (p. 84).

In Braguinsky and Yavlinsky (2000) we argued that a diffused system of politically protected de facto ownership had gradually replaced the totalitarian dictatorship following the death of Stalin, and that this new ownership system both caused the eventual collapse of communism and shaped the institutional framework for the transition to a market economy.<sup>9</sup> Vaksberg (1991) whose book was completed months before the Soviet Union collapsed, noted that the “Soviet mafia” had spread across all republics, regions, towns and districts to the point of making them “depressingly alike ... [T]he acquisition of money did not require any effort at all – only a little imagination and the guarantee of immunity. The most reliable and easily achieved guarantee was obtainable from the local party bosses – all the real power was in their hands” (p. 85). Not surprisingly, then, most of the new Russian oligarchs amassed and secured their wealth through political connections or underground economy or both.<sup>10</sup>

---

<sup>9</sup> This is echoed in Vaksberg (1991): “Hidden underground manufacturing, followed by misappropriation of so-called ‘reserved’ goods belonging to the state, ... the use of state ... facilities for the production of the unrecorded goods and their disposal ‘on the side’, a developing turnover of massive sums of money, nonexistent on paper but none the less real – there was none of this under Stalin’s totalitarian rule. Now that the screws have been loosened a bit, the black economy has fallen like an avalanche onto the official one” (p. 22).

<sup>10</sup> This is not meant to deny the role of individual entrepreneurial capacity, including the capacity to understand how the system was changing at an early stage. Such a capacity made a lot of difference in individual fortunes.

Guriev and Rachinsky (2005, GR) identify 22 major oligarchic groups, owned by 30 senior partners in the Russian economy as of Summer 2003. Since GR wrote their paper, 2 more senior partners in 2 of those groups have transpired, as a result of IPO disclosures. Moreover, in a number of other cases there were reasons to believe that current senior partners had begun their careers as junior partners of founding oligarchs, who, for various reasons were no longer actively involved in owning and managing the groups in 2003. We use the publicly available information assembled in the “Labirynt” database (<http://panorama.ru/info/labir.html>) to identify such cases and come up with 9 more oligarchs who had been closely associated with those groups in recent past. We thus estimate the total number of current and recent past senior partners to be 41 (see Table A1 in Appendix 1). We then look into the publicly available biographical information and histories of companies contained in “Labirynt” to gain insights into some of the characteristics relevant to our model. The details are provided in Appendix 1 (see Table A2 and notes to it). Here we present a summary of our main findings.

First, using publicly available information, we found that at least 11 out of 22 groups in GR were founded by a group of “old boys” who had either studied or worked together under the Soviet system. For example, Mr. Abramovich’s group, the richest oligarchic group in Russia as this paper is being written, started as a toy-making cooperative in the early 1990s founded by Mr. Abramovich together with 3 of his close personal friends, who still form the core of the group management. Also, three partners who started Alfa group used to study together in the Moscow Institute of Steel and Alloys, and so on. Eight out of 22 groups were initially created around a “red director” (the person who had been in charge of the main asset of the group since the Soviet times); 3 of them overlap with the “old boys” category. Overall, in 16 out 22 cases (72.6%) we are able to conclude that an oligarchic group has been formed around a closely-knit group of individuals with valuable insiders’ reputations, as assumed in our model.

Second, in 14 out of 22 oligarchic groups in GR (63.6%) we find documented evidence of a crucial role played by political connections or Soviet-era *nomenklatura* background or both early on in the history of the group. In addition, we find that partners from 7 oligarchic groups (31.8%) acquired high-ranking government offices or became elected politicians after their rise to business prominence. Five of those cases overlap with cases of political connections or *nomenklatura* heritage (or both) as the background for initial success, pointing to the phenomenon of “revolving doors”. This is reflected in the assumption we make in our model,



that local capital assets and political offices are perfect substitutes – both can be transferred back and forth within the oligarchy, and both are subject to the same kind of political risk.

The final, and most intricate question is how large a role in the rise of those oligarchic groups was played by unlawful methods. One aspect of the problem that makes it difficult to handle is that publishing *kompromat* (“a mixture of genuine information and falsified materials, impossible to sort out” – Hoffman, 2002, p. 496) has long become a widely used means of smearing rival oligarchic groups employed by Russian businessmen and politicians alike. In this paper, we decided to avoid relying on all sorts of *kompromat*-like material, even where it sounded very credible to us, so we are taking a very conservative approach. For example, GR refer to the “loans-for-shares” auctions at which many of the oligarchs acquired their prize assets as “the most scandalous episode of Russian privatization” (p. 138), and our reading of the history of those auctions fully conforms with that assessment. Nevertheless, we do not count oligarchic groups that rose to prominence through these auctions as having used unlawful methods because none of them has so far been formally charged with any crime related to them. Instead, we limit our statistic on unlawful methods as part of groups’ history to only actual arrests, criminal charges brought against and/or jail time actually served by at least one of the senior partners (including past senior partners). Under this approach, we still find publicly available specific evidence of some kind of criminal charges or convictions in 8 out of 22 groups (36.4%), which should be considered as a very conservative lower bound.<sup>11</sup>

## 2.2 Expropriation risk

As already mentioned, the key feature of our model is that oligarchs are not secure in their positions. But what is the actual degree of political risk faced by them? In less than 3 years since the completion of the GR paper, there has been a change of ownership in 4 out of 22 groups in their sample. While one of these cases (Metalloinvest) appears to be the case of a genuinely friendly sell-out, in at least two other cases (Yukos and AutoVAZ) the oligarchic

---

<sup>11</sup> As described in more detail in Appendix 1, in several of the above-mentioned 8 cases the partners with criminal background had already left the group and the remaining partners do not have the history of any documented formal charges brought against them. Also in one case, criminal conviction and jail time served (for a non-political crime) date back to the Soviet era, while no new charges have been brought against the oligarch since the transition began. Since our present purpose is to trace the origins of oligarchs, both these factors are irrelevant.

owners were removed while trying to resist it. Especially the Yukos case ended up in extremely severe ostracism for the oligarchic owner and several of his partners. The remaining case (Bendukidze) is somewhat unclear – he left (in other interpretations, fled) Russia and relinquished ownership as he became a government minister in his native republic of Georgia. If we consider only Yukos and AutoVAZ as genuine expropriation cases, this translates into group expropriation risk of 2.9% per year (4.3%, if Bendukidze is also included). On the individual level, on the other hand, 7 (8, including Bendukidze) of the senior partners out of the total of 41 appear to have been forcefully expropriated since around 1999, the beginning of the observation period we chose while looking into ownership of GR groups. This translates into individual expropriation risk of 2.4% (2.8% if Bendukidze is included) per year, for 7 years.

Using the GR sample probably leads to underestimating the risk of expropriation because it is comprised of only the largest oligarchs and also because it is subject to the “survival bias” – only those groups that were in good standing in Summer 2003 are included, and those are the groups that for various reasons have experienced the lowest attrition rate in recent years. To see how important the latter factor is, we have also looked at the list of 100 most prominent Russian businessmen, chosen by experts in the early 2000 (*Expert*, No. 38, 09.30.2000). Thirty-five oligarchs named in that list had retired by 2005, of which number at least 26 appear to have been removed as a result of expropriation. This translates into the annual rate of expropriation of 4.3%. Fourteen out of these 26 cases were accompanied by severe ostracism that either forced the expropriated oligarch to emigrate or put him in prison. Details are available upon request.

Anecdotal evidence of ostracism suggests that it can mostly happen as a result of either a political support agreement falling apart or a real or perceived breach of trust inside an oligarchic group. The well-known stories of downfalls of some big oligarchic groups (LogoVAZ, Yukos) present examples of the former type of ostracism. As an illustration of the latter type, the case of the group led by Iskander Makhmudov (number 11 in the list in GR, 2005, p. 158) appears to be very instructive. For many years, Jolal Khaidarov had been a senior partner entrusted with managing the Ural Metallurgy, the most prized asset of the group. In the late 1990s rumors started circulating, however, that Khaidarov (an ethnic Chechen) had developed close contacts to some Chechen gangs and was siphoning money out of Ural Metallurgy in his new friends’ interests. We can neither confirm nor deny those rumors, but apparently they were considered to be credible by other partners. Khaidarov was fired from the general manager position, but there

still remained the problem of shares that he owned as a senior partner. In an interview given later in exile to the Russian newspaper “Vedomosti”, Khaidarov described being first approached by a notorious Moscow gang leader with an ultimatum to give up his stake in the company and leave Russia. After he refused, he was arrested on charges including rape and the possession of drugs. The offer was repeated to him while in jail, relayed through detectives in charge of the case. This time Khaidarov obeyed; he was released, and allowed to emigrate (Vedomosti, 08.13.2001).<sup>12</sup>

Finally, a totally different way of estimating the expropriation risk is employed in Braguinsky and Myerson (2006), using the data on country risk premia. For the case of Russia, we estimate it to be equal to 6.9% per year for the 5-year period of 1996-2000.

### **2.3 Insider trust and outside investors**

Our model is based on the assumption that only oligarchs can own valuable assets (subject to the risk of ostracism), while any outside investor not belonging to the oligarchic group faces an almost certain risk of being expropriated right away. Nothing illustrates this logic better than the fate suffered by the famous international investor George Soros, himself originally from Eastern Europe. Soros saw his investments in Russia, including the \$1 billion invested in the telecoms holding Svyazinvest, almost completely destroyed. Soros himself described it as “the worst investment of [his] professional career” (Klebnikov, 2000, p. 282).

In these circumstances, any outside investor who is nevertheless willing to invest must raise the suspicion on the part of an oligarchic owner as being a potential Trojan horse. Sergei Bidash, the general manager of Tagmet, the 4<sup>th</sup> largest producer of steel pipes in Russia learned it in a hard way. Mr. Bidash owned 56% of his company’s shares but he allowed a minority shareholder to also acquire a stake. In 2002, the minority shareholder that turned out to be linked to an aggressive rival oligarchic group filed a law suit in a court in the Siberian city of Krasnoyarsk (about 3,000 miles away, but on the territory controlled by the rival’s businesses) claiming that some of the shares amassed by Mr. Bidash’s investment company had been obtained under false pretexts. The court ordered the seizure of the shareholders' registry, and the aggressor party then held their own shareholders' meeting, appointing a different general

---

<sup>12</sup> In 2004 he reportedly filed a lawsuit against two of his former partners in a Delaware court. As this paper is being written, the case is still pending.

manager. A special police task force arrived to physically take over the general manager's office but workers' vigilantes did not allow this to happen. Mr. Bidash then obtained another court decision, invalidating the decision of the previous court. In the process, however, he had to enlist the help of another large oligarchic group, which then took control of Tagmet and eventually ousted Mr. Bidash. In late 2004 he was charged with alleged murder conspiracy. Mr. Bidash who used to be one of the richest people in Russia became what the Russian press has labeled "a local Khodorkovsky"; as this paper is being written he remains in custody.

### **3. A model of capital and growth with oligarchic property rights**

#### **3.1 The investment problem of an insecure oligarch**

We first present here a modified version of a general model of capital and growth with oligarchic property rights developed in Braguinsky and Myerson (2006). Consider a simple economy where in each region, there is a small group of oligarchs, each of whom is connected to the local government by a relationship of personal trust. Our fundamental assumption is that only these oligarchs can own the capital in each region, or at least some essential fraction of this capital, because the local government will not protect outsiders' ownership claims. Thus, being an oligarch allows an individual to hold valuable local capital. We let  $\pi(t)$  denote the net rate of profit that this local capital yields at any time  $t$ .

As already mentioned, the oligarchs are not perfectly secure in their privileged positions. We assume that each oligarch faces a small independent probability of losing his oligarchic status over any short interval of time. When this happens, all his local assets are confiscated. The time  $\tilde{T}$  until such ostracism is assumed to be an independent exponential random variable with mean  $1/\lambda$  for each oligarch. That is, for anyone who is an oligarch at time 0, the probability of him still being an oligarch in good standing at time  $t > 0$  is  $e^{-\lambda t}$ . This political risk is the only risk that an oligarchic investor faces, and the net profit rate  $\pi(t)$  is assumed to be perfectly predictable.

In this economy, there is a single consumption good that serves as numeraire. The utility function is logarithmic, and future utility is discounted at a rate  $\rho$ . The oligarchs can also invest in foreign bank accounts which yield a risk-free rate of interest  $r$  assumed to be constant over

time and less than or equal to the utility-discount rate  $\rho$ .<sup>13</sup> These accounts are located in countries where the property-rights system makes them safe against political risk. Thus, if an oligarch were ostracized at a time  $t$  when he holds a safe foreign bank account worth  $x(t)$ , then he (or his family) could move abroad and live off the principal and interest from this account.

The oligarch's problem is to formulate a plan for his future investment and consumption which will depend, at any time  $t$ , on how long he has kept his oligarchic status. Denote the wealth of the oligarch, if he still has oligarchic status at time  $t$  (that is, if  $t < \tilde{T}$ ), by  $\theta(t)$ . A fraction,  $x(t)$ , of this wealth will be held in safe foreign banks, and he will consume at some rate  $c(t)$ . Denote the wealth of the oligarch who has lost oligarchic status at time  $t$  by  $\tilde{\theta}(t)$ , some random variable that implicitly depends on the actual time  $\tilde{T} \leq t$  when he was expelled from the oligarchy. All this wealth must be held in foreign banks, but his planned consumption, after losing oligarchic status, depends on this wealth according to some function  $\bar{c}(\tilde{\theta}(t))$ . These functions  $(\theta, x, c, \tilde{\theta}, \bar{c})$  are the decision variables in the oligarch's problem:

$$(1) \quad \begin{aligned} & \text{maximize } EU = E \left( \int_0^{\tilde{T}} e^{-\rho t} \text{LN}(c(t)) dt + \int_{\tilde{T}}^{\infty} e^{-\rho t} \text{LN}(\bar{c}(\tilde{\theta}(t))) dt \right) \\ & \text{subject to } \theta(0) = \theta_0, \\ & \theta'(t) = \pi(t)[\theta(t) - x(t)] + r x(t) - c(t), \quad \forall t \leq \tilde{T}, \\ & 0 \leq x(t) \leq \theta(t), \quad \forall t \leq \tilde{T}, \\ & \tilde{\theta}(\tilde{T}) = x(\tilde{T}), \\ & \tilde{\theta}'(t) = r \tilde{\theta}(t) - \bar{c}(\tilde{\theta}(t)) \text{ and } \tilde{\theta}(t) \geq 0, \quad \forall t \geq \tilde{T}. \end{aligned}$$

The following lemma, proven in Braguinsky and Myerson (2006), characterizes the solution to this optimal planning problem.

*Lemma.* *The optimal solution to (1) satisfies, for all  $t \geq 0$ ,*

$$(2) \quad c(t) = \rho \theta(t) \text{ and } \bar{c}(\tilde{\theta}(t)) = \rho \tilde{\theta}(t),$$

$$(3) \quad x(t) = \frac{\lambda}{\pi(t) - r} \theta(t),$$

$$(4) \quad \theta'(t) = [\pi(t) - \rho - \lambda] \theta(t).$$

---

<sup>13</sup> The inequality  $r \leq \rho$  is justified in Braguinsky and Myerson (2006, Section 5).

The optimal expected discounted utility for an oligarch with initial wealth  $\theta_0$  is

$$(5) \quad \int_0^{\infty} \left\{ \text{LN}(\rho\theta_0 e^{\phi(t)}) + \lambda \text{LN}[\rho\theta_0 e^{\phi(t)} \lambda / (\pi(t) - r)] / \rho + \lambda(r - \rho) / \rho^2 \right\} e^{-(\rho+\lambda)t} dt,$$

$$\text{where } \phi(t) = \int_0^t (\pi(s) - \lambda - \rho) ds.$$

Condition (3) says that the fraction of any oligarch's wealth that is invested locally will be  $1 - \lambda / [\pi(t) - r]$ . With any positive supply of local assets, this fraction must be positive, and so the local profit rate  $\pi(t)$  must always be greater than  $r + \lambda$  in equilibrium. Notice that (2) says that, with logarithmic utility, any investor always consumes at a rate equal to his current wealth multiplied by the discount factor.

### 3.2 Production and wealth accumulation

We now present a dynamic general equilibrium model of the local region where the oligarchs can invest. We assume that there are two kinds of assets in this region: local capital and government offices. Both are subject to the same  $\lambda$  political risk.

The single consumption good in this model is produced from capital and labor according to the standard Cobb-Douglas production function:

$$(6) \quad Y = AL^\alpha K^{1-\alpha},$$

where  $Y$  is the flow of output,  $A > 0$  and  $\alpha \in (0, 1)$  are some given constants, and the supply of labor  $L$  is constant and inelastic. The total supply of local capital at any time  $t$  is denoted by  $K(t)$ . Assuming labor mobility within a country, workers must be paid a wage rate  $w(t)$  that is equal to the marginal product of labor

$$(7) \quad w(t) = \partial Y / \partial L = (1 - \alpha) A (K(t) / L)^{1-\alpha},$$

and so the gross profit rate  $R(t)$  that can be earned by each unit of capital at time  $t$  is

$$(8) \quad R(t) = (Y(t) - w(t)L) / K(t) = (1 - \alpha) A (L / K(t))^\alpha.$$

We assume that new capital can be made directly from the consumption good on a unit-per-unit basis. But once capital has been made, it is not malleable and only depreciates at a given rate  $\delta$ , so that  $K'(t) \geq -\delta K(t)$ . We allow that capital may be sold in this economy, but only to buyers who can protect their ownership claims. Let  $q(t)$  denote the price of local capital in terms of the consumption good numeraire. The possibility of new investment implies that  $q(t)$

cannot exceed 1. When  $q(t) < 1$ , nobody would produce new capital, implying  $K'(t) = -\delta K(t)$ .

So at each time  $t$  we must have

$$(9) \quad K'(t) \geq -\delta K(t) \text{ and } q(t) \leq 1, \text{ with at least one equality.}$$

We want to discuss two different dimensions on which imperfect property rights might vary: the degree of political risk faced by oligarchs, and the fraction of capital that must be owned and financed by local oligarchs. The first dimension is captured by the parameter  $\lambda$  in the previous subsection. The second dimension can be introduced by allowing oligarchs to invite outside partners to finance some fraction of their local capital. To be specific, suppose that an oligarch may finance part of his local capital holding by borrowing from outside creditors, and offering his capital as collateral, but only up to a given fraction  $\beta$ . The fraction  $\beta$  represents the portion of local capital to which people outside the local oligarchy can be given some secure rights.<sup>14</sup> An oligarch who defaulted on his debts to outside creditors could conceal a fraction  $1 - \beta$  of his local capital from them, but the creditors could take at least temporary control of the fraction  $\beta$  and sell it to other oligarchs to recover the value of their investment  $\beta q(t)$ .

The enforcement of outsider creditor's claims depends on the oligarch's debts being recognized as legitimate by others in the oligarchy, which might not hold after the debtor has been expelled from the oligarchy. So we assume that, when an oligarch's assets are expropriated, his outside creditors' or partners' claims to the  $\beta$  fraction of his local capital are also expropriated. With the given risk-free interest rate  $r$  in world financial markets, well-diversified investors should be willing to hold small shares in any oligarch's idiosyncratic political risk provided that he pays the interest rate  $r + \lambda$ , to cover the expected expropriation cost  $\lambda$  per unit time. Since the rate of net profit  $\pi(t)$  on local assets is always greater than  $r + \lambda$  in equilibrium, each local oligarch will always choose to mortgage the maximal  $\beta$  fraction of his local capital investments, and so the value of his debt per unit local capital he owns will always be equal to  $\beta q(t)$ . That is, every unit of local capital will take an investment  $(1 - \beta)q(t)$  from its owner and will return him the net income stream  $R(t) - q(t)\delta + q'(t) - \beta q(t)(r + \lambda)$ , where  $q'(t)$  is capital gain in the value of local capital assets. Hence, the net profit rate on oligarchs' investments in local capital,  $\pi(t)$ , is

---

<sup>14</sup> Collateralized debts need not be necessarily owed to foreign investors. It is essential, however, that collateralized loans are made through safe bank accounts, because otherwise an oligarch would not be able to collect on the loans he is making to other oligarchs in case he is ostracized.

given by

$$(10) \quad \pi(t) = \frac{R(t) - q(t)\delta + q'(t) - \beta q(t)(r + \lambda)}{(1 - \beta)q(t)} = \frac{(1 - \alpha)A(L/K(t))^\alpha - q(t)\delta + q'(t) - \beta q(t)(r + \lambda)}{(1 - \beta)q(t)}.$$

Expropriated capital that has been taken from former oligarchs is reallocated through the political sector: government officials sell the newly expropriated capital to other oligarchs. This income stream from expropriated capital gives a value to government offices, and oligarchs can buy or sell these offices like capital. Like local capital, government offices would be expropriated from an individual who loses his oligarchic status. The profits from reselling these expropriated offices accrue to other government officials.

Let  $G(t)$  denote the total value of all government offices at any time  $t$ . We think of the number of oligarchs as a small fraction of the population, but large in numerical terms, so that the flow of expropriated wealth to government officials can be considered as a continuous income flow, subject only to the personal political risk of the recipients. Then the aggregate income accruing to government officials is  $\lambda[q(t)K(t) + G(t)]$ .

Because an oligarch's investment in a government office involves the same personal expropriation risk as his investment in local capital, these political and economic investments must be perfect substitutes for each other. So the net rate of return from investments in government offices must always be exactly the same as the rate  $\pi(t)$  for investments in local capital, implying that the following condition must hold at any time  $t$

$$(11) \quad \pi(t)G(t) = \lambda[q(t)K(t) + G(t)] + G'(t),$$

where  $G'(t)$  is the rate of capital gain in the value of government offices.

At any time  $t$ , let  $X(t)$  denote the total safe foreign bank deposits held by oligarchs from this country. Let  $\Theta(t)$  denote the total wealth of all the oligarchs, so that

$$(12) \quad \Theta(t) = X(t) + (1 - \beta)q(t)K(t) + G(t).$$

From equation (3) in the Lemma., we know that each oligarch holds the same fraction of wealth in safe deposits  $x(t)/\theta(t) = \lambda/[\pi(t) - r]$ . Aggregating over all oligarchs,

$$(13) \quad X(t) = \lambda\Theta(t)/[\pi(t) - r].$$

At any time  $t$ , the total oligarchic wealth  $\Theta(t)$  is just the sum of the wealths  $\theta(t)$  of all individual oligarchs. In equation (4), we saw that the any individual oligarch's wealth grows at the rate of  $\theta'(t) = (\pi(t) - \rho - \lambda)\theta(t)$  at any time  $t$ , as long as he retains his status in the oligarchy.



But individuals are losing oligarchic status over time at the rate  $\lambda$ , and so  $\lambda\Theta(t)$  must be subtracted from each individual's expected contribution to the aggregate  $\Theta'(t)$ .<sup>15</sup> Hence, the growth of total oligarchic wealth is

$$(14) \quad \Theta'(t) = (\pi(t) - \rho - 2\lambda)\Theta(t).$$

To sum up, the dynamic behavior of  $(\Theta, K, X, G, q)$  in this economy is characterized by equations (10)-(14) and the investment conditions (9) on  $K'$  and  $q$ . The authors have provided a spreadsheet file that numerically solves this dynamic model.<sup>16</sup>

### 3.3 The long-run steady state

The growth equation (14) implies that in a long-run steady state, the net profit rate for oligarchs' local investments must be

$$(15) \quad \pi^* = 2\lambda + \rho.$$

Since in the long-run steady state the return to capital is a stable constant, the capital stock itself must be constant. To replace depreciating capital there must be ongoing investment, so that the price of capital  $q(t)$  must be constant and equal to 1. All the steady-state values are then easily derived from equations (9)-(14):

$$(16) \quad R^* = (1 - \beta)\pi^* + \beta(r + \lambda) + \delta = 2\lambda + \rho + \delta - \beta(\lambda + \rho - r),$$

$$(17) \quad K^* = L(A(1 - \alpha)/R^*)^{1/\alpha},$$

$$(18) \quad w^* = \alpha A(K^*/L)^{1-\alpha}$$

$$(19) \quad G^* = \lambda K^*/(\pi^* - \lambda) = \lambda K^*/(\lambda + \rho),$$

$$(20) \quad X^* = \frac{\lambda[(1 - \beta)K^* + G^*]}{(\pi^* - r - \lambda)} = \frac{\lambda[2\lambda + \rho - \beta(\lambda + \rho)]K^*}{(\lambda + \rho - r)(\lambda + \rho)},$$

$$(21) \quad \Theta^* = X^* + (1 - \beta)K^* + G^* = \left( \frac{2\lambda + \rho - r}{\lambda + \rho - r} \right) \left( \frac{2\lambda + \rho - \beta(\lambda + \rho)}{\lambda + \rho} \right) K^*.$$

By equations (16)-(18), a decrease in the political risk parameter  $\lambda$  would cause a decrease in the returns to capital  $R^*$ , which in turn will imply an increase in the capital/labor

---

<sup>15</sup> When an oligarch is ostracized, his personal loss is only  $\theta(t) - x(t)$ , but he takes his remaining wealth  $x(t)$  with him out of the aggregate wealth of all oligarchs

<sup>16</sup> Available at <http://pluto.fss.buffalo.edu/classes/eco/sb56/oligarx.xls>

ratio  $K^*/L$  and an increase in the wage rate  $w^*$ . Thus, workers benefit from better protection of oligarchic property rights. Increasing the fraction  $\beta$  of capital that can be financed by outside investors decreases the steady-state gross profit rate  $R^*$  in proportion to the quantity  $\lambda + \rho - r$ . So in the general case where  $\lambda > 0$ , a relaxation of the borrowing constraint (increasing  $\beta$ ) causes a decrease in  $R^*$ , which in turn increases the capital/labor ratio  $K^*/L$  and increases the wage rate  $w^*$ . Thus, workers benefit from increasing the local capitalists' ability to borrow against their capital.

#### 4. Transitional depression and turnaround when capital is immobile

##### 4.1 The initial conditions for the transition to a market economy

We now apply our model to the transition to a market economy in Russia. Based on our earlier discussion, we assume that capital in the late stages of the planned economy was already controlled by an oligarchy rather than by the “state”. To make things simple, we also assume that the oligarchs faced the same political risk of expropriation  $\lambda$  before and after the start of the transition.<sup>17</sup> The crucial difference is that under the planned economy, oligarchs did not have opportunities for safe investment.<sup>18</sup> This can be captured in our model by making the safe interest rate  $r$  very negative. Also, there were no outside investors, so  $\beta = 0$  for the planned economy. As before, capital confiscated from any former oligarch is reallocated through government offices, and we also assume that competition for workers compels the oligarchs to pay the competitive wage rate (8), which determines the rate of return to capital as in (9).<sup>19</sup>

---

<sup>17</sup> The collapse of Communism might have changed  $\lambda$  but the direction of the change is not clear. On the one hand, property rights became less secure because of a general deterioration of law and order. On the other hand, the communist authority was itself a major source of political risk for Soviet oligarchs.

<sup>18</sup> Soviet oligarchs did try to hedge risks by hoarding literally all what they could hoard. In one example, “among the valuables collected by the mayor of Sochi, Voronkov, there were in his Alladin’s cave, alongside the gold and diamonds, pairs of three-rouble cufflinks, two-rouble tie-pins, also still bearing their price tags.” (Vaksberg, 1991, p. 27) But the opportunities were still limited as compared to those that opened up after the collapse of Communism, so we choose to ignore them in our model. Even the low-carat gold the Soviet oligarchs had access to commanded almost no value outside the Soviet Union (*ibid.*, p. 250).

<sup>19</sup> The official part of the planned economy obviously did not have competitive labor markets. But wages in the parallel (underground) economy were mostly competitive. Especially in the final years of the planned economy, a significant number of workers could choose the allocation of time between the official and parallel economies, so

We assume that by the time of its collapse, the planned economy had already reached its long-run steady state. Thus, the price of local capital must be  $q=1$ , and with  $\beta = 0$ , our steady-state equations (15)-(18) yield values of  $\pi^*$ ,  $R^*$ ,  $K^*$ , and  $w^*$  that do not depend on the interest rate  $r$ . In the steady state, the only effect of taking  $r$  to  $-\infty$  is that the oligarchs' safe foreign assets  $X^*$  go to 0. More intuitively, if the oligarchs have no way to hedge against the risk of expropriation, then the political risk rate will be effectively added to their rate of discounting the future, increasing their consumption rate per unit wealth from  $\rho$  to  $\rho + \lambda$ . In other words, while an oligarch's consumption as a common worker after being purged might be infinitesimal in comparison with what he enjoys as an oligarch, this will not affect his investment decision as an oligarch, when he has no way to save any wealth for himself after a purge. So for the oligarchs to maintain constant aggregate wealth after consumption and expropriation, the steady-state net return to local capital must still be  $\pi^* = 2\lambda + \rho$ . We thus have

*Proposition 1. The steady-state net return to local capital, capital/labor ratio and wage rate are the same in the closed planned economy and in the post-planned oligarchic economy, provided that political risk  $\lambda$  stays the same and that collateralizability of debt  $\beta$  remains equal to zero. These steady-state capital  $K^*$  and wages  $w^*$  are decreasing functions of  $R^*$ , and so workers would benefit from a decrease of  $\lambda$  or an increase of  $\beta$ .*

## 4.2 Two phases of transition to a market economy

The collapse of the planned economy that occurred in the early 1990s gave the oligarchs an opportunity to invest in safe foreign assets for the first time. Our model implies that when  $\beta$  and  $X(0)$  are both small (so that the oligarchs begin with a shortage of safe foreign deposits), the dynamic equilibrium path of the transitional economy has two phases. In the first phase, from time 0 until some later time  $T$ , the oligarchs invest nothing in local capital but send all their savings abroad into safe bank accounts. During this phase, the dynamics of the capital stock is determined by the depreciation rate:

$$(22) \quad K'(t) = -\delta K(t), \text{ and so } K(t) = K_0 e^{-\delta t} \text{ for all } t < T.$$

---

for the marginal workers the returns must have been more or less equal. Note that an official job gave access to subsidized housing, on-the-job consumption and other fringe benefits that made its total compensation much higher than the official wage.

After time  $T$ , the oligarchs will begin investing in new local capital, and so

$$(23) \quad q(t) = 1 \text{ and } q'(t) = 0 \text{ for all } t \geq T.$$

Suppose for a moment that we have guessed what will be this critical time  $T$  when the decline of the capital stock ends. With condition (23), the equations (10)-(14) that determine the path of the economy are the same as for the case of mobile capital that we studied in our previous paper (Braguinsky and Myerson, 2006). Using the methods of that paper, the conditions at time  $T$  and the entire path of the economy after time  $T$  can be determined from the initial capital stock  $K(T) = K_0 e^{-\delta T}$ , once  $T$  is known. Thus, given the value of  $K(T)$ , we can find the values of  $X(T)$ ,  $G(T)$ , and  $\Theta(T)$  that can constitute the initial conditions of a dynamic equilibrium with condition (23).

Now consider the situation before time  $T$ . By equation (13), the local profit rate  $\pi$  must always satisfy

$$(24) \quad \pi(t) = r + \lambda \Theta(t)/X(t).$$

Then equation (10) gives us a differential equation for the price of capital  $q(t)$  before time  $T$ :

$$(25) \quad q'(t) = q(t) \left[ (1 - \beta)\pi(t) + \beta r + \delta \right] - (1 - \alpha)A(L/K(t))^\alpha$$

The growth rate for the oligarchs' total wealth  $\Theta(t)$  from equation (14) is given by

$$(26) \quad \Theta'(t) = (\pi(t) - 2\lambda - \rho)\Theta(t).$$

By (11), the value of government offices  $G(t)$  can be computed from

$$(27) \quad G'(t) = \pi(t)G(t) - \lambda \left[ (1 - \beta)q(t)K(t) + G(t) \right].$$

The bank deposits  $X(t)$  can be determined from  $\Theta(t)$ ,  $K(t)$  and  $G(t)$  by

$$(28) \quad X(t) = \Theta(t) - (1 - \beta)q(t)K(t) - G(t).$$

With equations (22), (24), and (28), the differential equations (25)-(27) can be solved backwards from time  $T$  to time  $0$ , and our guess for  $T$  will be correct if it yields the given initial value of  $X(0)$ . If not, the guess is adjusted until the correct value of  $X(0)$  is obtained. The spreadsheet file provided by the authors (see footnote 17 above) numerically solves the model in this way.

### 4.3 A numerical example

We now demonstrate the power of our model by analyzing a numerical example. We consider a standard set of values for the basic parameters given by

$$(29) \quad \alpha = 0.6, \quad \delta = 0.03, \quad \rho = 0.05, \quad A = 0.7137, \quad L = 1.$$

It is shown in the multi-country general equilibrium model in Braguinsky and Myerson (2006) that with these parameters, if all countries had perfect enforcement of property rights (that is, if  $\lambda = 0$  everywhere) then a steady-state equilibrium would have interest rate  $\bar{r} = \rho = 0.05$ , gross profit rate  $\bar{R} = \rho + \delta = 0.08$ , capital/labor ratio  $\bar{K}/L = (A(1 - \alpha)/\bar{R})^{1/\alpha} = 8.33$ , and wage rate  $\bar{w} = \alpha A(\bar{K}/L)^{1-\alpha} = 1$ .

Instead of this ideal world, consider an economy with oligarchic property rights characterized by the political risk parameter  $\lambda = 0.03$  and no collateralizability of local capital, so that  $\beta = 0$ . The value of the risk parameter chosen here approximately corresponds to our estimates rate of expropriation for largest Russian oligarchs mentioned in Section 2.3. This is a rather low risk rate – with  $\lambda = 0.03$  each oligarch’s expected time before ostracism is 33.3 years. It is also significantly lower than the value of  $\lambda = 0.069$  estimated for Russia in Braguinsky and Myerson (2006), using the country risk premium. In Section 6 below we discuss the robustness of our results to choosing different values of  $\lambda$ .

**Table 1.** Long-Run Steady-State Values in the Closed Economy

( $\alpha = 0.6$ ,  $\delta = 0.03$ ,  $\rho = 0.05$ ,  $A = 0.7137$ ,  $L = 1$ ,  $r = -\infty$ ,  $\lambda = 0.03$ ,  $\beta = 0$ )

$\pi^*$	$R^*$	$K^*$	$w^*$	$G^*$	$X^*$	$\Theta^*$
0.11	0.14	3.279	0.689	1.23	0	5.509

Table 1 presents the long-run steady state values with the parameters in (29) computed from equations (15)-(23) for  $r = -\infty$  as in the closed economy. As can be seen, oligarchic property rights result in the long-run steady state capital-labor ratio that is less than 40% of what it would be in an ideal economy with perfect enforcement of property rights and the real wage that is 31.1% lower. If  $\lambda$  and  $\beta$  remain unchanged, the transition economy has the same long-run steady state values of  $\pi^*$ ,  $R^*$ ,  $K^*$ ,  $G^*$ , and  $w^*$ . But the oligarchs initially have no wealth abroad, and so their urge to acquire safe foreign assets drives them to export capital. Figures 1 and 2 show the two-phase transition that begins with the oligarchs acquiring the ability to invest abroad at the safe interest rate  $r=0.03$  at the start of the transition.<sup>20</sup>

<sup>20</sup> Using the multi-country general equilibrium framework as in Braguinsky and Myerson (2006), the spreadsheet shows that this would be the long-run steady-state equilibrium interest rate in the world comprised of two equal parts, one with  $\lambda = 0.03$  and  $\beta = 0$ , and the other with  $\lambda = 0$  and  $\beta = 0.6$ .

*[Insert Figures 1 and 2 around here.]*

For the parameter values (29), at the start of the transition, each oligarch would like to immediately sell about 32% of his local capital stock in exchange for safe foreign bank deposits. But with immobile capital, this only causes the collapse of the price of local capital and an extremely high local interest rate. In the dynamic equilibrium of this model, one year after transition we find that the price of local capital is 26% below its replacement cost ( $q(1) = 0.74$ ) and the local interest rate is around 35%. The first phase of capital disinvestment lasts about seven years (from time 0 until time  $T = 7.03$ ), during which period the capital stock declines by 19% (from  $K(0) = 3.279$  to  $K(T) = 2.655$ ) and wages decline about 8%, from  $w^* = 0.689$  to  $w(T) = 0.633$ . Safe deposits abroad, in the meantime, increase from zero to  $X(T) = 1.568$ . The value of government offices jumps down from  $G^* = 1.3$  to about 0.33 shortly after the transition starts because of the sharp decline in the price of local capital, and then  $G(t)$  gradually increases as the price of the local capital recovers.

At time  $T = 7.03$ , the price of local capital recovers to  $q=1$ , and the portfolio of local and safe foreign assets held by the oligarchs reaches the balanced growth path. At this point, the turnaround begins, and the oligarchs' total wealth starts increasing, so that the local capital stock and wage rate gradually climb back to their steady-state values. Still, 20 years after the start of the transition, the capital stock is 9.5% below its initial level, while wages are down by 4% as compared to where they were at  $t = 0$ . Capital outflows also continue, although at a reduced rate.

*Proposition 2. The opening up of a previously closed oligarchic economy to allow oligarchs to invest in safe assets abroad generates a prolonged recession during which there is no investment in local capital stock and the size of capital outflows is limited only by the speed at which the capital stock depreciates. The recession ends when the economy reaches the balanced growth path, and it then takes it many more years to grow back to the original steady state.*

*[Insert Figure 3 around here.]*

Figure 3 illustrates this process with the help of a simple phase diagram in the  $(K,X)$  space. The thick black line depicts the balanced growth trajectory of aggregate local capital

stock and safe foreign assets for the parameter values (29) and  $\lambda = 0.03$ . The square point on this trajectory indicates the steady-state  $K^*$  and  $X^*$  given by (17) and (20). The planned economy has a long-run steady state which has the same  $K^*$  but  $X=0$ . If capital were mobile, immediately after opening up the local capital would jump to the balanced growth path as indicated by the solid gray line. There would be a big one-time decline in local capital and wages, but the economy would start growing back to the original steady state right after it. When capital is fixed, however, the economy has to take a long decline phase, depicted by the dotted black line before it reaches the balanced growth path and starts growing again.

### 5. Effects of opening up to outside investors

The radical solution to the problems of transitional depression and suboptimal growth is, of course, to eliminate oligarchic property rights and the associated political risk. Absent this, the severity of the post-reform depression could still be reduced by increasing  $\beta$ . Consider the case of  $\beta = 0.2$ , with the standard parameter values given by (29) and  $\lambda = 0.03$ . Recall that  $\beta = 0.2$  means that outside investors can trust oligarchs to honor debts of up to one fifth of the value of the capital they offer as collateral. With this very modest degree of credit-worthiness, the period of contraction is reduced in half to 3.5 years, when the capital stock and wage rate bottom out at 89.9% and 95.8% of their initial levels, respectively. During this abbreviated contraction phase, the interest rates are much less extreme than we found with  $\beta = 0$ . With  $\beta = 0.2$ , one year after the transition the local interest rate is  $\pi(1) = 0.174$ . After  $T = 3.5$ , the economy grows to higher long-run steady-state values  $K^* = 3.71$  and  $w = 0.723$  (Table 2).

**Table 2.** Equilibria with Different Borrowing Parameters and  $\lambda = 0.03$

( $\alpha = 0.6$ ,  $\delta = 0.03$ ,  $\rho = 0.05$ ,  $r = 0.03$ ,  $A = 0.7137$ ,  $L = 1$ ,  $K(0) = 3.273$ ,  $X(0) = 0$ )

	T	K(T)	R(T)	w(T)	X(T)	$K^*$	$R^*$	$w^*$	$X^*$	$\pi(1)$	q(1)
$\beta = 0$	7.03	2.655	0.159	0.633	1.568	3.279	0.14	0.689	2.705	0.35	0.74
$\beta = 0.2$	3.53	2.949	0.149	0.660	1.377	3.710	0.13	0.723	2.616	0.17	0.96
$\beta \equiv 0.367$	0.06	3.273	0.140	0.688	1.214	4.144	0.122	0.756	2.506	0.14	1

T denotes the length of the decline phase (in years).

Figure 4 depicts the corresponding phase diagram. At time zero, the oligarchs mortgage the maximum allowed share (20%) of their initial local capital holdings, and immediately gain

possession of the same amount of safe assets abroad. Local capital stock then depreciates for 3.5 years until the balanced growth path (the solid black line) is reached. Note that the new steady state has capital stock higher than the initial one inherited from the planned economy.

*[Insert Figure 4 around here.]*

With our standard parameter values (29), the initial contraction can be completely eliminated if  $\beta \cong 0.367$ . When oligarchs have the ability to borrow a little over 1/3 of the value of their capital, they can immediately purchase safe foreign bank accounts in the amount of  $X = 1.214$ , at which point they are just willing to start investing in local capital again. Thereafter, the economy grows to new long-run steady-state values of  $K^* = 4.144$  and  $w^* = 0.756$ .

So a higher ability of oligarchs to borrow against their capital shortens the decline phase  $T$  and benefits the workers by yielding higher wages from time  $T$  on. An analysis of the oligarchs' welfare is more complicated and requires a numerical analysis of their expected discounted utility as defined by the integral (2). In our previous paper, we showed that, with mobile capital, in some empirically relevant cases a parameter change that improves oligarchic property rights by decreasing political risk  $\lambda$  or by increasing collateralizability  $\beta$  can reduce the oligarchs' aggregate welfare in the dynamic economic equilibrium (see Braguinsky and Myerson, 2006, Proposition 4). With immobile capital, the extreme initial condition of  $X(0)=0$  takes us very far from the steady state, and in this case the oligarchs would be better off if they could borrow capital right after the transition starts. But such borrowing requires credibility that the outside investors will not be expropriated. In our example with  $\beta = 0.367$ , the oligarchs would gain by expropriating the  $\beta K(T)$  claims of outsiders right after time  $T=0$  if they could do so without losing their own  $X(T)$  safe assets abroad, even if the result was that they would have to follow a  $\beta = 0$  equilibrium thereafter. To sum up, we have

*Proposition 3. The length of the transitional depression can be reduced or even eliminated altogether if opening up of the previously closed oligarchic economy also allows some, not necessarily high fraction of local capital stock to be credibly offered by collateral for outside investors. Thus, workers benefit from openness to outside investors, but the oligarchs may not be able to credibly commit not to expropriate those once they have obtained the initial safe assets abroad.*



## 6. Robustness, quantitative predictions, and Russian macroeconomic evidence

Our model with standard parameter values (29), a moderate degree of political risk,  $\lambda = 0.03$ , and no collateralizability of local capital generates a recession lasting for about 7 years, which roughly corresponds to the recession suffered by Russia and other CIS countries after the collapse of the Soviet Union. As can easily be seen from the provided spreadsheet, the length of the depression phase is robust to reasonable changes in the value of the political risk parameter  $\lambda$ . For example, if  $\lambda = 0.02$  (meaning the expected time until expropriation of 50 years), the depression phase lasts 6.7 years, while the capital stock declines by 18% during the depression phase rather than by 19% as with  $\lambda = 0.03$ . On the other hand, the recession lasts 7.16 years when  $\lambda = 0.04$ , (as opposed to 7.03 years in the case of  $\lambda = 0.03$ ). The intuition behind this robustness is straightforward: as political risk rate declines, the steady-state capital stock increases (by 30% when  $\lambda = 0.03$  is replaced by  $\lambda = 0.02$ ), so that it takes longer, for a given depreciation rate, to accumulate enough safe assets abroad and vice versa. This “scale effect” roughly offsets the decline (increase) in the ratio of desired safe assets to local capital assets implied by lower (higher) political risk for reasonable values of  $\lambda$ .

The turnaround that began in the Russian economy in 1999 has been casually associated with changes in political leadership and higher political stability brought about by it. But our model presented here generates a turnaround in about 7 years after the start of the transition, without any changes in the underlying political risk and/or leadership changes. Moreover, since the length of the depression phase is robust to reasonable variations in the risk parameter, our model can also explain the almost simultaneous turnarounds observed elsewhere in the former Soviet republics which may have somewhat different expropriation risks and have not experienced much of a political change in the late 1990s.

We now turn to examining how well our model can be made fit some other aspects of macroeconomic evidence from the transitional economy in Russia.

- *Liquidity constraints*

Our model predicts very tight liquidity constraints in the initial years of transition, implying high local interest rates on loans denominated in foreign currency. With standard parameter values (29) and ( $\lambda = 0.03, \beta = 0$ ), the local interest rates are predicted to be around 35% at the end of the first year of transition, declining to 23-24% by the end of the second year,

to about 13% by the end of the first phase (the beginning of the 8<sup>th</sup> year) and eventually approaching the long-run steady state level of 11% ( $\rho + 2\lambda = 0.05 + 2 * 0.03 = 0.11$ ).

Unfortunately, reliable data on market interest rates on loans denominated in foreign currency are very hard to obtain, especially for the first few years of transition to a market economy in Russia. There were very few such loans made on commercial basis, if at all, during those years. In Table 3 we have presented the best estimates we could obtain from newspaper sources in Russia for the years 1993-1996, plus the Central Bank of Russia series of average rates on short-term credits extended by Russian credit institutions in U.S. dollars, which starts from 1998. We have not been able to obtain any data for the first year of transition, 1992, and also for 1997. It should be noted that the data for 1993-96 and 1998-2004 come from different sources, so they are not directly comparable (see the on-line spreadsheet provided by the authors for details).

**Table 3.** Short-term interest rates on loans denominated in U.S. dollars, % per annum.

Year	Corporate borrowers		Individual borrowers	
	From	To	From	To
1993	12.8%	25.8%	N/A	
1994	16.9%	27.5%	N/A	
1995	17.9%	34.8%	N/A	
1996	N/A		34.2%	38.7%
1997	N/A		N/A	
1998	12.8%		20.3%	
1999	11.2%		16.8%	
2000	11.9%		13.1%	
2001	11.6%		11.0%	
2002	10.5%		11.1%	
2003	9.5%		10.5%	
2004	8.3%		11.2%	

Notes: the data for 1993-1996 are based on interest rates advertised by the two leading Russian banks at the time, Incombank and Alpha bank in *Kommersant* daily newspaper, various issues. Since 1998 the Central Bank of Russia has been publishing its own series on “average rates on short-term credits extended by Russian credit institutions, in \$” at [http://cbr.ru/eng/statistics/credit\\_statistics/print.asp?file=average\\_rates\\_e.htm](http://cbr.ru/eng/statistics/credit_statistics/print.asp?file=average_rates_e.htm). Table 3 presents yearly averages based on that series. N/A means that the corresponding data are not available.

Both of the Russian Central Bank series for 1998-2004 seem to exhibit the qualitative pattern predicted by our model. There is a clear trend toward declining interest rates in the late 1990s – early 2000s. Moreover, it does look as if overall, the interest rates in the late 1990s are lower than in the first half of the 1990s, although, as already mentioned, the data come from different sources.

We also interviewed expert sources in Russia, and their opinion was that both the advertised interest rates by commercial banks in the early 1990s and the more recent Central Bank data understate the true interest rates. In the opinion of Mr. Vitaly Shvydko, head of the Industrial Policy Research Group in Moscow, the interest rates on genuine arms-length foreign currency loans in the early 1990s could have been as high as 50% or even 80% per annum. He says that more recently the interest rates for such loans appear to have stabilized at around 20-25%. If this expert opinion is correct, it points to a much higher subjective discount rate or expropriation risk rate than we have assumed in our baseline numerical example or both. We will come back to this issue in a moment.

One feature of the data in Table 3 (confirmed also by the expert opinions) that seems to run contrary to our theoretical model is that the interest rates do not seem to be declining in 1993-95; if anything, they appear to be increasing. This might be explained by very large and volatile appreciation of the real exchange rate of the ruble against the US dollar that created a huge wedge between nominal and real interest rates on foreign currency loans in those years.<sup>21</sup>

While the evidence on interest rates should thus be treated with a strong degree of caution, there is other, more direct evidence that liquidity constraints faced by the oligarchs during the first stage of transition have been considerably relaxed. As mentioned in Section 2, the Russian enterprises relied on non-monetary exchange (barter and other similar forms) for 40-50% of their transactions in the early-mid 1990s, while in the recent years the share of non-monetary transactions has declined to less than 10% (*Russian Economic Barometer*, 2004).

- *Local capital stock and capital outflows*

Our model predicts that during the recession, there is no investment in local capital stock, which only depreciates, and that there should be large capital outflows as oligarchs scramble to

---

<sup>21</sup> The nominal exchange rate of the US dollar against the Russian ruble increased by 300.5% in 1993, 284.7% in 1994, and 130.7% in 1995, while the GDP deflator increased during the same years by 988.1%, 407.7%, and 278.2%, respectively (see the on-line spreadsheet provided by the authors for details). This translates into increases in the real exchange rate of the ruble against the US dollar of 69.6%, 30.2%, and 53.0%, respectively. Thus, even nominal dollar interest rates in the range of 50-60% per annum would be barely positive in real terms, for that part of lenders' money that is spent in Russia. Our model then predicts that nominal interest rates on loans in US dollars might easily have been in the range of 80% per annum, which is close to the upper bound suggested by experts. More recently, the real exchange rate has been on the average much more stable and predictable.

accumulate safe assets abroad. After the turnaround, on the other hand, the economy is on the balanced growth path, so that there is *both* new investment in local capital stock and continued capital outflows, although at a reduced pace. We now examine how these predictions relate to actual macroeconomic evidence.

**Table 4.** Changes in the age structure of fixed capital stock in Russian manufacturing

Years	Average annual rates of change in shares of different age groups in total					Average age increase, years per 5-years
	Less than 5 years	6-10 years	11-15 years	16-20 years	More than 20 years	
1995-99	-0.263	-0.071	0.054	0.081	0.105	4.32
2000-04	0.140	-0.244	-0.080	0.038	0.088	3.69

Source: our calculations based on Russian statistical yearbooks (details in on-line spreadsheet)

As reported by the Russian State Statistical Committee, the average age of the capital stock in the manufacturing sector increased from 11.3 years at the start of the transition (January 1992) to 17.01 years by the end of the decline phase (January 1999). This is an increase of almost 6 years during a 7-year time interval. Moreover, the aging of the capital stock was almost uniform across all age categories during that period. The average age of the capital stock has continued to increase even after the turnaround, but the pace of aging has slowed down. As can be seen in Table 4, the average age of the fixed capital stock in Russian manufacturing had increased by 3.69 years during the first 5 years after the turnaround, with most recent available data for 2004 showing aging by 0.6 years per annum. More importantly, Table 4 and the on-line spreadsheet that contains annual data show that while the share of newer capital stock (aged 5 years or less) had been steadily declining during the first phase of the transition, this tendency has been overturned since 2001. In other words, Russian manufacturing started installing new capital equipment at the turn of the century virtually for the first time after the collapse of the Soviet Union in 1991.

As for capital outflows, those are, of course, quite difficult to capture with any degree of precision but there have been several estimates produced by researchers for early years of the transition to a market economy in Russia, while the Russian central bank has since come up with estimates of its own that cover the period starting with 1994 and are constantly being updated on its website (see Appendix 2 for details). These estimates are presented in Table 5.

As can be seen from Table 5, capital outflows continue after the end of the decline phase, but they also appear to be somewhat declining, in line with the predictions from our model.

**Table 5.** Capital outflows from Russia, 1992-2004.

Years	Billions of US dollars		GDP (billions of rubles)	Exchange rate (average for the year, rubles per \$)	GDP in US dollars (at the average exchange rate for the corresponding year)
	Net capital outflow	Accumulated			
	A	B			
1992	15.0	15.0	19.0	0.3	67.1
1993	15.0	30.0	171.5	0.9	185.1
1994	12.4	42.4	610.7	2.0	304.2
1995	10.7	53.1	1,540.5	4.6	338.3
1996	25.1	78.2	2,145.7	5.1	419.6
1997	25.9	104.1	2,479.0	5.8	428.6
1998	15.7	119.8	2,741.3	9.7	282.4
1999	16.5	136.3	4,766.8	24.6	193.8
2000	22.8	159.1	7,063.4	28.1	251.2
2001	16.2	175.3	9,039.4	29.2	309.9
2002	10.6	185.9	10,817.5	31.4	345.1
2003	12.2	198.1	13,201.1	30.7	430.1
2004	11.5	209.6	16,778.8	28.8	582.3

**Source:** our estimates for 1992-1993; Central Bank of Russia estimates for 1994-2004 (see Appendix for details)

We can actually take the test of the quantitative predictions of our model one step further and ask how well it can match some macroeconomic ratios. With regard to local capital stock, disinvestment that had happened in Russia during the decline phase resulted in a sharp decline of capital-output ratio (from 2.73 in 1995-99 to just 1.20 in 2000-2004 – see the on-line spreadsheet). With regard to capital outflows, the data presented in Table 5 suggest that by the end of the decline phase (around the turn of the century) accumulated capital flight from Russia since the start of transition stood at about \$140-160 billion. By 2004 this had increased by about \$50 billion to the total of \$210 billion or so. The Russian GDP in US dollars calculated at the market exchange rate, on the other hand, averaged \$332.5 billion in 1995-1999 and \$383.7 billion in 2000-2004 (we are taking 5-year averages to smooth out fluctuations caused by yearly fluctuations in the real exchange rate). This gives the ratio of accumulated capital outflow to GDP of about 0.41 in 1999, and of about 0.55 in 2004.

Our baseline numerical example with parameter values (29) and ( $\lambda = 0.03, \beta = 0$ ) gives the capital-output ratio starting from 2.86 and declining to  $K(T)/Y(T) = 2.52$  by the end of the decline phase. This matches the first half of the 1990s reasonably well, but after that, the model

predicts that the ratio of K/Y should start increasing again toward the implied long-run steady state ratio of 2.86. This seems to significantly overpredict the actual capital-output ratio for more recent years. Given that the Russian economy inherited from the former Soviet Union a bulk of capital stock that was not useful from any economic point of view, matching the more recent capital-output ratio seems to be more important.

The baseline example also predicts the ratio of safe foreign assets to output ratio at the end of the decline phase  $X(T)/Y(T) = 1.57$  and the long-run steady state ratio of  $X^*/Y^* = 2.36$ . Once again, this prediction seems to be way too high as compared to the available estimates of actual accumulated capital flight.<sup>22</sup>

In order to match the recent capital-output ratio and the ratio of safe foreign assets to output estimated from the macroeconomic data we need to re-calibrate our model using the following parameter values:

$$(30) \quad \alpha = 0.7, \quad \delta = 0.015, \quad \rho = 0.17, \quad r = 0.14, \quad A = 1.11, \quad L = 1.$$

We still retain the value of the political risk parameter  $\lambda = 0.03$  as before, and continue to assume no collateralizability of debt, so that  $\beta = 0$ . When our model is calibrated using these new parameter values, the depression phase still lasts about 7 years, and the capital-output ratio at the end of the depression phase is equal to 1.14, which roughly corresponds to what we see in the Russian data. Moreover, the ratio of  $X(T)/Y(T)$  is predicted to be equal to 0.5, while the ratio 5 years after the end of the decline phase,  $X(T+5)/Y(T+5) = 0.57$  (the long-run steady state ratio  $X^*/Y^*$  is predicted to be equal to 0.7).

Thus, in order to more or less closely match the recent capital-output and accumulated capital outflow-output ratios estimated from the data we need to employ parameter values as in (30) which have lower depreciation rate of local capital stock and much higher both subjective discount rate and safe interest rate on foreign currency assets. While especially assuming 14% safe interest rate may at first seem implausible, it should be noted that “safe” in the context of our model means safe from local expropriation risk – granted that, Russian oligarchs may well be holding their foreign currency assets in the form of high-risk, high-return investments (that is, not “safe” at all according to the conventional definition). Anecdotal evidence and our

---

<sup>22</sup> It should be noted, however, that some of the safe assets are kept in hard currency cash in Russia itself and are presumably not fully captured by the above estimates. Inasmuch as this is true, the actual X/Y ratio in Russia is higher than estimated here.

interviews in Russia suggest that Russian investors do indeed consider truly safe interest rates in world financial markets to be unacceptably low, and they do indeed exhibit much greater risk tolerance than conservative Western investors, provided only they can hedge the risk of outright expropriation. Also, while the depreciation rate of 1.5% might seem low, Russian statistical yearbooks put the “coefficient of renovation” of fixed capital stock in the manufacturing (defined as the ratio of newly installed capital stock during a given year to the total outstanding fixed capital stock at the end of the same year) at about 1.6% even after during most recent, post-turnaround years (see the on-line spreadsheet). The “coefficient of liquidation” (the ratio of scrapped capital stock during a given year to the total outstanding fixed capital stock at the end of the same year) has been reported even lower, at about 1.4%.

## **7. Conclusions**

We have presented a theoretical model that shows how the collapse of communism that gave post-Soviet asset owners the chance to hedge against the risk of expropriation by building up assets abroad inevitably had to produce a long initial decline phase during which local capital stock, output and wages all decline. As the oligarchs reach the desired ratio of foreign assets to their local asset holdings, the economy starts growing again, but this growth is suboptimal and is accompanied by more capital outflows. To our best knowledge, the model presented here is the only one that is capable of explaining both the initial decline after the start of the transition to a market economy and the subsequent recovery, observed not only in Russia but in most other former Soviet republics, without relying on extraneous factors.

Our model also shows that even if the oligarchic property rights system inherited from the collapsing planned economy could not have been changed radically, the transitional depression could have still been mitigated, if not avoided altogether, by allowing outside investment in local capital stock. This insight might lead to useful policy implications for some other possible future cases, especially in developing economies. The fact that local oligarchs are really short on foreign assets at the start of the transition, oligarchic governments, acting in the collective interest of all oligarchs, would view some limited foreign investment quite favorably at that stage. The model implies, however, that as the economy reaches the balanced growth path, oligarchs as a class will be much less interested in attracting foreign investments and would prefer to renegotiate any earlier guarantees that might have been given to such investors. Thus, it

might be essential for reformist forces inside oligarchic countries themselves and the international community to try to help resolve the collective action problem with regard to attracting foreign investment in those countries early on because at a later stage the controlling oligarch will have much less incentives to do so. In line with this prediction from our model, attitude towards foreign investment on the part of the Russian government worsened considerably around the turn of the century, coinciding with the beginning of an economic turnaround. For example, the arrest and subsequent conviction of the owners of the giant oil company Yukos followed immediately in the wake of the announcement of their intention to sell a large stake in the company to foreign investors. As this paper is being written, Russia is passing legislation drastically limiting the participation of foreign capital in exploring its natural resources. Once again, such a shift of attitude from embracing foreign capital to harassing it has not been limited to Russia alone. In two recent articles, the *Wall Street Journal* reported similar problems in another former Soviet republic of Kazakhstan and even in Romania, despite its pending membership in the European Union (“Kazakh Honeymoon Is Over”, June 2, 2005; “Romania’s Probe of Big Oil Firm Prompts Concerns”, June 6, 2005).

Of course, our model cannot capture all the macroeconomic phenomena that have happened since Russia started its transition to a market economy nearly 15 years ago. The biggest discrepancy between the model and the reality is the reported cumulative decline in the GDP (of about 30% between 1992-1998) that cannot be reconciled with less than 20% decline in capital stock in the simple model using a Cobb-Douglas production function with full employment. In particular, the model we present here leaves out all the effects of structural readjustment, of the collapse of demand in the military-industrial sector and of state-sponsored large-scale construction. The model also ignores the big realignment of relative prices and the effects of huge fluctuations of the exchange rate that accompanied the transition to a market economy. What *is* in fact surprising, thus, is that a model that ignores all these no doubt extremely important factors can still predict the qualitative picture and in some cases (such as the decline of capital stock and the magnitude of capital outflows) even quantitative data reasonably well. We believe, therefore, that the model presented in this paper provides an important and so far largely neglected insight into why the depression had to be so deep and protracted and into the nature of the recent turnaround. The transition to a market economy inevitably had to involve a decline in many industries built under the planned economy and scrapping useless



capital. But instead of focusing on this restructuring, the oligarchic owners of the Russian economy scrambled to build insurance deposits abroad and ignored long-term investment opportunities inside Russia, making transition much longer and more painful.

Similarly, the model strongly suggests that the resumption of growth in recent years may have little to do with changes in political leadership or with the reassertion of “law and order”; if our logic is correct, this would have happened in any case, simply because the oligarchs have by now reached the long-term balanced growth path of their local and safe foreign asset holdings. If this is so, Russia may be looking at more years of suboptimal growth, capital outflows and increased isolationism (hostility towards incoming foreign capital). The underlying problem of oligarchic property rights must be addressed in order to avoid this scenario.

### **References:**

- Acemoglu, Daron, 2004. “The Form of Property Rights: Oligarchic vs. Democratic Societies.” National Bureau of Economic Research (Cambridge, MA) Working Paper, No. 10037.
- Alesina, Alberto and Guido Tabellini, 1988. “External Debt, Capital Flight and Political Risk”. *NBER Working paper No. 2610*.
- Boycko, Maxim, Andrei Shleifer and Robert W. Vishny, 1993. “Privatizing Russia”, *Brookings Papers on Economic Activity*, Vol. 2, 139-181.
- Braguinsky Serguey and Roger Myerson, 2006. “Capital and Growth With Oligarchic Property Rights”. Unpublished.
- Braguinsky, Serguey and Yavlinsky, Grigory, 2000. *Incentives and Institutions. The Transition to a Market Economy in Russia*. Princeton University Press, Princeton, New Jersey.
- The Central Bank of the Russian Federation Official Web site  
[http://www.cbr.ru/eng/statistics/credit\\_statistics/](http://www.cbr.ru/eng/statistics/credit_statistics/)
- Cooper, William H., and John P. Hardt. “RL-30934: Russian Capital Flight, Economic Reforms, and U.S. Interests: an Analysis.” CRS Report for Congress, March 10, 2000.
- Guriev Sergei and Andrei Rachinsky, 2005. “The Role of Oligarchs in Russian Capitalism.” *Journal of Economic Perspectives*, 19 (1), 131-150.
- Hafer, Catherine, 2006. “On the Origins of Property Rights: Conflict and Production in the State of Nature.” *Review of Economic Studies*, forthcoming.

- Hoffman, David E., 2002. *The Oligarchs. Wealth and Power in the New Russia*. Public Affairs, New York.
- Klebnikov Paul, 2000. *The Godfather of the Kremlin*. Harcourt, Orlando, Florida.
- Lucas, Robert E. Jr., 1990. "Why doesn't Capital flow from Rich to Poor Countries?" *American Economic Review*, 80 (2), pp. 92-96.
- North, Douglass C., 1981. *Structure and Change in Economic History*. W.W. Norton & Company, New York.
- Polishchuk, Leonid and Savvateev, Alexei, 2004. "Spontaneous (Non)Emergence of Property Rights." *Economics of Transition*, Vol. 12, pp. 103-127.
- Roland, Gerard, 2000. *Transition and Economics. Politics, Markets and Firms*. The MIT Press, Cambridge, Massachusetts.
- The Russian Economic Barometer*, 2004. Institute of World Economy and International Relations, Russian Academy of Sciences.
- Shleifer, Andrei and Daniel Treisman. "A Normal Country: Russia After Communism", *Journal of Economic Perspectives*, 19 (1), 151-174.
- Sicular, Terry, 1998. "Capital Flight and Foreign Investment: Two Tales from China and Russia", *The World Economy*, Vol. 21, No. 5, 589-602.
- Sonin, Konstantin, 2003. "Why the Rich May Favor Poor Protection of Property Rights?" *Journal of Comparative Economics*, 31 (4), pp. 715-731.
- Vaksberg, Arkady, 1991. *The Soviet Mafia*. St. Martin's Press, New York.
- Varese, Federico, 2001. *The Russian Mafia. Private Protection in a New Market Economy*. Oxford University Press, Oxford.

### Appendix 1. Russian oligarchs: some background information

Table A1. Updated Table 1 from Guriev and Rachinsky, 2005, p. 133.

No.	Senior partners: GR (updated)	Past	Major sector	Firm(s)	In control as of end 2005?
1	Deripaska O	Chernoy L, Chernoy M	Aluminum, auto	Base Element, Rusal	Yes
2	Abramovich R	Berezovsky B	Oil	Sibneft	Yes
3	<i>Kadannikov V</i>	<i>Berezovsky B</i>	<i>Auto</i>	<i>Avtovaz</i>	<i>No</i>
4	Melnichinko A, Popov S, Pumpyansky D		Coal, pipes, chemical	MDM	Yes
5	Alekperov V, Tsvetkov N		Oil	Lukoil	Yes
6	Mordashov A	Lipukhin Yu	Steel	Severstal Group	Yes
7	Potinin V, Prokhorov M		Non-ferrous metals	Interros, Norilsk Nickel	Yes
8	Abramov A	Boycko O	Steel	Evrzholding	Yes
9	Blavatnik V, Vekselberg V		Oil, aluminum	Sual-Holding, Renova	Yes
10	<i>Khodorkovsky M</i>		<i>Oil, banking</i>	<i>Yukos, Menatep</i>	<i>No</i>
11	Makhmudov I	Khaidarov D	Non-ferrous metals	Ural Metallurgy	Yes
12	Bogdanov V		Oil	Surgutneftegaz	Yes
13	Rashnikov V	Sharipov R	Steel	Magnitogorsk Steel	Yes
14	Zyuzin I		Steel, coal	Mechel	Yes
15	Lisin V		Steel	Novolipetsk Steel	Yes
16	Smushkin Z, Zingarevich B, Zingarevich M		Pulp	IlimPulp	Yes
17	Tahautdinov S		Oil	Tatneft	Yes
18	Fridman M		Oil, banking	Alfa group	Yes
19	<i>Ivanishvili B</i>	<i>Malkin V, Bykov A</i>	<i>Iron ore</i>	<i>Metalloinvest</i>	<i>No</i>
20	<i>Bendukidze K</i>		<i>Engineering</i>	<i>United Machinery</i>	<i>No</i>
21	Yevtushenkov V		Telecoms	Systema	Yes
22	Yushvayev G, Yakobashvili D, Dubinin M, Plastilin S		Food processing	WimmBillDann	Yes

Note: Four groups where the former owner-oligarch is no longer in control are italicized. Only Ivanishvili's departure appears to have been voluntary. Among 41 past and current senior partners in these groups, 13 are no longer in control. Ivanishvili, Maklin, the Chernoy brothers and Boycko departed peacefully by selling their stakes and hence should not be considered expropriated, and Bendukidze's case remains unclear. The remaining 7 had been expropriated, while 5 (Berezovsky, Khodorkovsky, Khaidarov, Sharipov and Bykov) were also severely ostracized (forced into exile and/or sentenced to jail time).

**Table A2.** Some characteristics of oligarchic groups from Table A1.

No.	Characteristics Group created around a "buzz" or a "red director"?	One or more of the current or past partners ...			
		Had been a high-level "nomenklatura" official	Had been closely related to a prominent politician prior to becoming an oligarch	Has become a federal minister of legislator/governor as an oligarch	Has been sought for or arrested or convicted in a criminal case
1	No	No	Yes	No	Yes
2	Yes	No	Yes	Yes	Yes
3	Yes	Yes	No	Yes	Yes
4	Yes	No	No	Yes	No
5	Yes	Yes	No	Yes	No
6	Yes	Yes	No	No	No
7	Yes	Yes	No	Yes	No
8	No	No	No	No	No
9	Yes	No	No	No	No
10	Yes	Yes	Yes	Yes	Yes
11	Yes	Yes	No	No	Yes
12	Yes	Yes	No	No	No
13	Yes	Yes	No	No	Yes
14	Yes	No	No	No	No
15	Yes	Yes	Yes	No	No
16	No	No	No	No	No
17	Yes	Yes	No	No	No
18	Yes	No	Yes	No	No
19	Yes	No	No	Yes	Yes
20	No	No	No	No	No
21	No	No	Yes	No	No
22	No	No	No	No	Yes
% of "Yes"	72.7%	45.5%	27.3%	31.8%	36.4%

Notes on "Yes" entries:

No. 1: Deripaska married daughter of Yeltsin's chief of staff. Criminal cases brought against former senior partners, the Chernoy brothers. No. 2: Three key partners studied and worked together with Abramovich since the Soviet time. Abramovich handled Yeltsin's family finances and was Berezovsky's junior partner. Abramovich became governor of Chukotka. Criminal charges brought against former senior partner, Berezovsky. Abramovich himself was arrested in 1993 for allegedly stealing wagons with fuel (the case was later dismissed). No. 3: Kadannikov had been "red director" of AutoVAZ. Served as first deputy prime-minister in 1996. Criminal charges brought against former senior partner, Berezovsky. No. 4: Melnichenko and Popov studied together. Two junior partners are deputies of State Duma. No. 5: Alekperov had been first deputy minister of oil and gas in the USSR, and most partners in Lukoil had worked together with him since then or had been "red directors" of oil fields comprising Lukoil. Shafranik (a junior partner) was minister of fuel and energy of Russia in 1993-96. No. 6: Past senior partner (Lipukhin) had been the "red director". No. 7: Senior partners had worked

together in the ministry of foreign trade of the USSR. Potanin served as first deputy prime-minister in 1996-1997. No. 9: Blavatnik and Vekselberg had studied together prior to Blavatnik moving to the U.S. No. 10: Khodorkovsky and his partners had buzzed and worked together since the Soviet times. Khodorkovsky had been a Komsomol (Young Communist League) official. He also served as deputy minister of fuel and energy in 1993. He and his partner Lebedev are currently serving jail time, other partners have emigrated and are being sought by the Russian authorities. No. 11: Former senior partner Khaidarov had been a "red director". Criminal charges were brought against him (see Section 2 in the main text for details). No. 12: Bogdanov had been the "red director". No. 13: The founders of the group all worked together on Magnitogorsk Steel, with a junior partner being the original "red director". Sharipov had been the original controlling shareholder but was criminally charged with obtaining shares by fraudulent means and forced into exile. The current owner was the director (top manager) of Magnitogorsk Steel at the time and formerly Sharipov's shares ended up under his control. No. 14: Founding partners Zyuzin and Iorikh had worked closely together during Soviet era; Iorikh later emigrated and helped raise the capital. No. 15: The owner had been a "red director". Closely linked to Oleg Soskovets, former first deputy prime-minister and one of the most powerful politicians of the early Yeltsin era. No. 17: This group appears to be de facto controlled by the inner circle of President Shaimiyev of Tatarstan. Tahautdinov had been the chief engineer of Tatneft in 1990-1999. No. 18: Several founding partners had studied together and also had started their first small business in late Soviet years jointly. Pyotr Aven (junior partner, according to some sources, senior partner) was minister of foreign economic relations in the first post-Soviet Yeltsin government. No. 19: Ivanishvili and Malkin studied together. Malkin became a federal legislator. Criminal charges were brought against past senior partner (Bykov). No. 21: The owning oligarch is closely related to Moscow Mayor Yuri Luzhkov (married to Luzhkov's wife's sister, according to some sources). No. 22: Yushvayev served jail time for banditry during the Soviet era.

**Appendix 2. Estimates of capital outflows (see also the on-line Appendix at <http://pluto.fss.buffalo.edu/classes/eco/sb56/oligarx.xls> for details on estimated interest rates, local capital stock and GDP)**

For the initial two years of transition, 1992-1993 we employ the rough estimates of \$15 billion, which are also the numbers given by Boycko, Shleifer and Vishny (1993). Sicular (1998) citing Russian sources reports two sets of estimates, although the methodology used in either of those remains unclear. The more conservative of the two sets gives the numbers of \$14 billion for 1992 and \$11 billion for 1993 (Sicular, 1998, p. 594). The Congressional Research Service Report (Cooper and Hardt, 2000) considers \$150 billion to be a reasonable working estimate for total capital flight from Russia for the period of 1992-1999. When we apply the estimates provided by the Central Bank of Russia for years 1994-1999 (see below), the total accumulated outflow for 1992-1999 becomes \$136.3 billion, so that our numbers for the early 1990s are perhaps a little bit conservative.

For the period of 1994-2004 we have an option to employ the estimates based on the balance of payments statistics published by the Central Bank of the Russian Federation ([http://www.cbr.ru/eng/statistics/credit\\_statistics/](http://www.cbr.ru/eng/statistics/credit_statistics/)). Those estimates are based on the Russian officials' view that two items in the balance of payments statistics are closely related to capital flight; those are "non-repatriated export proceeds and non-repatriated import advances" and "net errors and omissions". The former item is thought to capture a popular "legal" scam used in

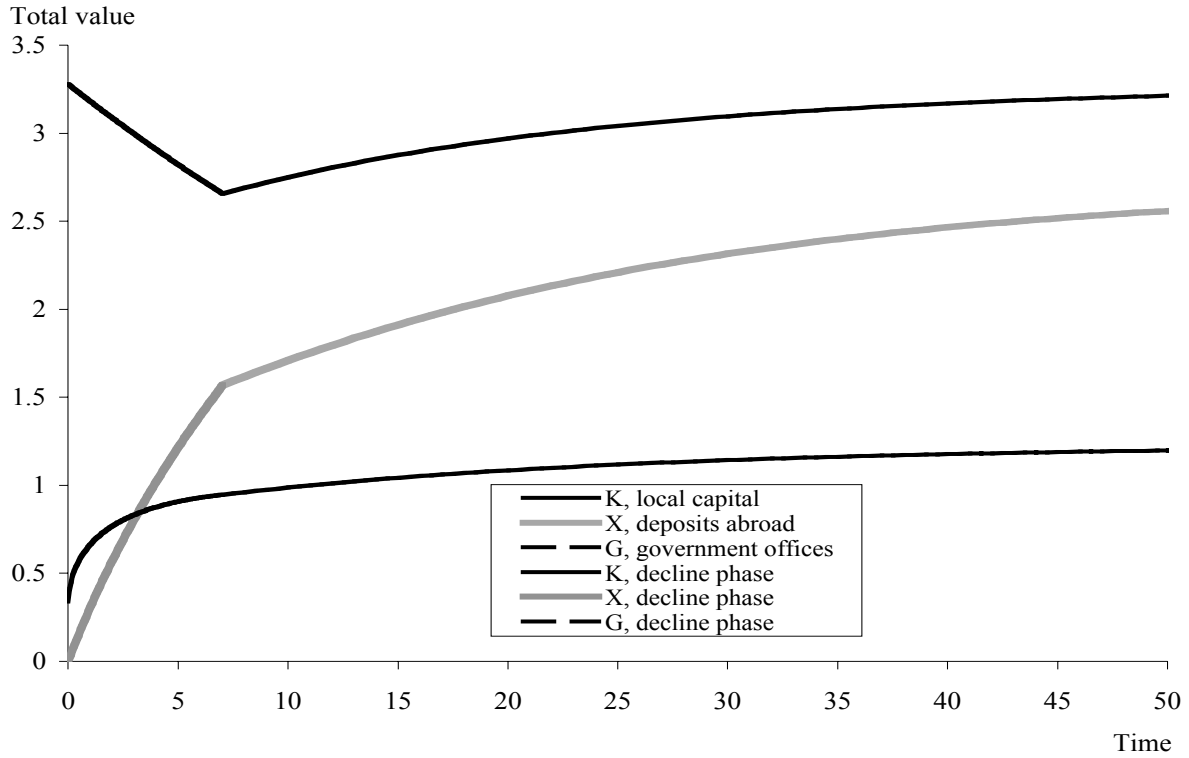
securing the transfer of funds abroad, according to which a Russian firm ships export goods and is not paid for it or makes an advance payment for imports that are never actually delivered. At the other end in the foreign country there is a company controlled by Russian capital that files for bankruptcy as soon as it receives the money (or the export good). Since the third quarter of 2001 the definition of this item was broadened to include also the estimate of non-receipts of services on import advances. The quantitative impact of this redefinition is not clear, but it means that the data prior to 2001 somewhat underestimate capital flight captured by this item in the balance of payments.

The “errors and omissions” item is thought to be capturing other means of capital flight like smuggling foreign currency out of the country and so on. It should be noted that this term is being constantly revised by the Central Bank (including very substantial revisions for past years). Finally, it should be mentioned that since there is also a lot of underreporting of both import and export transactions and a big circulation of foreign currency in Russia itself, our estimates probably underestimate actual capital outflows.

It should be noted that alternative estimates put capital outflows from Russia especially in recent years much higher than estimated by the Central Bank of Russia. Thus, the international rating agency Fitch estimated that \$100 billion fled Russia during the four years of 2001-2004, substantially more than \$34.4 estimated by the Central Bank of Russia for the same period (*The Guardian*, June 14, 2005). Fitch explains the difference by the fact that it is counting gross capital outflow, that is, it is not subtracting capital inflow into Russia, which it considers to be “hot money” that can leave at any moment. The Fitch estimates imply that there has not been any trend toward the decline of capital outflows even after the economic turnaround started in 1999, contradicting both our model and the assessments of many Russian experts.

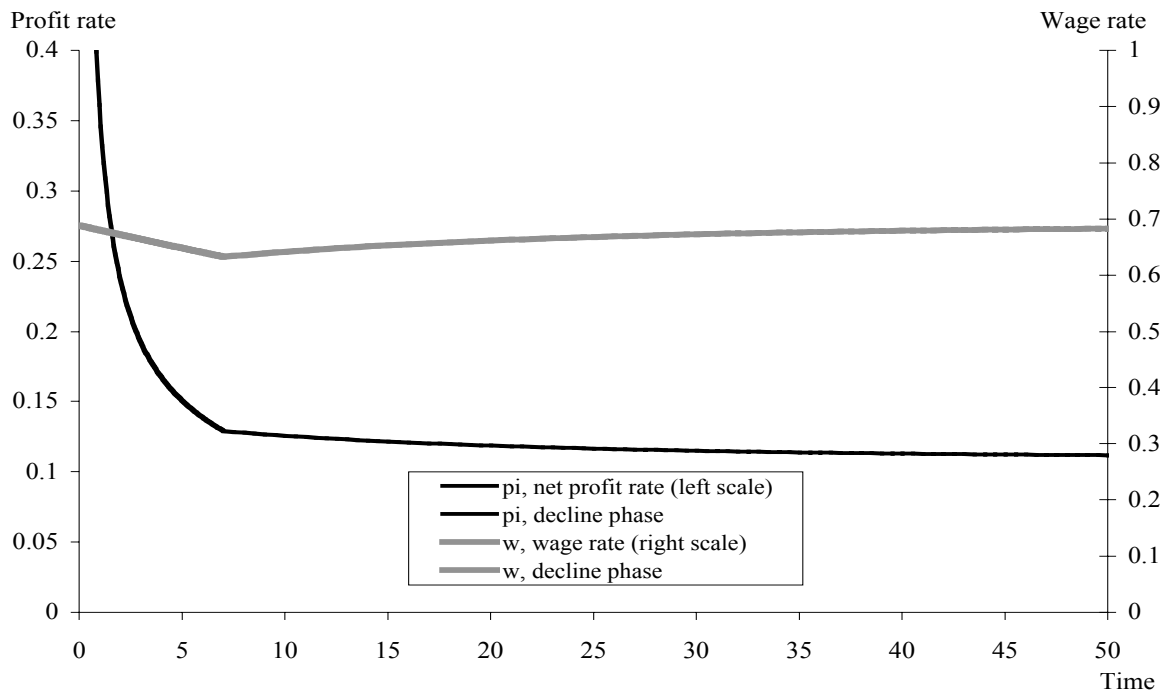
**Figure 1.** Oligarchs' assets over time, given parameters

$\alpha = 0.6, \delta = 0.03, \rho = 0.05, A = 0.7137, L = 1, r = 0.03, \lambda = 0.03, \beta = 0$

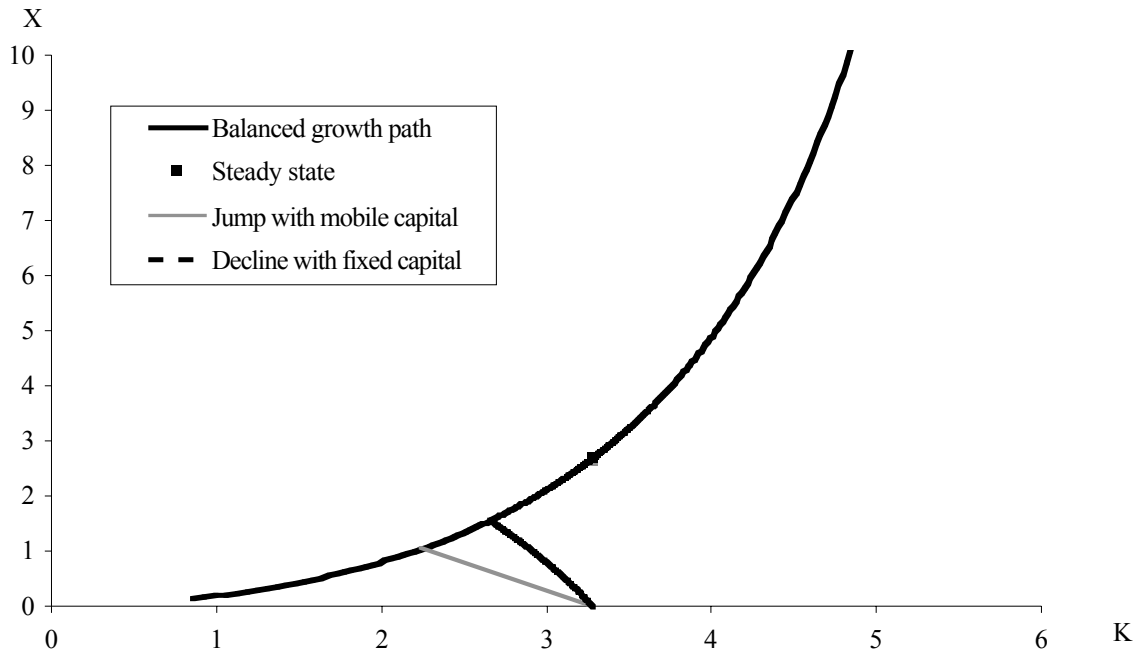


**Figure 2.** Price of capital, wage, and local interest rate over time, given parameters

$\alpha = 0.6, \delta = 0.03, \rho = 0.05, A = 0.7137, L = 1, r = 0.03, \lambda = 0.03, \beta = 0$



**Figure 3.** Balanced growth path and decline phase, given parameters  $\alpha = 0.6$ ,  $\delta = 0.03$ ,  $\rho = 0.05$ ,  $A = 0.7137$ ,  $L = 1$ ,  $r = 0.03$ ,  $\lambda = 0.03$ ,  $\beta = 0$



**Figure 4.** Balanced growth path and decline phase, given parameters  $\alpha = 0.6$ ,  $\delta = 0.03$ ,  $\rho = 0.05$ ,  $A = 0.7137$ ,  $L = 1$ ,  $r = 0.03$ ,  $\lambda = 0.03$ ,  $\beta = 0.2$

