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Kiel Working Paper, No. 920

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Suggested Citation: Heinrich, Ralph P.; Buch, Claudia M. (1999) : Handling Banking Crises - The Case of Russia, Kiel Working Paper, No. 920, Kiel Institute of World Economics (IfW), Kiel

This Version is available at:
https://hdl.handle.net/10419/17788

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Kiel Institute of World Economics
Düsternbrooker Weg 120, D–24105 Kiel

Kiel Working Paper No. 920

Handling Banking Crises — The Case of Russia

by

Claudia M. Buch and Ralph P. Heinrich

April 1999

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Abstract

Since August 1998, Russia has been suffering from a severe banking crisis. In finding a solution, two peculiarities of the Russian economy need to be taken into account: the substantial foreign liabilities of commercial banks and the failure of the government to service its liabilities. Apart from the externality problem of bank recapitalization, the paper discusses how to deal with the adverse selection and moral hazard problems resulting from asymmetries of information. We suggest that banks should be offered to their foreign creditors for recapitalization and that banks which cannot attract additional funds should be closed. The government should support the recapitalization process by taking over control from the banks' old shareholders. This would facilitate the transfer of control to foreign creditors. It would also serve to limit asset stripping and thereby to reduce externalities distorting the recapitalization process. Distortions could be mitigated further by bailing in investors not participating in the recapitalization.
(160 words)

JEL-classification: F34 (International lending and debt problems); G3 (Corporate finance and governance), P3 (Socialist institu tions and their transitions)

Keywords: Banking crisis, Russia, foreign debt restructuring

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1 Motivation*

In August 1998, the previous stagnation of the Russian economy abruptly ended in a severe financial and economic crisis. The government declared a moratorium on its domestic (ruble) debt and on private external debt. The Central Bank of Russia (CBR) abandoned its fixed exchange rate, resulting in a drastic devaluation of the currency. A large part of the banking system became insolvent. Bank runs ensued. The payments system collapsed and gross domestic product (GDP) declined sharply. A number of major banks were put under the administration of the CBR, and deposits were frozen temporarily. A recovery from this setback will depend critically on restoring confidence in economic policy in general and in the banking system in particular.

In finding a solution to the current banking crisis, two peculiarities of the Russian economy need to be taken into account. First, the failure of the government to service its liabilities has been a trigger of the crisis. Second, unlike in other transition economies at the time of their banking crisis, foreigners are holding quite substantial claims on insolvent Russian banks. This paper suggests a strategy for the reform of the Russian banking system which takes these aspects into account.

The government's financial problems imply that the option to recapitalize commercial banks through the issuance of government securities, as has been common practice in other transition economies, is not readily available. We argue instead that banks should be offered to their foreign creditors for recapitalization and that banks which cannot attract additional funds should be closed. The government should support the recapitalization process by taking over control from the banks' old shareholders. This would facilitate the transfer of control to foreign creditors. It would also serve to limit asset stripping and thereby to reduce externalities distorting the recapitalization process. Externalities could be mitigated further by bailing in investors not participating in the recapitalization. Their claims in excess of the liquidation value of existing assets would have to be removed or written down. However, we show that the recapitalization decision is subject to adverse selection problems and that under certain conditions these can lead to a pooling equilibrium without recapitalizations.

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* The authors would like to thank Christoph Berghaus and Christian Pierdzioch for helpful comments on an earlier draft. All remaining errors and inaccuracies are solely in our own responsibility.

The following second part gives a brief review of the Russian banking crisis, its origins, and solutions currently being discussed. Part three develops a strategy for bank recapitalization that applies recent models on optimal debt work-outs and bankruptcy procedures (Chen et al. 1994, Povel 1996). We take account of the possible externalities of bank recapitalization, the adverse selection issue in deciding which banks to recapitalize, and the moral hazard issue resulting from discretion of bank managers over the amount of effort they invest into a given project. Part four concludes and discusses the proposed solution.

2 Banking Crisis – Russian Style

2.1 Evolution of the Crisis

Russia is currently experiencing a severe banking and balance of payments crisis, i.e. a full-fledged twin crisis.[1] On August 17, 1998, the Russian government and the CBR have responded to acute pressure on the Russian ruble by announcing a bundle of emergency measures. Apart from a drastic devaluation of the ruble by almost three-fourth of its value up by the end of March 1999, the plan included a moratorium on the government's domestic (ruble) debt (GKO) and on private external debt, including loans raised by commercial banks on the international market. At the same time, the Russian banking system has become deeply financially distressed and is on the verge of bankruptcy.

Severe liquidity problems in Russian banks had preceded the balance of payments crisis which in itself has aggravated the problems in Russia's banking system. Prior to the crisis, about one third of the assets of the Russian banking system had been invested into government bonds (Table 1). Even after taking account of the fact that a substantial amount of GKO is held by the state-owned savings bank, Sberbank, GKO investment of the rest of the banking system still amounts to 15-20 percent of total assets.

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[1] See Kaminsky and Reinhard (1996) as well as Buch and Heinrich (1998) for an overview of the theoretical and empirical literature on twin crises.

Table 1 — Balance Sheet Indicators of Russian Banks 1994-1998

	1994	1995	1996	1997	1998 (June)	1998
	(in % of balance sheet total)					
Foreign assets	23.9	13.5	14.6	10.9	11.6	23.6
Claims on the government	5.2	18.5	30.3	30.8	33.0	27.9
Claims on the priv. sector	35.9	39.0	31.6	36.3	40.0	36.3
Other assets	35.0	29.0	23.5	22.0	15.4	12.2
Demand deposits	15.8	20.2	17.4	21.7	21.8	16.5
Foreign currency deposits	18.1	16.1	13.9	13.7	12.4	20.1
Foreign liabilities	7.0	8.7	11.8	17.2	16.9	21.3
Capital accounts	12.7	19.4	24.9	24.2	25.1	17.4
Other liabilities	46.4	35.6	32.0	23.2	23.8	24.7
Memorandum:						
Net foreign assets	16.9	4.8	2.8	–6.3	–5.3	2.3
Nonperforming loans[a]	...	15.6	17.9	18.5	16.4	...

End of period. Data include Sberbank and those activities of Vneshekonombank which are not performed in its function as a foreign debt manager of the Russian government. — a) Share in total loans in percent.

Sources: IMF (1999), CBR (1998a).

In addition, large Russian banks had borrowed quite extensively on international capital markets particularly over the past two years. In mid-1998, net foreign liabilities amounted to a negative 5 percent of banks' balance sheet total. At the same time, domestic liabilities accounting for about 12 percent of the balance sheet were denominated in foreign currency. Banks had tried to hedge against the resulting exchange rate risk by denominating about 45 percent of their domestic loans in foreign currency. This explains why, measured in ruble terms, domestic credits increased quite substantially after the financial crisis of August. Yet, to the extent that the recipients of these loans have revenues in ruble, these loans were only an imperfect hedge against foreign exchange risks.

Adding to exchange rate risk resulting from on-balance sheet activities have been off-balance sheet payments obligations. To a substantial degree, foreigners had hedged foreign exchange risks from GKO investments through forward contracts with Russian banks as counterparts. According to data provided by the CBR (1998a), liabilities resulting from forward contracts in foreign currency alone exceeded on-balance sheet activities of Russian banks by a substantial margin at the beginning of 1998. By the middle of the year, on- and off-balance sheet activities were roughly of equal volume. At least according to the official data, off-balance sheet liabilities were hedged by and large through off-balance

sheet assets. Yet, the reliability and usefulness of these data are likely to be poor because many of these hedges involve a substantial counterparty risk. Moreover, capital adequacy regulations restrict the foreign exchange exposure of commercial banks, which provides incentives for fictitious transactions.

Table 2 — Structure of Foreign Bank Loans 1992–1998

	1992	1993	1994	1995	1996	1997	1998 (June)	1998 (Sept.)
	(billion US-dollar)[a]							
Total loans to Russia	56.8	51.4	48.0	51.5	57.3	72.2	75.9	...
Loans to Russian banks	43.3	40.2	41.5	43.8	43.0	40.3	39.0	...
	Share of loans granted to commercial banks (%)[a]							
Asia	39.0	40.4	41.4	42.6	43.3	40.4	37.3	...
Latin America	25.2	26.9	24.7	24.5	24.2	26.1	24.1	...
Eastern Europe	71.1	72.4	70.6	70.3	64.2	52.7	50.0	...
Russia	76.2	78.3	86.5	85.0	75.2	55.8	51.4	...
	Share of short-term loans (%)[a]							
Asia	62.3	62.8	62.9	63.5	61.5	60.3	53.5	...
Latin America	45.5	50.0	51.3	52.4	53.7	55.0	55.0	...
Eastern Europe	32.2	37.2	35.2	39.2	44.2	43.4	44.7	...
Russia	29.2	35.6	35.8	39.7	46.3	44.9	45.7	...
	(billion US-dollar)[b]							
Foreign liabilities of Russian banks (total)	...	...	...	5.4	9.2	19.2	20.5	13.7
Other investments	...	...	...	4.7	8.5	17.4	18.5	12.9

End of period. — a) Consolidated cross-border claims in all currencies and local claims in non-local currencies of banks in the BIS reporting area. 1992 and 1993 = Former Soviet Union. — b) CBR data not including Vneshekonombank.

Source: BIS (1998), CBR (1998b).

Overall, foreign bank loans to Russia had increased up until mid-1998 (Table 2). Although the share of loans raised by commercial banks had come down considerably as compared to the early 1990s, it yet accounted for more than 50 percent of the total, according to data of the Bank for International Settlements (BIS). This is roughly in line with values observed in the rest of eastern Europe but clearly exceeds corresponding shares for Asian or Latin American countries. Presumably, however, the BIS-data include debt of the former Soviet

Union such as loans raised by the state-owned Vneshekonombank. Using data provided by the CBR which excludes these loans gives a share of liabilities of Russian commercial banks vis-à-vis foreign banks of about one fourth of the total.

Because the main causes of the banking crisis have been the devaluation of the currency and the default of the government on its debt, it might be argued that non-performing loans are not at the heart of the Russian crisis. Although the main trigger of the crisis has indeed not been an increase in non-performing loans, uncertainty about the true value of banks assets is yet substantial. Some banks have a sizable exposure to the Russian enterprise sector and the true quality of these loans is difficult to assess. For the banking system as a whole, non-performing loans amount to almost 20 percent of total loans.[2] Considering the poor quality of collateral and the weaknesses in reporting systems, the true amount of non-performing loans is likely to be higher. Finally, the fact that ownership links between banks and enterprises in so-called financial-industrial groups are pervasive in Russia implies a substantial opacity of loan portfolios.[3]

Banking sector instabilities and insolvencies have not been uncommon in transition economies and have spawned a voluminous literature on how to deal with these problems.[4] Likewise, recent crises in Asia's banking systems have ignited a discussion on the fiscal costs and optimal design of recapitalization programs.[5] The peculiar nature of Russia's twin crisis, however, makes it difficult to directly transplant policy lessons from earlier episodes. At least three factors are responsible for this:

First, in contrast to other transition economies of central and eastern Europe, Russia is the first country in the region to experience a full-fledged twin crises. Foreign debt held by Russian banks is substantial, and restructuring this debt will be crucial for paving Russia's future way into international capital markets.

Second, the institutional and legal environment is particularly poorly developed in Russia (EBRD 1998). For this reason, it is difficult and costly for banks to work out problematic assets through organized bankruptcy procedures. Likewise,

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2 This information has been taken from CBR (1998a: 82). In the same publication (p. 68), information is given which would imply a much lower share of non-performing loans of below 10 percent. An explanation for this discrepancy is not provided.

3 For a discussion of the role of financial-industrial groups see Johnson (1997), Perotti and Gelfer (1998), or Standard and Poor's (1998).

4 For an overview see Bonin et al. (1998), Buch (1996), or Anderson et al. (1996). Some recent contributions (Aghion et al. 1998; Mitchell 1998a, 1998b) provide formal models of bank recapitalization schemes in transition economies.

5 For a comprehensive survey of the literature see the homepage of Nouriel Roubini (http://www.stern.nyu.edu/Faculty/FacPict/Economics/index.htm).

authorities are trying to develop a workable bankruptcy procedure for banks only as they go along dealing with the present crisis. At the same time, poor accounting standards and inadequate banking supervision make it difficult to properly assess the actual economic situation of banks.

Third, the Russian government's budget constraint is decidedly more binding than that of governments during earlier crises episodes. Although fiscal costs of bank recapitalization in the Asian economies have been substantial, they were endurable, and banks' claims on the government were modest prior to the crises. In addition to recapitalizing banks, this has also enabled governments in Asia to guarantee foreign debt of commercial banks (Armstrong et al. 1998). The advanced transition economies of central and eastern Europe had funds at their disposal which are unavailable in the Russian context. Poland could draw on money from an unused Stabilization Fund to finance its banks recapitalization program. The Czech Republic utilized privatization proceeds. Arguably, Hungary faced the tightest budget constraint of the advanced reform states which is one of the reasons why bank recapitalization has at first been a fairly interminable process.

Table 3 — Hypothetical Balance Sheet of the Russian Banking System

	July 1998	December 1998	
	Book value	Book value	Market value
Balance sheet total	610	935	
Claims on government	195	260	26
Claims on corporate and private sector	275	370	260
Reserves and other assets (net)	140	305	305
Domestic deposits	305	435	435
Foreign liabilities	100	200	200
Other liabilities	75	150	150
Value of equity	130	150	–194
% of book value of assets	21 %	16 %	–21 %

Source: IMF (1999), own calculations

This contrasts to the situation in Russia where the failure of the government to meet its debt obligations has been one major cause of the crisis. Hence, the option to recapitalize commercial banks through the issuance of new bonds or to guarantee foreign liabilities of domestic banks is not readily available to the Russian government. Using the latest available balance sheet data for Russian banks (December 1998), the potential costs of bank recapitalization can be estimated (Table 3). Assuming default rates of the government of 90 percent and of the private sector of 30 percent gives a negative value of bank equity of about 250 bil-

lion ruble.[6] Almost with certainty, this value gives on the lower bound of the aggregate amount of losses in the Russian banking system.

In order to recapitalize the banks, only the interest rate expense on recapitalization bonds needs to be taken into account. At an interest rate of 120 percent p.a., annual interest expenses would amount to about 225 billion ruble. Note that this is the lower bound of total recapitalization expenses because it would suffice only to bring equity to zero and because estimated losses are on the low side. Even so, it would correspond to more than a doubling of the monetary base or to an increase in the budget deficit in excess of 150 percent.[7] Given that the government bond market has collapsed completely in the wake of the government default, it is hard to see how the government could finance a budget deficit on this scale.[8]

Alternatively, financing the rescue operation by printing new money would result in a doubling of the monetary base and would trigger severe inflation. In addition, because the government itself has substantial foreign liabilities, guaranteeing the foreign debt of banks would raise issues concerning the seniority of different claims and is thus unlikely to yield quick solutions.

2.2 Responses of Economic Policy

So far, the Russian government and the CBR have taken various lines of defense in addressing problems in the banking system. The declaration of a 90-day moratorium on the foreign debt of banks has given temporary reprieve. Yet, the deadline set originally was passed in November 1998 without resumption of regular debt service.

Most importantly, the government has announced that all private deposits with Russian banks would be guaranteed by the state although an official deposit insurance system had been in place only for state-owned banks. At the beginning of

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6 These figures are based on the assumption that the liquidation value of corporate sector loans is poorly approximated by the share of non-performing loans because of the poor quality of collateral. The probability of repayment on government debt has been estimated based on a decree of December 1998 that foresees a repayment of 10 percent of the face value of the securities (Bank of Finland 5.2.1999).

7 The monetary base has been taken as of December 1998, the budget deficit as of November 1998 at an annual rate. See RECEP (1999).

8 By contrast, recapitalization needs appear relatively modest in comparison to the amount of flight capital which conservative estimates put at 130 billion US-Dollar (Loukine 1998). At the January 1999 exchange rate, about 6 percent of the flight capital would thus suffice to recapitalize Russia's banks.

September 1998, six private banks were asked not to redeem their private depositors anymore who, in turn, could decide whether their deposits should be transferred to Sberbank. Yet, the terms of this conversion were rather unfavorable because foreign exchange deposits were transferred at a rate below the market rate and because the transferred deposits were blocked originally until November 1998. By the end of January 1999, about 50 percent of the transferred savings had been paid out (RECEP 1999).

In parallel to these emergency measures, programs on a resolution of the banking crisis have been drafted. According to a program of the CBR, banks are to be divided into four groups (Bank of Finland 16.10.1998): (1) solvent and liquid banks, which can continue operations without external financial assistance, (2) illiquid but solvent banks, which are to receive financial assistance both from the government and possibly from foreign sources, (3) insolvent banks, which will be liquidated, and (4) insolvent banks of „social and economic importance“, which are to be reorganized and recapitalized.

The program comprises a number of elements which are based on the experiences of earlier banking crises. Equity owners are, for instance, to lose their stakes, and reorganization of banks is aimed at ensuring their future solvency. There are indications that restrictions on the market entry of foreign banks will be relaxed, and debt-equity-swaps have been considered in this context. However, a general rule which limits the amount of foreign capital in the Russian banking system to 12 percent and which requires foreign banks to receive a license from the CBR has remained in place. Moreover, the program also suffers from several weaknesses as it still lacks a sound legal basis and as its goals leave ample room for interpretation.

Part of the plan are stabilization loans of the CBR ensuring the liquidity of the participating banks.[9] Information about the amount of stabilization loans that have been granted so far and about the conditions under which these loans are issued is sketchy. Reportedly, the CBR had issued loans by the amount of 15 billion ruble by November 1998 and has planned for the issuance of another 30 billion through the end of 1999 (Bank of Finland 20.11.1998). Taken together, this would be equivalent to an increase in the monetary base by about one fourth (as of November 1998). In mid-January 1999, Promstroibank has received a 1.6 billion ruble

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9 In an effort to stabilize the situation in the banking system, the CBR as early as in July 1998 provided a special refinancing facility on which banks could draw under the condition that they engaged in the restructuring of other banks (Bank of Finland 3.7.1998). Likewise, a softening and temporary suspension of minimum reserve requirements as well as offsets of banks' liabilities have been used to ease the liquidity situation of banks.

stabilization loan and, in return, 75 percent of its equity have been taken over by the CBR (RFE-RL 14.1.1999).

Generally, the CBR has not taken a very radical stance towards insolvent banks (RECEP 1998). Monthly withdrawals of licenzes did not increase significantly after the crisis, and only two banks have been put under temporary administration. Although a bank insolvency law has eventually come into effect in March 1999, political will to enforce the law will be decisive. Meanwhile, anecdotal evidence that banks engage in asset stripping and that foreign creditors lack power to enforce their claims becomes more and more frequently available.

One aim of the CBR program is to delegate bank restructuring to an „Agency for Restructuring of Credit Organizations“ (ARCO) which has been set up in early 1999 (Bank of Finland 4.12.1998). So far, however, it does not seem as if ARCO could make significant contributions to efficient bank restructuring. It has received a share capital of only 10 billion ruble from the Federation’s property fund, it is poorly staffed, and it lacks enforcement power.

Banks themselves have reacted to the crisis by forming alliances and announcing mergers. The most important of these new structures is a holding called Rosbank which has been formed by Uneximbank, Menatep, Mostbank and MFK and which holds a share of about 11 percent of the pre-crisis equity of the banking system. While assets have reportedly been transferred to Rosbank, liabilities have remained with the original founding banks (Thomson Bankwatch 1998).

Against this background, it needs to be asked which purpose a bank recapitalization program would actually have to serve. It could be argued that, because of the small size of the Russian banking system and its negligible importance for investment finance, all insolvent domestic banks should be liquidated. Total assets of banks, for instance, had a volume of only about a quarter of GDP at the end of 1997 as opposed to values around 100 percent for countries such as the Czech Republic, Korea, or Taiwan (Table 4).

Table 4 — International Comparison of Balance Sheet Indicators 1997

	Loans to the private sector	Loans the to government	Net foreign assets	Nonperf. loans	Banking system assets
	(in % of balance sheet total)			(% of total loans)	(% of GDP)
	Eastern Europe				
Czech Republic	56.7	7.8	3.2	29	116.9
Poland	36.6	24.8	4.9	10	49.3
Russia	36.3	30.8	–6.6	19	23.9
	Asia				
South Korea	76.6	1.7	2.1	25-30	91.1
Thailand	80.9	0.2	–20.1	25-20	143.7

Sources: IMF (1998), EBRD (1988), JPMorgan (1998), own calculations.

This argument neglects, however, the importance of stability in the banking system for the stability of the domestic currency, as has been evidenced by the recent crisis. Domestic banks had been major channels for foreign capital imports. As foreign investors lost confidence in the domestic banking system, this channel has dried up. This has aggravated the balance of payments crisis. Hence, without restoring confidence in the banks, future monetary stabilization is unlikely to be achieved. The key challenge for policy makers is to design recapitalization programs in a way that only efficient banks are rescued. Possible solution are discussed in the following section.

3 The Economics of Bank Recapitalization

In an efficient bankruptcy procedure, efficient firms with a continuation value of asset in excess of liquidation value would thus be reorganized, while inefficient firms would be liquidated (Senbet and Seward 1995: 925). A similar rule can be applied to banks. Yet, in sorting out banking crises and isolating efficient from inefficient banks, policy makers usually face several problems. *First*, efficient recapitalization may not be achieved because it raises the market value of all existing claims including those of stakeholders who do not participate in the recapitalization. This positive externality may create free rider problems. *Second*, as loans are heterogeneous assets, regulators and outside stakeholders have incomplete information about their value. One of the critical problems in designing a solution is how to induce banks to reveal the true extent of their problems (adverse selection). *Third*, bailing out ailing banks may set a bad precedent and

may encourage banks to take inadequate account of risk in their future business decisions (moral hazard).

The three problems are intertwined. For instance, resolving adverse selection typically requires rewarding banks for admitting to their financial problems. But such rewards may compromise incentives to avoid problems in the first place and may thus encourage moral hazard. In discussing possible solutions to these conflicts of interest, we assume the following timing of events:

t = 1	There is a group of banks which are financially distressed, i.e. which have a liquidation value of assets below the value of current liabilities. Two types of banks are distinguished: *bad banks* which have new investment opportunities with a positive net present value and *failures* with unprofitable new projects. The type of the bank is known only to its managers but not to outside investors.
t = 2	A decision is made which stakeholders should recapitalize viable banks (externality problem, Section 3.1).
t = 3	A mechanism is devised which prevents failure banks from being recapitalized (adverse selection, Section 3.2).
t = 4	Recapitalized banks continue operations and receive additional funding, project returns are determined by effort of the managers and the state of nature. Since effort is unobservable to outside investors, incentives must ensure that managers exert optimal effort (moral hazard, Section 3.3).
t = 5	Final pay-offs are realized.

3.1 Externalities and Conflicts of Interest

The aim of a bank recapitalization program should be the separation of efficient from inefficient banks. Yet, an optimal solution is often difficult to obtain because debt- and equity-holders have conflicting interests. To see this, consider a bank which is potentially able to generate a positive operating profit in the future if it can get access to additional funds to finance its operations. In this case, it makes sense to provide additional funds, even if the bank is so heavily indebted that profits net of debt service would still remain negative (Krugman 1989). The problem of course is that since the bank would continue to incur losses on its existing liabilities, new investors would not have adequate incentives to provide funds, unless the existing claims were to be subordinated to the new ones.

This problem may be overcome in part by having existing rather than new claimholders provide the new funds. This is why in standard bankruptcy procedures for non-financial firms existing equity holders and creditors are usually

brought together to negotiate a solution. However, commercial banks are different in that equity is typically very low and that the bulk of existing claims are held by depositors (Dewatripont and Tirole 1994). Since depositors are usually too numerous to be organized into a renegotiation of claims, since they are usually covered by some explicit or implicit deposit insurance, and since they tend to have little disposable wealth, the government typically steps in to provide new funds on behalf of depositors.

However, the Russian government lacks the funds to cover the entire liabilities of the banking system. Yet, a way to potentially overcome this deadlock arises from the fact that in the case of Russia and unlike other transition economies, foreigners are holding a substantial amount of the claims on the Russian banking system. As will be shown below, the fact that foreigners already hold a stake in the banks may allow a recapitalization program to draw on additional funds provided by the banks' existing foreign creditors. While the Russian government would still have to take over part of the liabilities, foreign involvement could substantially reduce the fiscal burden. Yet, the discussion will also show that the willingness of foreigners to provide additional funds depends on a number of conditions.

The incentives of different claimants of a Russian bank to provide funds for recapitalization are shown in a simple, illustrative model.[10] The model shows that generally third parties will have insufficient incentives to recapitalize ailing banks. Then, conditions are derived under which existing claimholders will have incentives for efficient investment and how these incentives could be created. Throughout, the balance sheet of a representative bank is assumed to be given by:[11]

Liquidation value of assets = Y	Domestic liabilities = D
	(Net) foreign liabilities = F
	Equity = E

The bank is assumed to be insolvent, i.e. the value of its assets is below the value of its liabilities:

(1) $Y < D + F$.

10 The basic structure of this model has been adopted from Chen et al. (1994).

11 All interest payments have been capitalized.

By implication, old equity is negative ($E = Y - D - F < 0$). The bank is also illiquid because it cannot meet its current liabilities. We assume that the government has acquired de facto ownership of the bank by taking over control rights. Given the weak institutional environment in Russia, it is likely that government control over the bank would remain imperfect in practice. However, removing old owners from control as far as possible is necessary because otherwise they would have the potential to hold up efficient recapitalization.

Generally, the recapitalization of banks might make sense because the fact that a bank is distressed financially might not imply necessarily that it is also distressed economically. Rather, it has the opportunity to invest into a new project which requires additional investment by the amount of *I*. If all creditors stay, additional funds by the amount of $I - Y > 0$ are thus needed. The net present value (NPV) of the new project is:

$$NPV = X_G P_G + X_B P_B - I \qquad (2)$$

where P_G, P_B give the probability of reaching the good and the bad state, respectively, and X_G, X_B are the pay-offs in the two states with $X_B \geq 0$ and $X_G > X_B$. The optimal investment rule implies $NPV > 0$. In the Russian environment, few of the insolvent banks will have positive NPV projects available. As banks which new projects have a negative NPV should be liquidated, the following discussion will show that the willingness of foreigners to bring in additional capital can be a crucial signal for the government in its decision to liquidate banks.

Without additional capital, the return to foreign creditors depends on the seniority of claims on the bank, i.e. $Y \leq F$ if foreign debt is senior or $Y - D \leq F$ if domestic debt is senior. The ownership stake of the government is worth $\max[Y - D - F, 0]$, i.e. zero in the present specification.[12]

For the purpose of the present section, the liquidation value of assets is taken as given. More specifically, we rule out the possibility that assets are dissipated over time.[13] Allowing for the possibility that the management of the bank engages in asset stripping would imply that a timely solution to the recapitalization problem needs to be found. If not, *Y* would shrink continuously, thereby raising the amount of additional funds needed and thus reducing the incentives of any party to recapitalize.

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[12] Under state ownership, this is equivalent to assuming that no automatic deposit insurance exists.

[13] See Mitchell (1998b) for a discussion.

In order to highlight the externality problem of additional finance, we assume that all agents are risk-neutral. Moreover, although future returns are uncertain, there are no asymmetries in information. This assumption will be relaxed in the following section. Under these simplifying assumptions, the efficiency of investment decision depends on the type of stakeholder who recapitalizes. A distinction is being made between recapitalization through third parties or through foreign creditors. Domestic creditors (depositors) are assumed to have no disposable wealth to recapitalize the banks. Two main cases can thus be distinguished:

Case 1: New funds provided by a third party.

A third party not so far involved with the bank provides additional *equity* if the value of its new equity at the end of the period is positive:

$$(3) \qquad \Pi_E = P_B \max\left[X_B - D - F, 0\right] + P_G \max\left[X_G - D - F, 0\right] - (I - Y) > 0$$

There are three possible cases to consider:[14]

$$(3') \qquad \Pi_E = \begin{cases} NPV + Y - D - F & for \quad X_B \geq D + F \\ P_G\left(X_G - D - F\right) - (I - Y) & for \quad X_B < D + F \leq X_G \\ -(I - Y) & for \quad X_G < D + F \end{cases}$$

In the first case, $P_E < NPV$ holds because of (1) and underinvestment will occur, i.e. some projects with positive net present value will not be undertaken. The reason is that the third party has to share the returns of the new project with domestic and foreign creditors. In a similar vein, the third party's return on equity would always be negative in the third case, and so it would never invest, regardless of the net present value of the project.

In the second case, $P_E > 0$ may coincide with a positive or negative present value of the new project. The investment decision will be efficient only for $P_B X_B + P_G(D+F) - Y = 0$. There will be underinvestment if $NPV > P_E > 0$ which is equivalent to $P_B X_B + P_G(D+F) - Y > 0$. However, if $P_B X_B + P_G(D+F) - Y < 0$, overinvestment occurs. Overinvestment is thus more likely (i) the lower the pay-off in the bad state, (ii) the lower the face value of existing debt, or (iii) the higher the liquidation value of assets. What causes overinvestment under these circumstances is the agency problem of debt (Jensen and Meckling 1976). By undertaking the new investment, an uncertain pay-off is substituted for the certain pay-off

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[14] Given that prior to the recapitalization equity was negative, we assume that the owners of the old equity do not retain any residual claims on the bank.

Y which would have gone to creditors had the new project not been undertaken. In the bad outcome, part or all of Y is lost. Since equity investors are limited in their liability to their equity investment, creditors share in this loss. The lower the pay-off in the bad state, X_B, the lower *c.p.* the net present value of the project. However, the higher the liquidation value, Y, the larger the share of that loss borne by existing creditors instead of the new equity investor. By contrast, in the good outcome, creditors share the pay-off only up to the face value of their claims. If that face value is low, the new equity investor retains a large share of the pay-off in the good state. Thus, the new investor may find a project worthwhile even though it has a negative net present value. The new investor „gambles for resurrection" (Chen et al. 1994).

By contrast, if the third party was to provide new *loans* rather than new equity, it would do so if:[15]

$$(4) \qquad \Pi_L = P_B \min\left[X_B - (D+F); I - Y\right] + P_G \min\left[X_G - (D+F); I - Y\right] - (I - Y) > 0 .$$

As before, we can distinguish three cases:

$$(4') \ \Pi_L = \begin{cases} 0 & for \quad X_B - (D+F) \geq I - Y \\ P_B\left[X_B - (D+F) - (I - Y)\right] < 0 & for \quad X_B - (D+F) < I - Y \leq X_G - (D+F) \\ NPV + Y - (D+F) < NPV & for \quad X_G - (D+F) < I - Y \end{cases}$$

In this case, there would always be underinvestment because the additional investment creates a positive externality both for existing creditors and for existing equity holders. Subordinating existing debt to the new debt would remove the externality with respect to existing debt, but would not internalize the externality with respect to equity. Hence bringing in a private-sector third party is not normally going to solve the problem of investment inefficiency.

In theory, a benevolent government pursuing overall economic efficiency could overcome all of these problems by acting as the third party investor *and* by basing its decision not on the pay-off accruing to it from the new investment, but on its actual net present value. This route was feasible in many banking sector reform packages in other transition economies because the governments enjoyed some financial leeway. However, Russia differs from other transition economies in that the government is in dire straits itself. Therefore, carrying the entire burden of bank recapitalization is likely to exceed the Russian government's financing ca-

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[15] To simplify, $X_i - (D+F) > 0, i = B, G$ is assumed from here on. This means that in both states, existing creditors can be paid off in full. Without this assumption, six rather than three cases would have to be distinguished. Five of these would lead to underinvestment unambiguously. In one case however, overinvestment would be conceivable since spending Y on the new project even though existing creditors may not be fully paid off creates the possibility for a negative externality.

pacity at present. Thus, with no third party available to provide financial relief for the Russian banking sector, the only feasible solution is to bail in existing creditors. Domestic households can be made to share part of the burden by writing down the value of their deposits in real terms. This is something that has happened already de facto. However, it will not be possible to induce households to supply additional funds nor would a further write-down of household deposits do anything to restore confidence in the Russian banking sector.

In contrast to other transition economies at the time of their banking crises, Russian banks also have substantial liabilities to foreign banks. Unlike third parties not previously involved with the ailing banks, these foreign creditors have an interest in maximizing the value of their claims and might therefore be brought in to supply additional funds. As shown above, new investment is constrained by possible positive externalities it creates for existing holders of equity and debt claims not participating in the provision of new funds. By having existing foreign creditors buying out the government's equity stake, the former source of externalities can be eliminated. We therefore focus on the solution where foreign creditors provide additional equity rather than additional loans.

Case 2: Foreign creditors provide additional equity.
It is now assumed that the government sells the domestic bank to foreign creditors so that the government (nor other previous owners) does not retain any equity claims which could rise in value as a consequence of the recapitalization by the foreign creditors. Subsequently, foreigners inject new equity. Assuming initially that there is no domestic debt, the pay-off to new equity is:

$$P_B \max[X_B - F, 0] + P_G \max[X_G - F, 0] - (I - Y) \tag{5}$$

The pay-off to old foreign debt is given by:

$$P_B \min[X_B, F] + P_G \min[X_G, F] \tag{6}$$

The combined pay-off thus equals the net present value (NPV) of the project plus the liquidation value of assets:

$$\begin{aligned} \Pi_F &= P_B\{\max[X_B - F, 0] + \min[X_B, F]\} + P_G\{\max[X_G - F, 0] + \min[X_G, F]\} - (I - Y) = \\ &P_B X_B + P_G X_G - I + Y = NPV + Y \end{aligned} \tag{7}$$

Thus, in this case, the investment decision is efficient: investment takes place whenever $\Pi_F > Y$ which is equivalent to NPV > 0. The case that the foreign

creditor swaps old debt into equity and provides new equity to finance additional investment is very similar to the situation without a debt-equity-swap.

With $D > 0$ and D senior to foreign debt, in contrast, the combined pay-off is:

$$(7') \qquad \begin{aligned} \Pi_F &= P_B\{\max[X_B - D - F, 0] + \min[X_B - D, F]\} + \\ &P_G\{\max[X_G - D - F, 0] + \min[X_G - D, F]\} - (I - Y) = NPV + Y - D \end{aligned}$$

which leads to an efficient investment decision if $Y - D \geq 0$. In this case, the claims of domestic depositors are covered in full even without additional investment, and so additional investment does not create a positive externality for them. However, if domestic deposits are large relative to the liquidation value of assets, i.e. $Y - D < 0$, underinvestment will occur because of the positive externality that additional investment by foreign creditors creates for domestic creditors.

Empirically, it is difficult to know whether the liquidation value of assets exceeds the face value of the banks' domestic debt. Our estimates suggest that the gap between the liquidation value of assets and the face value of all existing liabilities is about 25 percent of liabilities (Table 3). This would suggest that domestic liabilities could be covered by the liquidation value of assets. Hence new equity injections by foreign creditors would not suffer from externality problems. Moreover, after the onset of the crisis, the share of domestic liabilities has dropped since the government allowed household deposits of some of the banks to be transferred to Sberbank. Household deposits made up about 13 percent of liabilities prior to the crisis. For those banks where household deposits were transferred, the condition that the liquidation value of assets exceed remaining domestic liabilities would then by met *a fortiori*. These calculations must be regarded as highly tentative, though, since they are, for instance, based on the assumption that only corporate loans and GKO have a market value below face value.

But even if the liquidation value of existing assets should turn out not to be sufficient to cover domestic deposits, comparing (7') to (4') suggests that the distortion in the investment decision would be smaller with new equity provided by existing foreign creditors than with new *loans* provided by any third party. In comparison to new *equity* provided by third parties (eq. 3'), the distortion would be smaller in the two extreme cases. Yet, it could be larger in the intermediate case because the two countervailing distortions created by the agency problem of debt and the positive externality for existing creditors might tend to cancel each other out if new equity was provided by third parties.

Distinguishing several foreign investors and allowing for the possibility that not all would be willing to supply additional equity would complicate the problem. Analytically, this would be equivalent to case 2 with a lower share of foreign credits and a higher share of domestic credits, i.e. the condition $Y > D$ would be less likely to be fulfilled. Hence, the more severe the collective action problems among foreign creditors, the greater would be the probability that some viable banks might not be rescued.

On balance, the simple model shows that by supplying new equity capital to banks with positive NPV projects, existing foreign creditors can play a vital role in solving the Russian banking crisis. Neither the provision of additional equity by third parties nor the provision of additional loans by third parties or by existing creditors is likely to lead to optimal recapitalization. Whereas in the first case either overinvestment or underinvestment can occur, underinvestment is likely in the second case because some of the gains in the good state of the world accrue to equity holders.

The result that the injection of equity through foreign creditors is the preferred option would be strengthened even further if we assumed that foreign ownership raises the efficiency of banks and thus the net present value of new projects. Moreover, recapitalization through the government is likely to be suboptimal as the government is likely to come under political pressure to rescue banks which have a low NPV but may be considered „socially important“. Hence, establishing foreign involvement as a clear-cut criterion for rescuing banks may enable the government to tie its own hands and to resist lobbying efforts aimed at preserving unviable banks.

3.2 Adverse Selection

In addition to the externality problem discussed above, the heterogeneity of banks and of their loan portfolios poses a problem in the context of bank recapitalization. Since non-performing loans have been a major source of trouble in banking systems in earlier crises elsewhere, one of the critical problems in designing solutions has been how to induce banks to reveal the true extent of their problems (adverse selection).

In cases where the true quality of assets is unknown, there is a danger that management might hide problems for as long as possible in order to avoid losing private benefits from control. Rather than separating sound from ailing banks, a tough policy might result in a pooling equilibrium in which even ailing banks pretend to be sound. This might lead to substantial additional losses of efficiency as banks would continue to misallocate funds (Buch 1996). For instance, banks might curtail lending to sound firms and instead roll over non-performing loans to troubled firms on the slim chance that these firms regain their footing, or they might charge excessive interest rates on credits to sound firms in an effort to cover their losses from non-performing loans.

One approach that would avoid these inefficiencies would be to recapitalize ailing banks without imposing penalties on owners and managers. However, instead of achieving a separating equilibrium, too generous a bail-out policy might end up creating a pooling equilibrium with even sound banks pretending to be in trouble in order to obtain recapitalization funds. As a solution, Aghion et al. (1998) suggest that bank owners and managers should not be penalized for insolvency, but that bail-outs should be tied in a non-linear way to the willingness of banks to force a sufficiently large number of bad customers into bankruptcy. By offering bail-outs without penalizing owners and managers, incentives to reveal problems would be strengthened. At the same time, the conditionality attached to the bail-outs would deter sound banks from participating since they have few bad customers.

However, unless the severe problems Russian banks are currently having with working out their non-performing loans are addressed, this proposal is unlikely to be effective in the Russian context. In the presently weak legal and institutional environment, the fact that Russian banks fail to vigorously pursue their non-performing debtors may not so much signal that the banks are really viable, but rather that they see little chance of recovering outstanding loans. These institutional weaknesses reflect the Russian government’s reluctance to allow higher unemployment and its attendant social costs. This shows that while reforming

bankruptcy legislation and its enforcement against firms is needed in its own right quite apart from the current banking crisis,[16] acting on this front will be an important ingredient of a banking reform program.

Since a solution to the banking crisis cannot wait until such a reform fully materializes, different tools to tackle the adverse selection problem need to be devised for an interim period. One solution has been suggested by Povel (1996). His proposal does not rely on firm bankruptcies as a signal to separate viable from unviable banks. Instead, it focuses on severance payments as an inducement for managers and owners of banks to reveal financial distress.

Returning to the model used above to discuss the externality problem, we now presuppose that only one group of investors (foreign creditors) exists. But an asymmetric information problem is now introduced. There are two types of domestic banks, and only the managers can observe what each bank's type truly is. Moreover, we assume that the bank's managers reap a private non-transferable benefit *r* from staying in control, i.e. from not having the bank liquidated early. This creates an incentive for the bank manager to conceal failure.

We depart partly from the model of the previous section in which the pay-off without additional investment, i.e. without a rescue operation, was deterministic (Y). Now it is assumed that Y is stochastic from the creditors' point of view because they know the probability distribution of project types only, whereas the actual type is private knowledge of managers.

More specifically, with probability P_G, a bank is in financial distress but can be rescued if an additional investment *I* is made, in which case it yields a fixed gross pay-off of X_G. Even if no rescue occurs, there is still a gambling chance of γ that the bank's project yields the same pay-off X_G, but with probability $1-\gamma$ it yields nothing. However, there is also a probability $P_B = 1 - P_G$ that the project is a hopeless failure which cannot be rescued and does not yield any gross pay-off at all, i.e. $X_B = 0$. In this case, additional investment delays liquidation and enables the bank's managers to hang on to their private benefit of control.

Thus, without a rescue operation, the investor expects the value of the bank's assets to be:

$$(9) \qquad Y = \Pi_{1,P} = \gamma P_G X_G .$$

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[16] Similarly, one of the lessons the IMF has drawn from its handling of the recent financial crises in Asia is that the improvement of frameworks for corporate debt work-outs and bankruptcy should have been given higher priority from the outset of the crises (Lane et al. 1999).

With a rescue operation, expected pay-off of investors equals:

(10) $\Pi_{2,P} = P_G X_G - I$.[17]

We assume that it is socially efficient to rescue salvageable projects but not failures. This implies the following two conditions:

(11) $X_G - I > \gamma X_G \quad \Leftrightarrow \quad (1-\gamma)X_G > I$

and

(12) $I > r$.

Under these circumstances, the foreign investor would want the bank to reveal the type of the project truthfully. Failure to do so would result either in a futile rescue operation, which would imply wasting *I*, or in not rescuing a deserving bank, which would imply foregoing part of the maximum achievable pay-off. However, bank managers will want to reveal their information about the type of the project only if they are compensated for the informational rent they are giving up. By reporting the project as salvageable when it is in fact a hopeless failure, the bank could induce the investor to mount a rescue operation. The managers would then retain their private benefit which they would lose if the bank was liquidated. This gives managers an incentive to misrepresent a failed project as salvageable.

The investor can get around this problem by promising a severance payment equivalent to the private benefit *r* to managers whenever they announce a failed project. This payment makes the managers indifferent between reporting the truth and exaggerating the quality of the project and thus avoids futile attempts at rescuing failed projects. Managers offered a severance payment *r* do not have any incentive to misrepresent the bank's type. In equilibrium, the incentive constraint of bank managers binds: managers of bad but salvageable banks are indifferent between telling the truth, thereby receiving the private benefit *r*, or reporting a failure and cashing in on the severance payment. Managers of failure banks likewise get *r* under both options. A separating equilibrium is achieved provided managers prefer revealing over concealing the truth as long as it does not affect

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[17] Notice that in contrast to the externality model of the previous section, where $P_G X_G - I$ would have been the socially efficient pay-off, an improvement over (10) is possible in the present context because efficient use of managerial knowledge would allow to achieve the gross expected pay-off $P_G X_G$ by committing only $P_G I$ instead of *I*.

their pay-offs. Thus, in order to achieve efficient information sharing, the only payment from the investor to the bank managers that is necessary is a reward equivalent to *r* for reporting a failed project.

However, a perfectly separating equilibrium generally exists only if the manager's private benefit is a commonly known constant. If instead there is asymmetric information about managerial types, perfect separation of salvageable and failed projects is generally no longer achievable. In the appendix, we discuss the intricacies which this additional source of informational rents creates.

The question remains under which conditions it is optimal for the investor to establish a separating instead of a pooling equilibrium. Two pooling equilibria are conceivable. By definition, they both result in the managers always reporting the bank as being salvageable. However, the investor may either decide never to undertake rescue operations, or always to rescue.

Payoffs under the pooling equilibrium without rescue are given by (9) $\Pi_{1,P} = \gamma P_G X_G$. As seen in (10), payoffs under the pooling equilibrium with unconditional rescue are:

$$(13) \qquad \Pi_{2,P} = P_G X_G - I .$$

Thus, investors would prefer to rescue all banks in the absence of any information about project quality if and only if:

$$(14) \qquad P_G X_G \geq \frac{I}{1-\gamma},$$

and would prefer never to rescue otherwise. Rescue is thus less likely the higher the costs of rescue and the higher the probability of a turn-around.

By contrast, a separating equilibrium by definition reveals the true type of project to investors. Therefore, a rescue will be mounted only if the project is salvageable. Moreover, in order to induce information sharing, a severance payment must be made if the project is a failure. The expected pay-off of the separating equilibrium therefore is:

$$(15) \qquad \Pi_S = P_G(X_G - I) - P_B\, r = \Pi_{2,P} + P_B(I - r) > \Pi_{2,P}$$

because of (12). Under our maintained assumption that it is socially inefficient to rescue failed projects, the investor will never implement a pooling equilibrium with unconditional rescue. Compared to the pooling equilibrium without rescue, the separating equilibrium involves a severance payment and a rescue cost, but

also entails a higher probability of the good outcome. Hence, a separating equilibrium is *more* likely ($\pi_S \geq \pi_{1,P}$) the higher the probability of a salvageable project, the lower the probability of a successful gamble for resurrection, the lower the private benefit of the manager, and the lower the cost of rescue measured against the manager's private benefit:

(16) $\quad (1-\gamma)P_G X_G \geq r + P_G(I-r)$.

3.3 Moral Hazard

The analysis so far has been confined to the present situation in Russia where banks are already in distress. We have not focused on how the banks got into trouble in the first place. But after a successful clean-up of the banking sector, the success of the remaining banks will crucially depend on the performance of their managers. As managers are able to influence returns to future projects through their personal effort, mechanisms need to be designed that provide proper managerial incentives to minimize the danger of similar crises re-emerging in the future.

To the extent that managers learn from the present crisis, how the crisis is handled will shape future incentives. In particular, bailing out managers as suggested in the previous section may send the message that managers have little to lose if their banks get into financial distress. Therefore, it might be objected that bailing out banks now sows the seeds of future moral hazard problems. Instead, discouraging moral hazard would require a credible commitment not to bail out the managers of financially distressed banks (Dewatripont and Tirole 1994b).

However, under certain conditions, future moral hazard problems can also be mitigated by providing additional pecuniary incentives for managers while retaining the offer of severance pay in the event of financial distress. Returning to the model of Povel (1996), we now look at a recapitalized bank to show that a bail-out along the lines suggested above does not necessarily compromise ex ante managerial incentives in the future if contracts are designed properly.

After a successful rescue operation, a recapitalized bank again faces competing investment projects that it can undertake. As before, there is a risk that the project undertaken will turn out to be a failure, or that it will turn out to be non-performing but salvageable. However, while in the previous section, which modeled the current situation in Russia, these were the only possibilities, we now assume that the project may also turn out to be profitable. Moreover, the bank's

managers can raise the probability with which the project will succeed by exerting managerial effort *e*.

Let the probability of success be *e* if effort is exerted and *1-e* if no effort is exerted. Exerting effort comes at a private unit cost *c* to the manager but is assumed to be socially efficient. This implies the following inequality:

$$(17) \qquad eX_G + (1-e)P_G(X_G - I) + [e + (1-e)P_G]r - c\,e > P_G(X_G - I) + P_G\,r\,.$$

The LHS of equation (17) gives the expected social return when effort is invested. The first term is the probability-weighted return in the good state. The second term denotes the probability-weighted return when the project turns out to be salvageable and is rescued. The third term gives the private benefits of management in these two cases. Correspondingly, the RHS of (17) gives the expected social return when no effort is supplied. It consists of the probability-weighted return to a salvageable project if it is rescued and the management's corresponding private benefit.

We assume that managers are risk neutral but protected by limited liability. If the only pecuniary incentive offered to managers was a severance payment in case they reported the project as failed, managers would choose not to exert costly effort, because due to the severance payment they would not lose anything if the project turned out unsuccessful. The gross pay-off to management would be *r* in both cases. Thus, by creating an incentive for efficient information sharing ex post, incentives for efficient effort ex ante would be compromised.

However, management can be motivated to supply effort by offering it a share of the pay-offs if the project is successful.[18] Payments must be made conditional on what managers report about the type of the project and on the actual outcome of the project. Specifically, management as before receives the severance payment *r* if it reports the project as failed. The project is then liquidated and management is fired. If it reports the project as in distress but salvageable, investors undertake a rescue operation. In this case management receives a pay-off of $\gamma\, c/(1-\gamma\, P_G)$ if the rescue operation is successful and a pay-off of zero if it is not. Finally, if management does not report any problems, its pay-off is $c/(1-\gamma\, P_G)$ if the project turns out profitable and again zero if it does not.

With this contract, management has both the incentive to provide effort ex ante and thus to minimize the probability of financial distress and the incentive ex post

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[18] For a detailed derivation of this result see Povel (1996). Alternatively, the threat of an infinite penalty for failing to exert effort might also be sufficient to elicit efficient effort, but this is ruled out by the assumption of limited liability.

to truthfully reveal the financial situation of the bank and to minimize the costs of possible rescue operations.

To see this, consider first the worst outcome, a failed project. As in the previous section, management can recover its private benefit of control by reporting the truth. By pretending the project was salvageable or even profitable, management can delay liquidation and thereby also protect its private benefit, but it does not receive any additional pecuniary benefit.

Now suppose the project is in effect distressed but salvageable. By wrongly reporting it as failed or as profitable, management would be preventing a successful rescue and would therefore be reducing its own expected pecuniary benefit. Finally, if the project is truly profitable, management can secure a higher pecuniary benefit by announcing the truth than by pretending the project to be in distress or failed. Thus, the contract implements the same separating equilibrium as in the previous section and hence solves the adverse selection problem. The contract is also compatible with management exerting optimal effort ex ante.

The contract guarantees management its private benefit of control in all states of the world. Moreover, if effort is exerted, the gross managerial pay-off rises by:

$$(18) \qquad e\left[\frac{c}{1-\gamma P_G} - P_G \frac{\gamma c}{1-\gamma P_G}\right] = c\, e$$

relative to the situation where no effort is exerted. The first term in parentheses is the pay-off if effort is exerted and the project turns out to be profitable, while the second term is the pay-off if no effort is exerted and the project turns out to be salvageable. Hence, the cost of effort is exactly offset by the higher gross pay-off, and expected managerial pay-offs are identical with and without effort:

$$(19) \qquad \Pi_m = r + \frac{\gamma P_G c}{1-\gamma P_G}.$$

Thus offering severance payments to managers of distressed banks today does not preclude creating efficient performance incentives for bank managers in the future. This proposition is true even if it means that future bank managers will come to expect similar severance payments in case of financial distress.

4 Discussion of Results

The current banking crisis in Russia differs from its predecessors elsewhere because the government lacks funds for recapitalization, because foreign liabilities of domestic banks are substantial, and because institutions are weak. Against this background, an efficient mechanism for the reform of the banking system needs to be found which ensures that inefficient banks are closed and that banks which new investments have a positive net present value can continue operations.

This paper has discussed alternative approaches to the recapitalization of commercial banks and has suggested a blueprint for reforms. Reforms must deal essentially with three problems: the externalities which can prevent principally solvent banks from having access to fresh funds and may hence cause them to fail for lack of liquidity, the adverse selection problems arising from asymmetric information about the true financial condition of banks applying for recapitalization, and moral hazard issues arising from expectations about future bail-outs.

The weak financial position of the Russian government means that the standard solution to the externality problem, namely for the government to supply additional funds to viable banks, is hardly a feasible option for the Russian banking system as a whole. In addition, recapitalization by the government may not lead to efficient investment, and banks whose projects have a negative net present value are likely to be rescued. However, since foreign banks have significant stakes in the Russian banking system, they have an interest in a successful rescue operation. Recapitalization through foreign creditors might lead to efficient investment decisions because foreign creditors can internalize the effects of new investments on the value of existing claims. Establishing foreign involvement as a clear-cut criterion for rescuing banks would have an added advantage. It would enable the government to tie its own hands and to resist lobbying efforts aimed at preserving unviable banks.

Our analysis suggests that it may in principle be feasible that foreign banks provide the necessary funding for the recapitalization of the viable part of the Russian banking system. In order to achieve such an outcome, the government would have to take over failed banks, offer them for recapitalization to their existing foreign creditors, and liquidate those banks which are not able to attract additional funds. Moreover, the government must ensure that seniority rights are specified and enforced.

Yet, apart from the fact that the institutional framework needs to be conducive to a positive net present value of new projects, a first best solution can only be achieved if a number of key conditions are met:

- Claimholders who do not participate in the recapitalization can retain seniority over the newly injected capital only as long as their claims do not exceed the liquidation value of existing assets. Otherwise, recapitalization would provide a positive externality to these claimholders. In the present context, this would imply that old shareholders lose their equity claims and that asset stripping of managers is halted. Hence, a timely solution is needed. The claims of domestic depositors could be (partially) backed by new assets provided by the government *conditional on* additional funds being made available by existing creditors. To the extent that a recovery of the Russian banking sector is in the interest not only of private foreign creditors but of Western economies in general, the funds needed for the (partial) reimbursement of domestic depositors may be made available by multilateral institutions.
- Furthermore, because foreign banks would have to assume ownership of the Russian banks, policies concerning the market entry of foreign banks need to be revised. Thus far, foreign banks can only enter the Russian market after they have received a license from the CBR, and the maximum amount of foreign capital in the Russian banking system has been restricted.
- Finally, macroeconomic risks have been ignored in the above analysis. As the banks' net present value has been calculated in domestic currency and as foreign debtors are interested in foreign currency returns, exchange rate risk may lower substantially the value of the bank in the eyes of foreign investors. Hence, as long as the macroeconomic situation does not stabilize sufficiently, foreign money is unlikely to be forthcoming.

As long as these conditions are not met, the efficient solution would be to close all distressed banks and to realize the liquidation value (if any) of the existing assets. In addition, the decision of foreign creditors to provide additional equity and to take over Russian banks cannot be seen in isolation from a solution to Russia's foreign debt problem in general. By assuming ownership in Russian banks, foreign creditors would, for instance, indirectly obtain claims on the Russian government over and above the claims that they already hold. Although a discussion of possible links between the foreign indebtedness of the Russian government and commercial banks is beyond the scope of this paper, this shows that a solution to

the problems in the banking sector is unlikely to be forthcoming if the foreign debt problem as a whole is not tackled.

As for the adverse selection problem, tying bail-outs to the willingness of banks to enforce their claims via the initiation of bankruptcy procedures could in principle limit inefficiencies. Yet, the presently weak institutional environment implies that it would be difficult to use the banks' efforts at recovering non-performing loans as a signal about their financial condition in the short-run. While economic policy should change its track and show the will to enforce existing bankruptcy legislation, severance payments could be used as a tool to overcome the adverse selection problem until institutional bottlenecks have been overcome. Severance payments could be made to current managers (and possibly owners) in order to induce managers to share their information about the true financial situation of individual banks. However, it was also shown that a separating equilibrium is less likely to be reached if the necessary severance payment would be high, if failed projects are likely, if the probability of a successful gamble for resurrection is high, and if the amount of additional investment required is high.

Offering severance payments to the managers of ailing banks may furthermore raise concerns that in the future bank managers will expect similarly generous treatment in the event of financial distress. If so, their ex ante incentives to work hard in order to avoid financial distress might be compromised. However, this is not necessarily the case as surviving banks can use pecuniary incentives for good performance to elicit managerial effort.

While pecuniary incentives can be used to encourage managerial effort, they may be insufficient to achieve the socially efficient level of effort. For instance, assuming managerial effort to be continuous rather than dichotomous in the model of Section 3.3 would result in ex ante managerial effort remaining inefficiently low under a contract which prevents adverse selection.

To the extent that pecuniary incentives may not be effective, ex ante performance incentives could be provided by the threat of *tough* intervention in the event of financial distress (Dewatripont and Tirole 1994a, 1994b). But since tough intervention is incompatible with efficient information sharing ex post, the tension between preventing ex ante moral hazard and preventing ex post adverse selection would remain. Alternatively, the threat of tough intervention could be combined with better ex ante monitoring by a regulator (Mitchell 1998a). This points to the key role which enhanced banking supervision and improved accounting

standards can play to increase the transparency of banks' balance sheets and to reduce the degree of asymmetry of information in the future.

5 Appendix

Adverse Selection with Asymmetric Information About Managers' Private Benefits

In the main body of the paper, we have assumed that the bank manager's private benefit is a commonly known constant. The present appendix discusses the robustness of the result on adverse selection if this assumption is relaxed.

Assume, for instance, that managers can be of two types. As before, both types do not receive any private benefit if the project is liquidated early.[19] But one type reaps a low private benefit $\underline{r}$ if the project is continued, and the other type reaps a high private benefit $\bar{r}$ in these circumstances. Investors know only the distribution of managerial types but cannot observe which type they are dealing with.

In this case, a perfect separation of projects into failed and salvageable types is not generally feasible. Suppose the manager has a high private benefit. In this case, any severance payment short of $\bar{r}$ would be insufficient to prevent him from misreporting a failed project as salvageable, since his pay-off from misreporting would be $\bar{r}$.[20] Hence some failed projects would go undetected. But neither would raising the severance payment to $\bar{r}$ achieve perfect separation. This is because for managers whose private benefit is low, any severance payment in excess of $\underline{r}$ would induce them to misreport salvageable projects as failed.

Thus the correlation between managerial types and project types is of crucial importance in the presence of asymmetric information about private managerial

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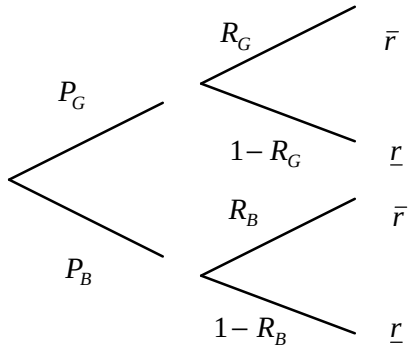
19 This assumption is retained because otherwise managers would never have any incentives to misrepresent a failed project as salvageable.

20 In contrast to the case where there is no asymmetric information about managerial types and where therefore perfect separation of project types is feasible, the announcement of a failed project may or may not be true in the present case. Hence it is no longer obvious that the investor should liquidate the project immediately when the manager announces it as failed. Rather, the investor may now want to gamble for resurrection. We assume that if the investor chooses to gamble, he will fire the manager first. This means that, as was true without asymmetric information about managerial types, the manager will never enjoy a private benefit of control if he announces a failed project.

benefits. If managers with high private benefits are likely to have salvageable projects, then the cost of keeping the severance payment below $\bar{r}$ in terms of inefficient investments into failed projects will be low. Conversely, the cost of raising *r* above $\underline{r}$ in terms of preventing rescue of salvageable projects will be high in this case. Hence the stronger a positive correlation between managerial private benefits and project quality, the more sense it makes to offer a *low* severance payment for reporting failures. In the extreme, if the correlation is perfect, offering $\underline{r}$ will achieve the separating equilibrium.

To see this, let the probability of a manager being of high type given that his project is of type *i* be R_i, where $i = G,B$; then the corresponding conditional probability for a manager of low type is $1-R_i$. The joint probability of a manager being of high type and the project being of type i is then given by $P_i R_i$, and the corresponding joint probability for a low-type manager is $P_i(1-R_i)$ (Graph 1).

Graph 1



By offering a high severance payment of $\bar{r}$ to managers who report their projects as failed, the investor can expect the following pay-off:

(A1) $$\Pi_{r=\bar{r}} = P_G\left[R_G(X_G - I) - (1-R_G)(\bar{r} - gX_G)\right] - P_B\bar{r}.$$

A manager with a high private benefit and a salvageable project, a combination which occurs with probability $P_G R_G$, will truthfully report the project as salvageable because by reporting it as failed and collecting the severance payment he could not improve on his private benefit. The investor invests *I* and the project is rescued successfully for a pay-off of $X_G - I$. By contrast, if the manager has a low private benefit and the project is salvageable, the manager will claim that the project has failed, thereby foregoing his low private benefit but collecting the high

severance payment at a cost of $\bar{r}$ to the investor. The investor will then take a gamble in the hope that the project is not really a failure and still turns out well. With probability γ, this gamble results in a positive pay-off of X_G (partially) offsetting the costs incurred through the severance payment.[21] Finally, any manager of a failed project will truthfully report failure and collect the severance payment because it is at least as high as his private benefit would be if he misrepresented the project as salvageable. Thus with the high severance payment, all failed projects will be revealed truthfully, but some salvageable projects will be misreported as failed.

Alternatively, the investor could offer the lowest possible severance payment $\underline{r}$. In this case, the expected pay-off would be:

(A2) $$\Pi_{r=\underline{r}} = P_G\left(X_G - I\right) - P_B\left[R_B I + \left(1 - R_B\right)\underline{r}\right].$$

Under this contract, any manager with a salvageable project will always report the truth. However, managers with a high private benefit and a failed project will eschew the low severance payment and will claim that their project is salvageable. This will induce the investor to invest at a cost of *I* without getting a return. Finally, managers with a low private benefit and a failed project will report the truth and collect the severance payment.[22] Thus in contrast to the contract offering the high severance payment, all salvageable projects will be revealed truthfully now, while some failed projects will be misreported as salvageable.

Combining (A1) and (A2), we can represent the general case where the severance payment is in between the extreme values:

(A3) $\Pi_r = P_G\left[R_G\left(X_G - I\right) - \left(1 - R_G\right)\left(r - \gamma X_G\right)\right] - P_B\left[R_B I + \left(1 - R_B\right)r\right]$ where $\underline{r} < r < \bar{r}$.

In this case, there is neither full identification of salvageable projects nor of failed projects. However, any intermediate severance payment is always dominated by the low severance payment because by assumption (11) rescuing sal-

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[21] The strategy to gamble on the project after the manager has announced it as failed obviously dominates the alternative of immediate liquidation because gambling costlessly preserves the possibility that the project may turn out successful. Of course there is a third conceivable strategy, namely to ignore the manager's announcement altogether and to rescue any project. This amounts to a pooling equilibrium and will be discussed below.

[22] Again, since perfect separation of project types is unattainable, the investor might conceivably choose to gamble on the projects announced to be salvageable rather than trying to rescue them. In essence this amounts to a pooling equilibrium without any rescue attempts, an alternative which is taken up below.

vageable projects leads to a higher expected pay-off than gambling for resurrection.

(A4) $\Pi_{r=\underline{r}} - \Pi_r = (1-R_G)P_G\left[(1-\mathsf{g})X_G - I\right] + (1-R_G)P_G r + (1-R_B)P_B(r-\underline{r}) > 0$.

Hence in the remainder of the section we can focus on the two corner solutions (A1) and (A2). Specifically, the investor will prefer the (imperfectly) separating equilibrium with the low severance payment (A1) to the one with the high severance payment (A2) if

(A5)
$$\mathsf{P}_{r=\underline{r}} - \mathsf{P}_{r=\bar{r}} = (1-R_G)\left(\mathsf{P}_{2,P} - \mathsf{P}_{1,P}\right) - (1-R_G)P_G(I-\bar{r}) + (1-R_G)I - P_B R_B\left[I-\underline{r}\right] + P_B(\bar{r}-\underline{r}) \geq 0$$

It is readily seen that this condition tends to be more easily met if R_G is high and R_B is low, i.e. if the correlation between managerial and project types is strong. This can be highlighted by considering the extreme case where correlation is perfect. This case corresponds to $R_G = 1$, and $R_B = 0$. We then have:

(A1a) $\Pi_{r=\bar{r}} = P_G(X_G - I) - p_B\bar{r}$ and

(A2a) $\mathsf{P}_{r=\underline{r}} = P_G(X_G - I) - p_B\underline{r}$.

Both solutions achieve perfect separation of project types. Subtracting (A1a) from (A2a) gives:

(A6) $\mathsf{P}_{r=\underline{r}} - \mathsf{P}_{r=\bar{r}} = P_B(\bar{r}-\underline{r}) > 0$,

i.e. the low severance payment is preferred to the high payment. Moreover, the low severance payment is preferred to any intermediate payments as well. The intuition behind this is that offering the minimum severance payment is sufficient to induce the managers of failed projects, all of which have low private benefits, to reveal the truth. At the same time, the low severance payment does not encourage any of the managers of salvageable projects, all of which have high private benefits, to distort information. Hence raising the severance payment raises the costs to the investor without improving the information sharing and hence the pay-offs.

In this special case, the results from the main body of the paper carry over. However, in the general case with less than perfect correlation and hence imperfect separability, the size of the optimal severance payment and thereby the optimal form of the pay-off depends on the parameter constellation. Rearranging

(A5), we see that for the separating equilibrium with the low severance payment to dominate the one with the high severance payment for a given distribution of managerial types, it is sufficient that (i) the pooling equilibrium with unconditional rescue be superior to the pooling equilibrium without rescue, and that (ii) the sum of conditional probabilities for high private managerial benefits, $R_G + R_B$, be less than unity:

(A5') $$\begin{aligned}\Pi_{r=\underline{r}} - \Pi_{r=\bar{r}} &= (1-R_G)(\Pi_{2,P} - \Pi_{1,P}) + (1-R_G-R_B)(1-P_G)I \\ &\quad + (1-R_G)\bar{r} + P_B R_B \underline{r} + P_B(\bar{r}-\underline{r})\end{aligned}$$

By the same token, few general statements are possible on the relative size of investor returns under the separating and pooling equilibria.

Comparing the expected pay-offs to investors under the *low* severance payment and with unconditional rescue we find:

(A7) $$\Pi_{r=\underline{r}} - \Pi_{2,P} = (1-P_G)(1-R_B)(I-\underline{r}) > 0\,,$$

i.e. investors always prefer the (imperfectly) separating equilibrium with low severance payment to unconditional rescue (as was the case without asymmetric information about managerial types). A sufficient condition for the separating equilibrium with low severance payment to dominate the pooling equilibrium without rescue is for the latter to be dominated by the pooling equilibrium with unconditional rescue:

(A8) $$\mathsf{P}_{r=\underline{r}} - \mathsf{P}_{1,P} = \mathsf{P}_{2,P} - \mathsf{P}_{1,P} + (1-P_G)(1-R_B)(I-\underline{r}) > 0 \text{ if } \Pi_{2,P} \geq \Pi_{1,P}\,,$$

which is satisfied if (14) holds. Pulling these sufficient conditions together, we can say that if the pooling equilibrium with unconditional rescue is preferred to the one without rescue, then an (imperfectly) separating equilibrium will be implemented. If, in addition, the sum of conditional probabilities for managerial types is less than unity, then the investor will choose to implement the separating equilibrium with the low severance payment.

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