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# WORKING PAPER

## Passive Creditors

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May 2003

2003/177

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We wish to thank Sophie Claeys for most helpful comments. This paper also benefited from remarks by seminar participants at LICOS, SITE and Ghent University and from participants at the Moscow Annual conference for Transition Economists.

D/2003/7012/15

# Passive Creditors

Koen Schoors and Konstantin Sonin

**Abstract**

Creditors are often passive because they are reluctant to show bad debts on their own balance sheets. In transition economies this problem is particularly severe. In this note, we analyze a simple general equilibrium model, which allows to study the externality effect of creditor passivity. The model yields rich insights in the phenomenon of creditor passivity, both in transition countries and developed market economies and allows to derive policy implications to solve creditor passivity. Our model explains in what respect banks are different from enterprises as creditors and what this implies for policy. Phenomenons that are commonly observed in banking, such as deposit insurance, government coordination to work out bad loans, and special bankruptcy proceedings for banks, are explained by this.

## 1 Introduction

In transition countries, creditors have often remained passive in the face of overdue claims. Wage arrears and pension arrears have been predominant in all countries in the region . Tax arrears have risen and fallen again. Inter-enterprise arrears (i.e. involuntary trade credit) have emerged in all countries of the region (Rostowski, 1994) and are still present in some[1].

*We wish to thank participants of the LICOS seminar, the SITE seminar, the Moscow Annual conference for Transition Economists and the University of Gent seminar for useful comments

[1]Payment arrears are still a serious problem in Romania (IMF (2001), OECD (2002)).

The problem of bad loans is still looming in many countries. The common denominator of all these phenomena is creditor passivity. We propose a simple general equilibrium model that focuses on the externality effect of creditor passivity. Our approach highlights the adverse externality effect of creditors' passivity on other creditors' incentives. In the presence of this effect, the economy might be locked in an equilibrium characterized by low enforcement, and low incentives for each individual creditor to enforce. The situation might be changed by a coordinated effort of many creditors, e.g. by a government program.

Creditor passivity in transition countries was not unexpected, since newly-born market economies lacked many standard institutions of contract enforcement. Ultimately, only the threat of bankruptcy can impose financial discipline on a debtor in a legal way. However, most countries in the region did have commercial law and bankruptcy regulation in place before 1995 (Bruniaux, 1995). Despite of this, creditor passivity has persisted because of continued intransparency, uncertainty and inefficiency in the enforcement of the new rules by the judiciary.[2] This has been referred to as the softness of legal constraints (e.g., Perotti, 2003).Our model builds on this idea. If an agent enforces, he not only receives the liquidation value, but also reduces the intransparency and uncertainty about the liquidation value for other creditors. Hence the expected proceeds of enforcement increase for other creditors. This is certainly the case if there are economies of scale or learning effects in the provision of public goods, such as contract enforcement by the judiciary. Therefore in our model, the expected average cost of enforcement is low if enforcement is standard practice, while it is high if enforcement is absent. The main insight of this paper is that this positive externality of enforcement (i.e. negative externality of passivity) can create a creditor passivity trap, where passive creditors remain passive mainly because all the others remain passive too. We further analyze how the equilibrium is possibly affected by economic stabilization and by strategic debtor behavior.

Our analysis relates to several important strands of literature. The first body of relevant literature is on soft budget constraints. Passive creditors extend soft budget constraints to their debtors. After Kornai, there are two conceptually different soft-budget-constraint

[2]The recent EBRD's Legal indicator Survey suggests that the choice of insolvency system is less important than the progress and effort put into effectively implementing a chosen system.

models: one based on sunk investments (see Dewatripont and Maskin, 1995, Maskin and Xu, 1999 and Berglof and Roland, 1997), and another explicitly based on creditor passivity (Mitchell, 1993, 1998, 1999). In Mitchell (1998, 1999) creditors are passive exactly because they are aware of showing bad debt on their balance sheets. There is another strand of literature that focuses on collusion between economic agents to explain the build-up of arrears. Agents may collude and voluntary extend credit to each other in the knowledge that it will not be repaid, because they expect that the government will come in with a collective bail-out if too many firms are threatened with a collapse (see Perotti, 1998).

After developing first intuition of general-equilibrium aspects of creditors passivity, we concentrate on one particular class of creditors, namely banks. Banks are in a league of their own. Contrary to tax arrears and inter-enterprise arrears, bad loans have not really faded in transition countries (see Table 1) and they are also present in developed market economies. It is bank passivity that makes bad loans accumulate and spill over in a banking crisis. The prevalence of bank crises and twin crises (a currency crisis combined with a bank crisis) has increased substantially since 1973 (Bordo et al, 2001). The consequences of banking crises are often severe. Kaminsky and Reinhart (1999) find that banking crises typically precede a currency crisis, while the currency crisis deepens the banking crisis, activating a vicious spiral. In our model, banks are special because they have very liquid liabilities. Tax payers cannot withdraw paid taxes, workers cannot withdraw contributions paid to the government pension fund, banks nor enterprises can easily withdraw credit granted to other economic agents. Depositors however can very easily withdraw deposits. This pronounced liquidity of bank liabilities makes banks vulnerable to their creditworthiness in the eye of the depositor. Enforcement involves signalling the presence of bad loans on your balance sheet. Banks are aware of this because they fear to be punished by depositors. In our model, the severity of the punishment depends on the actions of other banks. If nobody enforces, the punishment is severe, while there is no punishment if enforcement is standard practice. Indeed, if all banks enforce and all have some visibility of bad loans on their portfolio, there is no problem with enforcing an individual loan. Enforcement of bad loans by only a few banks however may be interpreted by depositors as a signal of fundamental problems in these banks and may trigger a deposit withdrawal or ultimately a bank run. Our model does not offer a

new explanation for bank runs. Rather, we are focused on how the sheer possibility of a bank panic affects banks' incentives to deal with bad loans on their balance sheets. Thus, the liquidity of bank deposits constitutes an additional barrier to enforcement. This is reinforced by a time inconsistency problem: Depositors punish now, while the proceeds of enforcement will arrive only in the future. In the meanwhile the bank could be dead.

It is concluded that banks' innate fear of abrupt illiquidity and bankruptcy may render them more passive. To break this adverse incentive banks may need special bankruptcy regulations. Also, there may be a largely neglected role for deposit insurance. It is true that deposit insurance has been shown to provoke moral hazard of banks and depositors. Demirguc-Kunt and Detragiache (1998) even find that the the presence of explicit deposit insurance increases the probability of a bank crises. However, deposit insurance may also contribute to banking sector stability, because it makes deposits less liquid. In the framework of our model this gives banks an incentive to be active creditors, and hence renders the build-up to a systemic crisis less likely.

Further, we elaborate the model of passive banks by focussing on bank heterogeneity and liquidity shocks. In real life, banks are not identical, but heterogenous. This is introduced by giving banks different initial liquidity level. In this case the effects of a liquidity shock, as the one that occurred in Russia in August 1998 become very interesting. In fact the liquidity shock may function as a catalyzer for enforcement and restructuring, but it may also instead reinforce creditor passivity, depending on the parameters of the model. A good liquidity shock may shake the banking sector out and make the sector leave the passivity trap. If the crisis is too severe, the passivity trap becomes a bank cemetery.

The rest of the paper is organized as follows. In Section 2, we introduce a simple general-equilibrium model. Section 3 deals with the special case of banks as creditors. Section 4 concludes.

# 2 The Theory

## 2.1 The Setup

There is a continuum $[0,1]$ of identical creditors. Each creditor has an overdue claim in amount of 1. The creditor can either enforce payment now or wait until the next period, $t+1$. To make this decision, each creditor compares the net present value of waiting $W_t$ to the net present value of enforcement $E_t$. If the creditor has chosen to wait at $t$ ($W_t > E_t$), he can again choose to wait or enforce in the next period, by comparing $W_{t+1}$ and $E_{t+1}$.[3] The net present value of waiting $W = W(\beta, \pi)$ is an increasing function of the expected probability of debt repayment in the next period $\pi$, $0 < \pi < 1$, and the discount rate $\beta$, $0 < \beta < 1$. The probability of repayment $\pi$ and the time discount factor $\beta$ are fixed and known to the creditor. The value of enforcement depends on the share of creditors that enforce, $\lambda$, with domain $[0,1]$. If the creditor decides to enforce at $t$, he receives $V(\lambda)$, net of direct costs of enforcement at $t+1$, with $V(\lambda) : [0,1] \rightarrow [0,1]$, $V'(\lambda) > 0$. We assume that $V(\lambda)$ increases with $\lambda$ to reflect the idea that when enforcement is a common way of dealing with bad loans, the direct costs of initiating a bankruptcy procedure are lower. This may be easily derived from first principles as economics of scale or learning effects in the public sector. In a specific transition context, there is an additional argument on the certainty of the liquidation value. If an agent enforces, he not only receives the liquidation value, but also reduces the intransparency and uncertainty about the liquidation value for other creditors. Therefore, the net present value of enforcement for a creditor at $t$ is defined as $E(\beta, \lambda) = \beta V(\lambda)$ and $E'(\lambda) > 0$.

## 2.2 Equilibria

A rational creditor chooses to enforce the overdue claim if $E(\beta, \lambda) \geq W(\beta, \pi)$. We are interested in steady-state equilibria. Define $\lambda^* \in [0,1]$ by $E(\lambda^*) = W(\beta, \pi)$. If $E(0) > W$, then $\lambda^* = 0$, and if $E(1) < W$, then $\lambda^* = 1$. If $\lambda^* = 0$, there is a unique equilibrium, with $\lambda = 1$ (all creditors enforce). If $\lambda^* = 1$, there is a unique equilibrium, with $\lambda = 0$ (all creditors wait). We refer to these equilibria as to the high-enforcement equilibrium and low-

[3] From now on, we skip time indices whenever it leads to no ambiguity.

enforcement equilibrium, respectively. The generic case is described in the proposition below (see Figure 1). When the share of agents that enforce is $\lambda$, each of them faces the following trade-off. He can either enforce and get $E(\beta, \lambda)$, or wait and get $W(\lambda)$. If $1 \geq \lambda \geq \lambda^*$, then $E(\beta, \lambda) \geq W(\lambda)$, so the agents that enforce have no incentives to deviate, while those that wait switch to enforcement. Thus, $\lambda = 1$ is an equilibrium. The case $0 \leq \lambda \leq \lambda^*$ is symmetric. The above discussion is summarized by our first result.

**Proposition 1** *If* $0 < \lambda^* < 1$, *there are two stable equilibria, a non-enforcement equilibrium with* $\lambda = 0$, *and a full-enforcement equilibrium with* $\lambda = 1$, *separated by an unstable equilibrium* $\lambda = \lambda^*$.

This simple model describes some phenomena of creditor passivity commonly observed in transition countries, namely overdue claims of individuals (wage arrears, pension arrears), overdue claims of the government (tax arrears)[4], overdue receivables (such as inter enterprise arrears)[5] and overdue bank loans (bad loans)[6]. All transition countries started transition without a functioning bankruptcy code, which implies that their creditors all started in situation with $\lambda^* = 1$, i.e. full non-enforcement. In this situation bad debts persist because bad debtors persist. In a later period, bankruptcy codes and proceedings were introduced in all countries at different dates (see the EBRD annual transition reports for regular updates on progress on this front). Our idea of a passivity trap fits the experience of transition countries, where the phenomenon of creditor passivity and hence soft budget constraints persisted some time after commercial law and enforcement rules were introduced, but then gradually disappeared[7]. Kornai (2001) gives an excellent overview of how the budget constraints were gradually hardened in transition countries. Wage arrears and pension arrears have been present in all countries in the region, but are now falling, although slower in some countries than others. Russia has been one of the slow enforcers as described by Pailhe

[4]For Russian, see Ivanova and Wyplosz (1999).

[5]See Schaffer (2000).

[6]See Euromoney, June 1999.

[7]This practice is not limited to transition countries. In Belgium, professional soccer teams have been holding huge social tax arrears for decades, before the government finally decided to clamp down on the pertruders. Being held responsible for the demise of a soccer team is off course not the top priority of any politician.

and Pascal (2001), Brana and Maurel (2001), Desai and Idson (2000) and Lehmann et al. (1999). Tax arrears have arisen in all countries and have fallen again. Perotti (2003) shows data for Russia and Schaffer (1998) shows that in Poland tax arrears are concentrated in non-profitable firms. Tax arrears may be slow to fall because they provide a subtle way to conduct industrial policy[8]. Inter-enterprise arrears (i.e. involuntary trade credit) have emerged in all countries. Some countries have faced a rapid accumulation of interlocking webs of arrears which in some occasions triggered collective bail-outs by the government, as for example in Poland (see Rostowksi, 1994), Romania (Clifton and Khan, 1993 and Daianu, 1994) or Russia (Ickes and Rytermann, 1992) during early transition. Perotti (1998) describes how firms can collude and rationally extend trade credit that is not likely to be repaid, if they expect to be bailed by a government unwilling to accept the demise of good firms linked by arrears to bad firms. Other countries tackled this problem of inter-enterprise arrears by immediate enforcement. Hungary for example installed a tough bankruptcy law in 1992 which caused an initial wave of bankruptcies (Bonin and Shaffer, 1995) and installed enforcement once and for all, although the law was later revised by removing the 'automatic trigger' for bankruptcy (Burniaux, 1995). By now trade credit, which is a normal market practice, has become voluntary in most transition countries (Shaffer, 2000). Nonetheless, there are still some countries that exhibit involuntary trade credit with negative spillover effects. Hildebrandt (2002) shows empirically that the problem of interlocking effects of trade credit is more pronounced in countries that are less committed to economic reform. All this evidence is interpreted in our model as follows: All countries were initially caught in the creditor passivity trap. Our explanation complements the earlier analysis and provides a common explanation for all types of passivity. Creditor passivity is persistent because creditors are trapped in a non-enforcement equilibrium (the passivity trap) with $\lambda^* = 1$ and $\lambda = 0$. Creditors have been hesitant to use the new enforcement instrument, because the existing level of enforcement was below $\lambda^*$. One can interpret our externality effect of enforcement as a first mover cost of enforcement in the non–enforcement case. $\lambda^*$ can then be interpreted as the amount of creditor coordination necessary to jump from $\lambda = 0$ to

[8] Ponomareva and Zhuravskaya (2000) show that if explicit subsidisation is forbidden, one can arrive at very much the same result by extending tax arrears.

$\lambda = 1$. Since the cost of coordination is an increasing function of the number of agents to be coordinated, $\lambda^*$can be understood as a barrier (a measure of the coordination cost) that keeps creditors in the non-enforcement equilibrium.

If debtors could strategically react to creditors' action, creditors' passivity might be to some extent mitigated. Indeed, debtors might benefit, if they know how creditors behave. If the economy is in the low-enforcement equilibrium, a debtor has additional incentives not to pay back, as he knows that creditors are not enforcing anyway. Some debtors will not pay back, even if they have the money to do so, because the opportunity cost of default has fallen if creditors are less likely to enforce. Still, the probability of being paid back, $\pi$, might be non-zero as there remain other incentives to pay back: e.g., a default might affect future access to credit and capital. On the other hand, if the economy is in the high-enforcement equilibrium, a debtor has very strong incentives not to default on creditors, because he is faced with a real threat of bankruptcy. He will postpone payments to workers (wage arrears) and payments to the state (tax arrears) rather than fail on creditors, because these are less likely to threat with immediate enforcement. Figure 2 shows how one can formalize this by letting $\pi$, the probability of debt repayment, to depend on $\lambda$, the share of creditors that enforce.

The figure indicates that instead of a non-enforcement trap there may be a low-enforcement trap with enforcement at a level of $\delta^*$ . The equilibria of Proposition 1 can be changed accordingly. (The proof of the following Proposition is straightforward.)

**Proposition 2** *Suppose that debtors are more likely to re-pay debts if more creditors enforce,* $W = W(\beta, \pi(\lambda))$, $W'(\lambda) > 0$, $W''(\lambda) < 0$. *Then the full-enforcement equilibrium is more likely ($\lambda^*$ shifts to the left as compared to the equilibrium with a constant value of waiting equal to $W = W(\beta, \pi(1))$), and in the low-enforcement equilibrium, it might be that a non-zero share of creditors enforce.*

## 2.3 Stabilization

How does macroeconomic stabilization affect creditors' incentives? Stabilization is accompanied by lower inflation expectations (higher $\beta$) and a higher probability $\pi$ that the creditor

will repay in the future, due to the higher real growth of the economy without high inflation. The inverse relation between high inflation and growth is well established for very high levels of inflation. Then higher real growth will lead to higher profits and hence higher $\pi$. An increase in the value of waiting reduces creditors' incentives to enforce. Indeed one of the costs of stabilization and growth is that the incentive to enforce bad debts falls in case the economy is still in the bad equilibrium.

**Proposition 3** *A macroeconomic stabilization increases $\lambda^*$, the barrier to enforcement.*

It follows from Proposition 3 that macroeconomic stabilization might provide a creditor with additional incentives to wait, as can also be seen in Figure 1. If the pre-stabilization equilibrium has $\lambda = 0$, stabilization does not change the equilibrium and increases the amount of coordination $\lambda^*$ needed to leave the ineffective equilibrium. This is exactly what happened in Russia in 1995-1997. During this period, the country enjoyed an exchange rate based macro-economic stabilization, but the problem of creditor inactivity and bad loans persisted (see Perotti, 2003, for an overview of the relevant data). In our view of the world this is what should be expected: If the economy is still in the bad equilibrium, stabilization will only make this equilibrium more persistent, as creditors can rationally wait longer to enforce and try to 'grow their way out of bad debts'. Although a stable macroeconomic environment is an important pre-condition for development of a market economy, stabilization clearly does not solve the problem of creditor inactivity in itself, quite on the contrary.

Propositions 1 and 3 carry a number of fascinating policy implications. What should the government do if faced with the problem of creditor passivity? First, the government could focus on making bankruptcy proceedings more efficient, which will shift $E(\lambda)$ upward and hence $\lambda^*$ to the left. Eventually the economy will shift to the state with $\lambda^* = 0$. Second, the government should, once stabilization is accomplished, commit to no more bail-outs, which will decrease $\pi$ and $W$ and hence shift $\lambda^*$ to the left. A firm commitment to hard budget constraints by the government (no more automatic subsidies to loss-making enterprises) would encourage the bank-led restructuring and/or liquidation of these loss-making firms. The reverse also holds. Indeed, the continued expectation of future bailouts of bad debtors

($\pi$ rises) would increase the value of waiting $W$, and would make enforcement less likely. Repeated bail-outs of enterprises are therefore likely to produce usual soft-budget-constraint negative effects: creditors will be more inclined to wait and see and may be seduced to gamble for another opportunistic bailout (Perotti, 1998). Third, even with unchanged $W$ and $E$ (and hence $\lambda^*$) the government can shift the economy to the enforcement equilibrium $E$, by introducing some $\lambda_G > \lambda^*$. One way of accomplishing this is a hard stance on tax arrears. If the government would enforce its overdue taxes by means of bankruptcy proceedings, it introduces a level of enforcement in the economy, which might be sufficient to shift the economy from the non-enforcement to enforcement. Another way of accomplishing this is direct coordination of enforcement and restructuring by the government of a proportion of $\lambda_G \geq \lambda^*$.This is what Germany has tried to accomplish by means of the Treuhandanstalt (for an overview of the economics of German reunification see Sinn and Sinn,1992). A third way of achieving $\lambda_G > \lambda^*$ is by introducing an automatic trigger in the bankruptcy law. Hungary introduced a very tough bankruptcy law in 1992, containing an "automatic trigger"-clause. The clause stipulated that managers were required to file themselves for bankruptcy within eight days after they had arrears exceeding ninety days (see Gray et al. 1996). Thanks to this Hungary was able to escape the trap of creditor passivity early on. Once enforcement had exceeded the threshold $\lambda^*$, the economy left the passivity trap and the automatic trigger was removed from the bankruptcy law by end 1993 (Burniaux, 1995). Kornai (2001) compares the number of bankruptcies in the Czech Republic, Hungary and Poland in 1992-1996. As a proportion of total firms, Hungary has much more bankruptcies, but not at the cost of lower economic growth. Clearly creditor activity has become the norm in Hungary. In several successor states of the Soviet Union, tax arrears are mainly in the form of energy sector quasi fiscal activities. Petri et all 2002 show that a decade into transition many successor states of the Soviet Union still provide large implicit and untargeted subsidies in the form of low energy prices and the toleration of payment arrears for energy bills. Since the energy companies are often government-owned, the government could also install $\lambda_G > \lambda^*$ by no longer accepting payment arrears on energy bills. Note however that often governments lay at the heart of the arrears chain. Many governments run expenditure arrears themselves, not only to government personnel and pensioneers but

also to suppliers. Ramos (1998) shows that expenditure arrears are distinctively present in the successor states of the Soviet Union. These supplier arrears are often owed to energy companies. This suggest that governments are in a bad position to enforce payment arrears on energy bills because they are one of the main debtors themselves. Breaking this cycle of arrears and in general eliminating government expenditure arrears are a precondition to achieve creditor activity in the economy.

# 3 Why Are Banks Different?

## 3.1 Market Discipline

Enforcement involves a public announcement by the creditor of the existence of overdue claims. If the public has imperfect information on the quality of creditor's claims, such an announcement lowers the value of the creditor's capital in the perception of the public. Often, creditors are also debtors: e.g., governments have payment arrears, enterprises have payables and loans, and banks have depositors. However, the debts of banks (deposits) are very liquid, while the debts of other agents are rather illiquid. Indeed, the government can not just cancel government arrears, nor can an enterprise withdraw granted trade credit, while deposits can easily be withdrawn and reinvested. This liquidity difference ensures that banks will behave fundamentally different from other agents in the presence of a signalling effect of enforcement.

In the case of banks, savers can either withdraw their deposit (or credibly require higher interest rates to compensate the observed higher risk). Let the losses due to these averse effects of signalling be denoted by $D(\lambda) > 0$, $D'(\lambda) > 0$. In its extreme form $D(\lambda)$ is a deposit run. Models of a bank run include Diamond and Dybvig (1983), Postlewhite and Vives (1987), Wallace (1988,1990), Chari (1989), Champ, Williamson, and Jagannathan (1996), Alonso (1996), Allen and Gale (1998) and many others, with explanations of why a bank run occurs ranging from "sunspots" to business cycle fundamentals. At an intermediate level of $\lambda$, $D(\lambda)$ refers to market discipline imposed by depositors on banks. Empirical evidence of market discipline in developed banking markets is reported by Park and Peristiani (1998) for the case of US savings and loan associations. Their findings indicate that riskier thrifts not

only pay higher interest rates on uninsured deposits, but also attract a smaller quantity of uninsured deposits. They even find that risk has an adverse effect on the growth and pricing of insured deposits, although the effect is less pronounced. Berger (1995) provides indirect evidence for the presence of market discipline by arguing that it may partly account for the observed positive relationship between capital and earnings of US banks in the 1980s. Ellis and Flannery (1992) report results consistent with the hypothesis that US money-center bank CD rates immediately reflect the information impounded in bank stock prices. The fact that depositors often switch deposits to other banks makes the 'externality' effect even stronger. This 'punishment' of deviation from the non–enforcement-equilibrium occurs at $t$, while the proceeds of enforcement are only received in $t+1$. We assume that $D'(\lambda) < 0$ : the rationale is that the larger is $\lambda$, the lower is opportunity cost of keeping deposits in a bank with bad loans. If nobody enforces, the punishment is severe, while there is no punishment if enforcement is standard practice. The more banks enforce, the less punishment there will be, as the signalling effect becomes weaker. Indeed, if all banks enforce and all have some visibility of bad loans on their portfolio, there is no problem with enforcing an individual loan. Enforcement of bad loans by only a few banks however may be interpreted by depositors as a signal of fundamental problems in these banks and may trigger a deposit withdrawal or ultimately a bank run.The value of enforcement to the bank is $E_B(\beta, \lambda) = \beta V(\lambda) - D(\lambda)$, and $E'_B(\lambda) > 0$. We assume that if a firm's losses exceed $D(\lambda)$, it brings the pay-off of $-\infty$,which should be understood as bankruptcy.

The simple model described above allows to single out the key difference between banks and enterprises in their behavior when facing bad debts. We define an enterprise's value of immediate enforcement as $E_E(\beta, \lambda) = V(\beta, \lambda)$, while the bank has the same value as above $E_B(\beta, \lambda) = V(\beta, \lambda) - D(\lambda)$. The only difference is that enterprises have no immediate losses due to deposit withdrawal. The value of waiting $W$ is the same for both types of agents.

**Proposition 4** *Because of market discipline, the barrier to enforcement is higher for banks, than for other creditors. Formally, if* $\lambda_i^*$ *is defined by* $E_i(\lambda_i^*) = W$ *and* $0 < \lambda_B^* < 1$, *then* $\lambda_E^* < \lambda_B^*$.

To prove the above proposition, it suffices to note that because of deposit withdrawal, the value of enforcement for banks is lower than for other creditors for any $\lambda$. (See Figure

3.) This result is very intuitive: since the bank's decision to enforce a contract is connected with an immediate cost, and thus the externality effect is more severe for banks, the banks' barrier to enforcement $\lambda_B^*$ is higher than the enterprises' barrier to enforcement $\lambda_E^*$. This means that banks are less likely to leave the non-enforcement equilibrium than enterprises, i.e. bad loans are ceteris paribus more persistent than inter-enterprise arrears. This fits reality very well. Inter-enterprise arrears have ceased to pose a problem in Central Europe (see Schaffer, 2000), but bad loans are still very much a problem as seen from Table 1.

This carries interesting policy implications. The mere introduction and implementation of efficient bankruptcy proceedings and hard budget constraints by the government (the policy recommendations implied by Proposition 1 and 3), might not be enough for banks to leave the passivity trap. In order to fulfill $\lambda > \lambda_B^*$ and reach the full-enforcement equilibrium, one needs a sufficient number of banks to coordinate and start enforcement together. An excellent way to organize this coordination is state intervention. Indeed, in most transition countries there has been strong state intervention in the case of systemic bad loans and non-enforcement by banks. In most cases loan workout units were organized either inside the bank, as in Poland (see Bonin, 2001) or outside the bank in a collective loan hospital as in the Czech Republic (see Matousek, 1995, for an analysis of the Czech consolidation bank experience). This was always combined with some form of recapitalization, conditional on operational restructuring and enforcement. Schoors (1995) gives an overview of early bank reform in the Czech Republic, Hungary, Poland and Slovenia. Bonin and Wachtel (2002) review a broader set of country experiences. In this case $\lambda_B^*$ has the following economic interpretation: it is the minimum share of banks (or contracts) that the government should restructure, if the government wishes to shift the banking sector from the low-enforcement equilibrium to the high-enforcement equilibrium. In transition countries, creditor passivity among enterprises has only occasionally been solved by a direct coordinated approach by the government. In the banking sector this approach was quite common not only in transition countries (see Schoors, 1995), but also in developed market economies. The solution of bank crises in the US (the S&L crisis) the Nordic banking crisis (in Sweden, Norway and Finland in the early nineties) and the ongoing Japanese banking crisis all involved substantial government interference and the allocation of budget money. Also more contemporaneous

banking sector problems in transition countries are solved by means of coordination, as for example in China were bad loans have been transferred to four asset management companies (Bonin, Huang, 2001). This omnipresence of government interference in bank restructuring is commonly attributed to the systemic importance of the banking system. We add to this explanation that banks, because of their very liquid liabilities, need a lot more coordination to leave the creditor passivity trap. Government intervention may be instrumental in providing this coordination.

Proposition 4 also gives a new rationale for deposit insurance. Deposit insurance reduces the liquidity of bank deposits and hence stimulates enforcement by banks by decreasing the punishment of enforcement. It is has been well documented that deposit insurance provokes moral hazard of participating banks and may in fact contribute to banking crises. Keeley (1990), Mishkin (1992), and Demirguc-Kunt and Detragiache (1998) have all found links between deposit insurance and bank crises. We however find that the reverse can also be true. Indeed, the absence of deposit insurance has a possible moral hazard cost in the form of non-enforcement. The moral hazard cost of deposit insurance (riskier behavior by banks) can be contained by properly priced insurance premia and prudential regulation and control (Dewatripont and Tirole,1994), while it is not clear how the moral hazard cost of no deposit insurance (non-enforcement) can be contained unless by direct state intervention. Therefore we think that the combination of properly priced deposit insurance and good prudential regulation and control might in some countries be superior to no deposit insurance at all.

We observe this problem clearly in the Russian banking system. In Russia there is still no deposit insurance, except for the state banks (with Sberbank on top), that have a state guarantee on their obligations according to the law and banks and banking activity. A leaked analysis of Russian banks after the crisis of August 1998 shows that the major loss of capital for banks was not the devaluation loss or the government default on treasury bills (the famous GKO), but bad loans that were in their balances already for some time[9]. The banks had been hiding these bad loans and there had not been a single bankruptcy proceeding started by a bank to enforce its loan before the crisis of August 1998. Our interpretation is that banks feared that enforcement from their side would be a signal to

[9] See The newly-wed and the nearly dead, *Euromoney*, June 1999.

depositors of their solvency and would encourage them to shift deposits to Sberbank, the safe, but not very profitable deposit haven. Indeed, when we observe the market share of Sberbank on the market for household deposits, we observe that it rises steadily from below 50 % in mid 1994 to above 85% in 1999. Since then stabilization has occurred and deposit insurance insurance has been introduced, which made the share of Sberbank fall back again. Every major financial scandal or banking crisis is clearly mirrored in a jump of Sberbank's market share. Therefore banks were very cautious to show any sign of bad loan problems to depositors, as they knew by experience what the punishment would be. Clearly, the Russian banking system was trapped in the low-enforcement equilibrium of the kind described in this paper. This was reinforced by the discriminatory deposit insurance situation (guarantee for Sberbank, nothing for the rest). After the August 1998 devaluation the Russian banking sector was by consequence in a dire state. The restructuring of the banking sector seemed imminent but has fundamentally stalled ever since (see for Schoors, 1999, for an overview of the mired restructuring). This is very well captured by our model.

## 3.2 Liquidity Constraints

Obstacles to enforcement can become greater because of liquidity constraints. Let $B$ denote the maximum amount of losses that allows a bank to continue its operations. In essence, $B$ represents a regulatory rule such as the minimum required capital for banks. Alternatively, $B$ represents total liquidity of the bank, in the absence of effective regulation. That is, if losses are too large, $D(\lambda) > B$, the bank is closed, and the agent's payment is zero. Therefore, the value of enforcement is $E(\lambda) = \beta V(\lambda) - D(\lambda)$ if $D(\lambda) < B$ and 0 otherwise. Then define $\mu^* \in [0,1]$ by $D(\mu^*) = B$ with $\mu^* = 0$, when $D(0) < B$, and $\mu^* = 1$, when $D(1) > B$.

Let $\lambda^*$ have the same meaning as before. If $\mu^* < \lambda^*$, then the liquidity constraint plays no role and Proposition 1 applies. If, however, $\mu^* > \lambda^*$, it is not longer $\lambda^*$, but $\mu^*$ that is the barrier to enforcement, and thus determines equilibria. Let $\lambda^{**} = \max\{\mu^*, \lambda^*\}$. The new threshold $\lambda^{**}$ decreases (non-strictly) with $B$.

**Proposition 5** *If banks' ability to enforce is limited by a liquidity constraint, the barrier to enforcement is higher than in the case of no liquidity constraints. Formally, the barrier to*

*enforcement,* $\lambda^{**} = \max\{\mu^*, \lambda^*\}$, *where* $\lambda^*$ *is the barrier with no liquidity constraints, and* $D(\mu^*) = B$.

If $\lambda^{**} = 0$, there is a unique equilibrium, with $\lambda = 1$. This is the enforcement equilibrium. If $\lambda^{**} = 1$, there is a unique equilibrium, with $\lambda = 0$ (all creditors wait). This is the low-enforcement equilibrium. Figure 4 shows the equilibria. Any additional liquidity constraint of banks only makes the non-enforcement equilibrium more persistent, as $\lambda^{**} \geq \lambda^*$ by definition. This allows to analyze consequences of liquidity crises (due to some exogenous shock, e.g., a sudden increase of short term interest rates, a foreign exchange crisis, a default by the government on its treasury bills, or a bubble of asset prices) on bank passivity. Suppose that $B = B_0$, i.e. each bank may accept short-term losses not to exceed $B_0$, and $0 < \lambda^{**} < 1$, with $\mu^* < \lambda^*$, and equilibrium $\lambda = 1$ is the current equilibrium. If there is a sudden liquidity shock $(B_1 - B_0)$ and $B$ changes to some $B_1 < B_0$, then if follows that $\mu^*(B_1) > \mu^*(B_0)$. There is a possibility that $\mu^*(B_0) < \mu^*(B_1) = 1$,which implies that the economy might shift to the state with $\lambda^{**} = 1$, where the non-enforcement equilibrium is a unique equilibrium. In short, a severe enough liquidity crisis might make the economy jump from the efficient equilibrium (enforcement) to a non-efficient one (the passivity trap).

The long-term consequences of a liquidity shock are less clear as the waiting value would possibly be reduced following the liquidity crisis, unless a government bail-out has become more likely due to the crisis. Exact results depend on elasticity of $D(\lambda)$ with respect to $\lambda$ : the less depositors punish their banks for a given level of the overall enforcement (the smaller the slope of $D(\lambda)$), the more dramatic are consequences of a liquidity shock ($\mu^* \to \infty$, $\lambda \to 0$). This has a clear empirical implication: A liquidity shock following from an external shock might jump the economy from a good equilibrium to a bad one. This fits the empirical evidence on systemic banking crises in many developed market economies. The US S&L crisis, the Swedish banking crisis of the early nineties, the banking system crises in Asian countries were all triggered by an external shock that affected severely the liquidity of banks. The prediction of our model is that in case of systemic crises, banks start to hide their bad loans instead of enforcing them. So they do not replenish the bad loans (Dewatripont and Tirole, 1994), but just wait and gamble for resurrection by investing the remaining funds in more risky projects (Kane, 1989).

The analysis above carries two important policy implications. First, we found that that the additional liquidity constraint will make the non–enforcement equilibrium more likely and more persistent (in the sense that an equal amount or more coordination $\lambda^{**}$ will be needed to leave it), and that a liquidity crisis can cause the economy to jump from the good state to the bad. This provides a rationale for a policy instrument that solves the liquidity problem. Liquidity crises create a negative externality for the economy if banks remain passive solely because of the liquidity constraint or if the economy is thrown into the passivity trap due to a liquidity crisis. The government can solve this problem by providing a Bagehot-type lender of last resort that provides liquidity to commercial banks. This function is nowadays typically assumed by central banks. The Bagehot rule provides that the lender of last resort should lend speedily and according to clear and explicit rules to illiquid but solvent banks. Insolvent banks are not entitled to liquidity support, which is ensured by only providing short term and collateralized liquidity support. This rule makes a lot of sense in the framework of our model. If the liquidity problem were not binding ($\lambda^* > \mu^*$), liquidity injections by the central bank would not change the state of the economy that is determined by $\lambda^{**} = \max\{\mu^*, \lambda^*\}$. Hence, lending to banks where liquidity problems are not the cause of creditor passivity ($\lambda^* > \mu^*$), makes no sense indeed.

The argument also provides a rationale to have different bankruptcy laws for banks and for the non-banking sector. Indeed around the world we observe special provisions for bank failure. Our model suggests that a bankruptcy law for banks should offer more chapter 11 - type of protection to the debtor than a bankruptcy law for other enterprises. This additional protection will shield banks from the liquidity constraint. Time is bought to bridge the period between initial cost of enforcement $D(\lambda)$ and the ultimate enforcement revenue $\beta V(\lambda) - D(\lambda)$. This will encourage enforcement by banks, and will avoid the cyclical accumulation of bad loans and non-enforcement, a problem that seems to have become endemic to market economies worldwide. In a mature market economy, there is however less need for two laws as usually the economy is in E. Still the savings and loans crisis in USA (Akerlof and Romer, 1993) and contemporaneous problems of the Japanese banking system (Hoshi and Kashyap, 2000) show that our story might be relevant for developed economies as well. In case of large scale bank problems the government is not eager to let bankruptcy

take care of banks and some special government arrangements and regulations are always present.

### 3.3 Heterogenous Banks

These results can be easily extended to a setup with banks being heterogenous in overdue loans. Again, we assume that depositors do not know which banks have more bad loans than others. Since overdue loans pay no interest, heterogeneity will affect directly banks' liquidity, and thus we can simply assume that banks differ in liquidity. Precisely, assume there is a continuum of banks, each bank having a liquidity capacity of $b$ such that $0 < \underline{B} \leq b \leq \overline{B} \leq 1$, where $\underline{B}$ and $\overline{B}$ are the lowest and highest liquidity, respectively, and $b$ is distributed with c.d.f. $F(\cdot)$ on $[\underline{B}, \overline{B}]$. Proposition 4 shows that banks with higher capacity are less reluctant to enforce, so the banks can be ordered as follows. We say that the share of banks $\lambda \in [0, 1]$ enforce if all banks with liquidity capacity $F^{-1}(\lambda)$ enforce, and $D(\lambda)$ remains a decreasing function.

**Proposition 6** *(i) There exist two thresholds $\lambda^*$ and $\mu^*$ such that if the share of banks that enforce exceeds $\lambda^*$, then the economy converges to the high-enforcement equilibrium. If less than $\mu^*$ banks enforce, the economy converges to the low-enforcement equilibrium. Any point between $\mu^*$ and $\lambda^*$ corresponds to an equilibrium, in which some banks are willing to enforce, but could not do this because of liquidity constraints.*

*(ii) If one c.d.f. $G(\cdot)$ of $b$ on $[\underline{B}, \overline{B}]$ first order stochastically dominates another distribution $G'(\cdot)$, than $\lambda^*$ is lower for $G(\cdot)$ than for $G'(\cdot)$ That is, the faster the distribution function reaches higher liquidity levels (high proportion of liquid banks in the economy), the less coordination enforcement requires and vice versa..*

Proof of Proposition 6 is relegated to the Appendix. The proposition is mirrored in Figure 5. One clear policy implication that follows from this is that any coordinated government program that seeks to find a coordinated solution to the creditor passivity problem in the most efficient way, should select a sufficiently high proportion of the most liquid banks and work out their loans in order to reach a level of $\lambda$ high enough to reach one of the mixed strategy equilibriums. So, government programs to solve systemic creditor passivity

crises should select the most liquid banks and not the most indebted ones, to create sustainable, though not full, enforcement. Over time, the remaining proportion of non-enforcing banks will diminish, as many banks become illiquid and are bankrupted, until eventually full enforcement is reached.

## 3.4 Bank bankruptcy

Assume there has been no government coordination sufficient to establish the level of enforcement $\widetilde{\lambda}$, needed to leave the bad equilibrium. Then, we can study the effect of a liquidity crisis in this environment. Assume there is an adverse liquidity shock $A$ that affects bank liquidity $b$: now each bank has liquidity $b-A$ instead of $b$. If $\underline{B} < A < \overline{B}$, then some proportion of banks $\widetilde{\lambda}(A)$ is put in bank bankruptcy. If bank bankruptcy occurs, the receiver will enforce the remaining bad loans, as he does not need to take into account the signalling effect of enforcement. His role is legally defined as enforcement to the benefit of the creditors. In effect, bank bankruptcy will introduce a certain exogenous level of enforcement $\widetilde{\lambda}(A)$ in the economy.

**Proposition 7** *If the liquidity crisis is severe enough so that the share of banks put into bankruptcy exceeds $\lambda^*$, then the economy is shifted to the high-enforcement equilibrium.*

The proof is trivial. The liquidity crisis here works as an exogenous increase in the number of banks that choose to enforce. If the resulting number of enforcing banks exceed the threshold $\lambda^*$, all banks found it more attractive to enforce, rather than to wait. Figure 6 illustrates this logic.

The insight that follows from proposition 7 is that with heterogenous banks in a non–enforcement state, a severe enough but not too severe liquidity crisis might work as a catalyzer to reach the enforcement equilibrium or one of the mixed strategy equilibria, while a too moderate shock will only aggravate non-enforcement.

However, the positive effects from a crisis can only produce if there is bank bankruptcy. Without bank bankruptcy proceedings the receiver will not introduce $\widetilde{\lambda}$ and for the remaining banks the situation can only stay the same or worsen. Indeed the liquidity constraint can only become more binding while $\lambda$ remains unchanged. Therefore, the conclusion that a liquidity

crisis can solve though receivership, is only true if there is a law on bank bankruptcy that functions. We give an example of both cases. Estonia faced several two severe banking crises very early in transition, one in 1992 and one in 1994. The crisis ultimately led to the closure of insolvent banks, North Estonian bank and Union Baltic bank in November 1992 and Social bank in 1994 (Niinimäki, 2002) and the introduction of very tough capital adequacy rules. As a consequence the bad loan problem has basically disappeared in Estonia and creditor activity is the norm. We observe in table 1 that since 1994 bad loans have been between 1.5% and 4% of the total loan portfolio. Compare this to the experience of Russia, that also faced several severe banking crisis (October 1994, August 195, August 1998). However, the first two crises did not lead to the demise of large but insolvent banks. Some insolvent banks did go under, but many more were allowed to struggle on. In the August 1998 crisis, the government defaulted on its treasury bills. The banking system collapsed, but most banks were again allowed to survive despite blatant insolvency. A law on bank bankruptcy was effective in March 1999. So the sanatory effect of proposition 7 did not produce, and the long overdue restructuring is still incomplete. In fact the bankruptcy law was abused to get rid of 'inconvenient liabilities' by some banks (see Schoors, 1999). During 1999-2002, Russia enjoyed a gradual stabilization and substantial economic growth which made the enforcement trap even more persistent. Because of economic growth the proportion of bad loans may have fallen, but it is still well above 10%. Unless bank bankruptcy manages to fulfill its role in the end and the government takes a coordinated attempt to sort out the banking mess, the next crisis may be waiting around the corner of the next recession.

# 4 Conclusion

In this paper, we analyzed creditor inactivity from a new perspective, namely the adverse externality effect of creditors' passivity on other creditors' incentives to enforce. This can lead to a situation with two stable equilibria, namely an enforcement equilibrium and a non-enforcement equilibrium, which we refer to as the passivity trap. The introduction of debtor behavior reveals that there may be a low enforcement equilibrium instead of a non-enforcement equilibrium. The partial equilibrium is interesting because it seems to describe

well the muddling through that occurs in many countries with systemic loan quality problems. The difference between banks and other creditors is that banks face 1) an additional externality cost from enforcement, imposed by liquid depositors who exert market discipline on the banks by withdrawing deposits, and 2) an additional liquidity constraint, imposed by the time difference between the immediate punishment by depositors and the later reward of the proceeds of enforcement. Together these constraints ensure that the amount of coordination needed to make banks leave the passivity trap is strictly higher than the amount of coordination needed for enterprises or the state. This means that inter-enterprise arrears and tax arrears are more easily solved by market discipline and bankruptcy proceedings than systemic bad loans. Introducing bank heterogeneity adds the insight that there may be a number of stable partial equilibria, in which the most liquid banks are enforcing, while the least liquid ones are not.

Interesting policy insights follow from the analysis. Stabilization will, ceteris paribus, not solve creditor inactivity, as shown by the case of Russia. The government can contribute to the solution of creditor inactivity, by investing in smoothly functioning bankruptcy proceedings, committing to hard budget constraints for corporate debtors and enforcing its own tax arrears. Settling government expenditure arrears and enforcing energy bill arrears would also be very helpful. This will however not do to save to clean the banking sector from creditor passivity. The amount of coordination needed to resume creditor activity in the banking sector is higher than in other sectors. Therefore government intervention is ceteris paribus more desirable in the banking sector. The paper sheds light on a crucial liquidity difference between banks (highly liquid deposits) and other agents (trade credit, bank loan or budget arrears). This liquidity difference entails a cost for banks, which can be contained by properly priced deposit insurance. Deposit insurance may have a moral hazard cost, but also removes a barrier to creditor inactivity. This is why government interference is commonly observed in deposit insurance schemes (implicitly or explicitly). The paper also explains that due to this liquidity difference, banks face an additional liquidity constraint, which constitutes a barrier to enforcement. Therefore banks need a lender of last resort that behaves along the Bagehot rules. A suchlike institution will remove the liquidity constraint to creditor activity in the banking sector. This liquidity constraint also implies that banks

need a bankruptcy law that differs from the general bankruptcy law in the sense that it should provide more chapter-11 protection. This will lead to more enforcement by banks and hence harder budget constraints for their debtors. With identical banks, a liquidity shock can only increase the barrier to enforcement. However, with bank heterogeneity, a liquidity crisis might actually act as a catalyzer to enforcement. This is because a portion of the least liquid banks will be forced into the state of bankruptcy, where a receiver is appointed by the law. The receiver is not concerned about the liquidity constraint and will enforce the bad loans in order to protect the creditors of the bank. This injects a level of enforcement into the banking sector that might be instrumental in pulling the most liquid banks out of the passivity trap. However, this beneficial effects can only possibly realize if there exists a bankruptcy law for banks that is effectively enforced. This was unfortunately not the case for Russia, where no law existed at the right time and many illiquid banks were allowed yet another live.

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**APPENDIX: Proof of Proposition 6.**

(i) For the sake of simplicity, assume that $\underline{B} = 0$, $\overline{B} = 1$. For each $\lambda \in [0,1]$, $F(D(\lambda)) = P(b < D(\lambda))$ is the share of banks, for which the liquidity constraint is binding. Let $\mu^*$ be defined by $E(\mu^*) = W$, and let $\lambda^*$ be such that $F(\lambda^*) = D(\lambda^*)$. (Assume that $\mu^* < \lambda^* < 1$.) Now, if $\lambda > \lambda^*$, then the economy converges to the full enforcement equilibrium. Indeed, each firm with the liquidity capacity higher than $F(D(\lambda))$ has a possibility to enforce as $F(D(\lambda)) > F(\lambda^*)$, and has incentives to do so as $\lambda > \lambda^* > \mu^*$.

Each $\lambda$ between $\mu^* < \lambda^*$ defines an equilibrium: the marginal firm (corresponding to $\lambda$) is willing to enforce, since the value of enforcement exceeds the value of waiting, but could not enforce because of the liquidity constraint.

(ii) Define the probability density functions that corrrespond to $G(\cdot)$ and $G'(\cdot)$ as $g(b)$ and $g'(b)$. If $G(\cdot)$ first order stochastically dominates $G'(\cdot)$, we know that $\int_{\underline{B}}^{\overline{x}} g(b)db \geq \int_{\underline{B}}^{\overline{x}} g'(b)db$ for every $x$ between $\underline{B}$ and $\overline{B}$ (the cumulative ditributions functions do not cross). Hence for every $x$ in $[\underline{B}, \overline{B}]$, there is a difference $G(x) - G'(x) \geq 0$. Since $\lambda^*$ is defined as $F(\lambda^*) = D(\lambda^*)$.and $D'(\lambda) < 0$, we know that $\lambda^*$ for $G(\cdot) \leq \lambda^*$ for $G'(\cdot)$.■

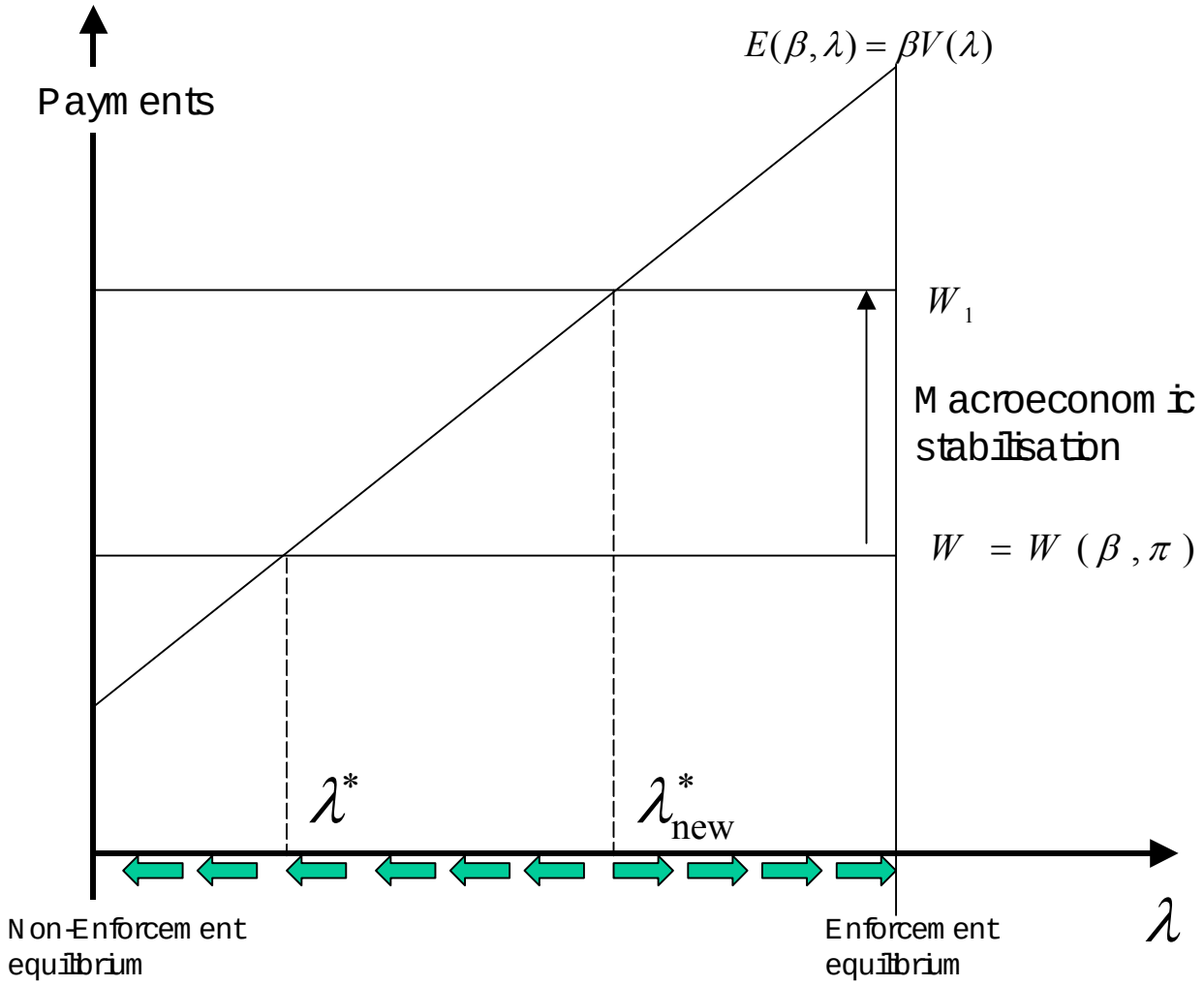


Figure 1: The equilibria and the effect of stabilisation

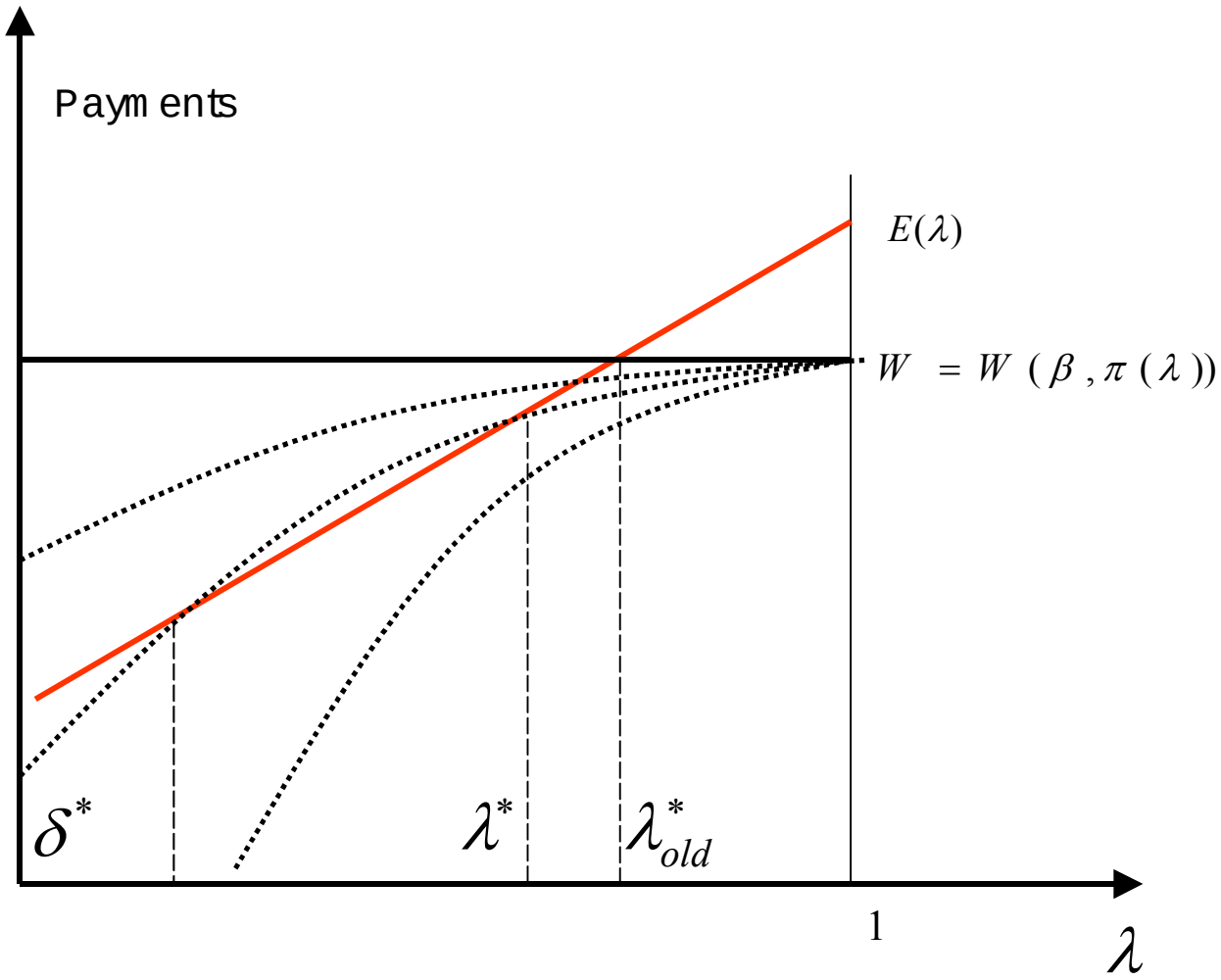


Figure 2: The effect of debtor's behaviour

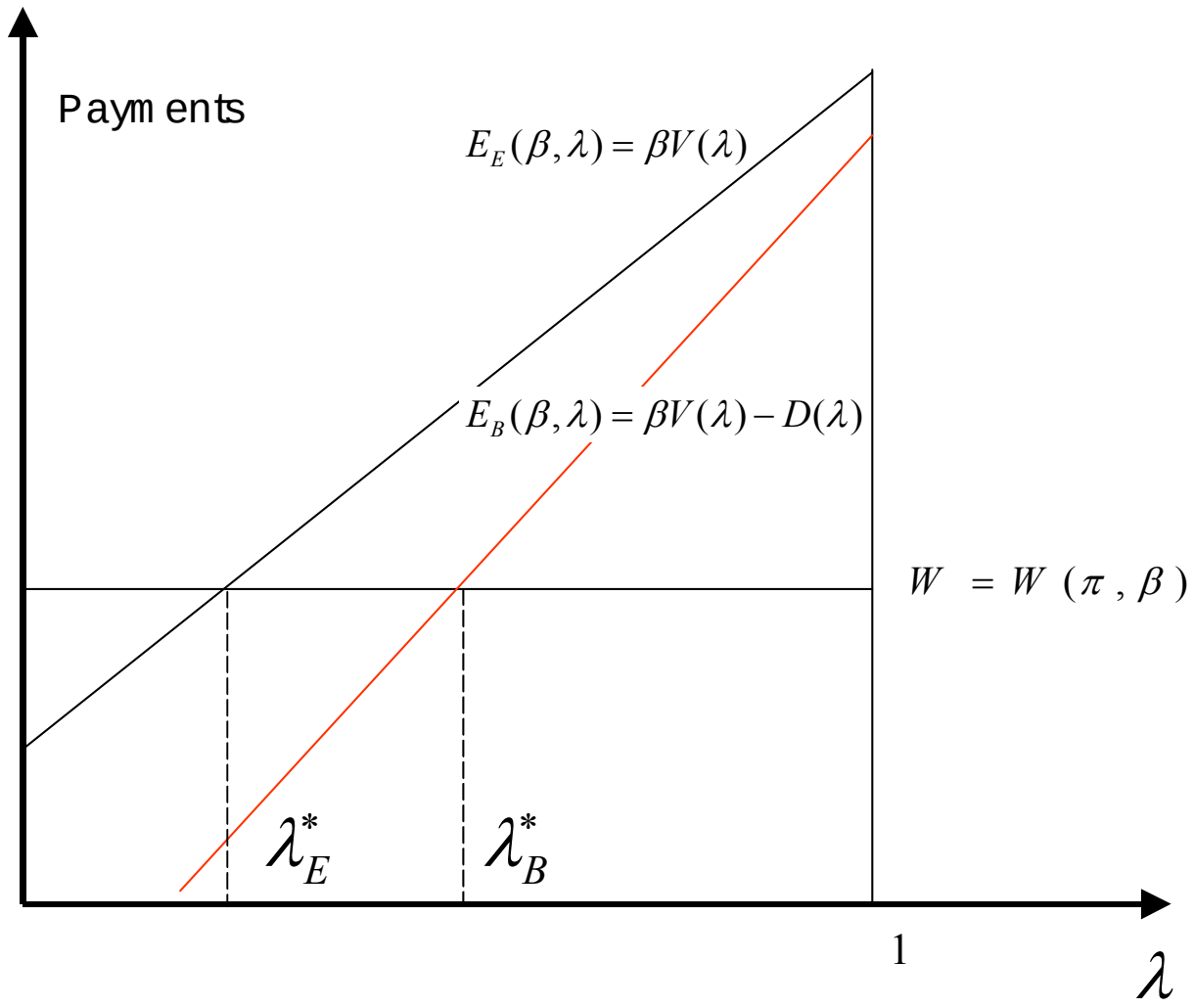


Figure 3: Why are banks different: the unbearable lightness of liabilities

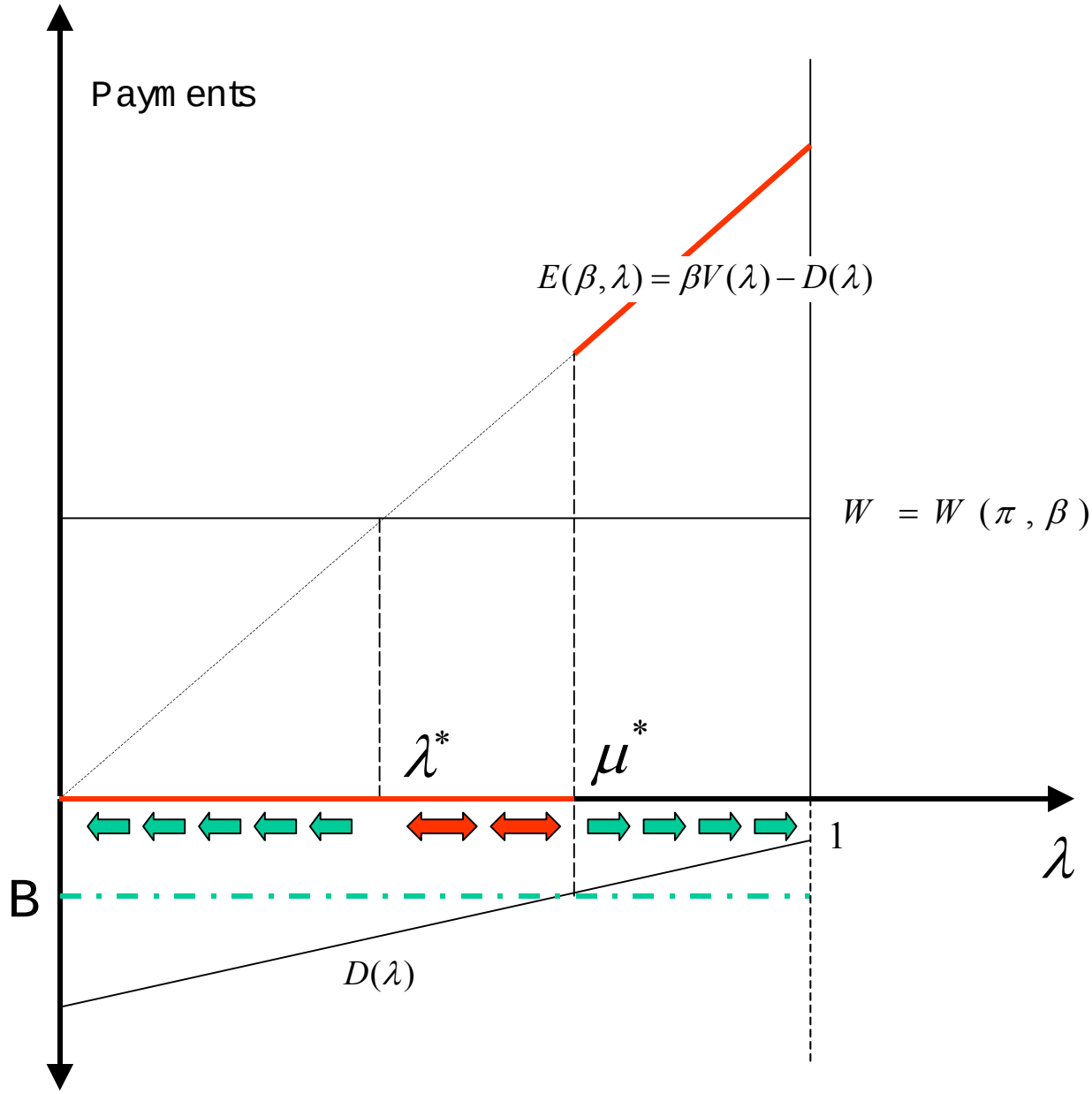


Figure 4: The additional liquidity constraint for banks

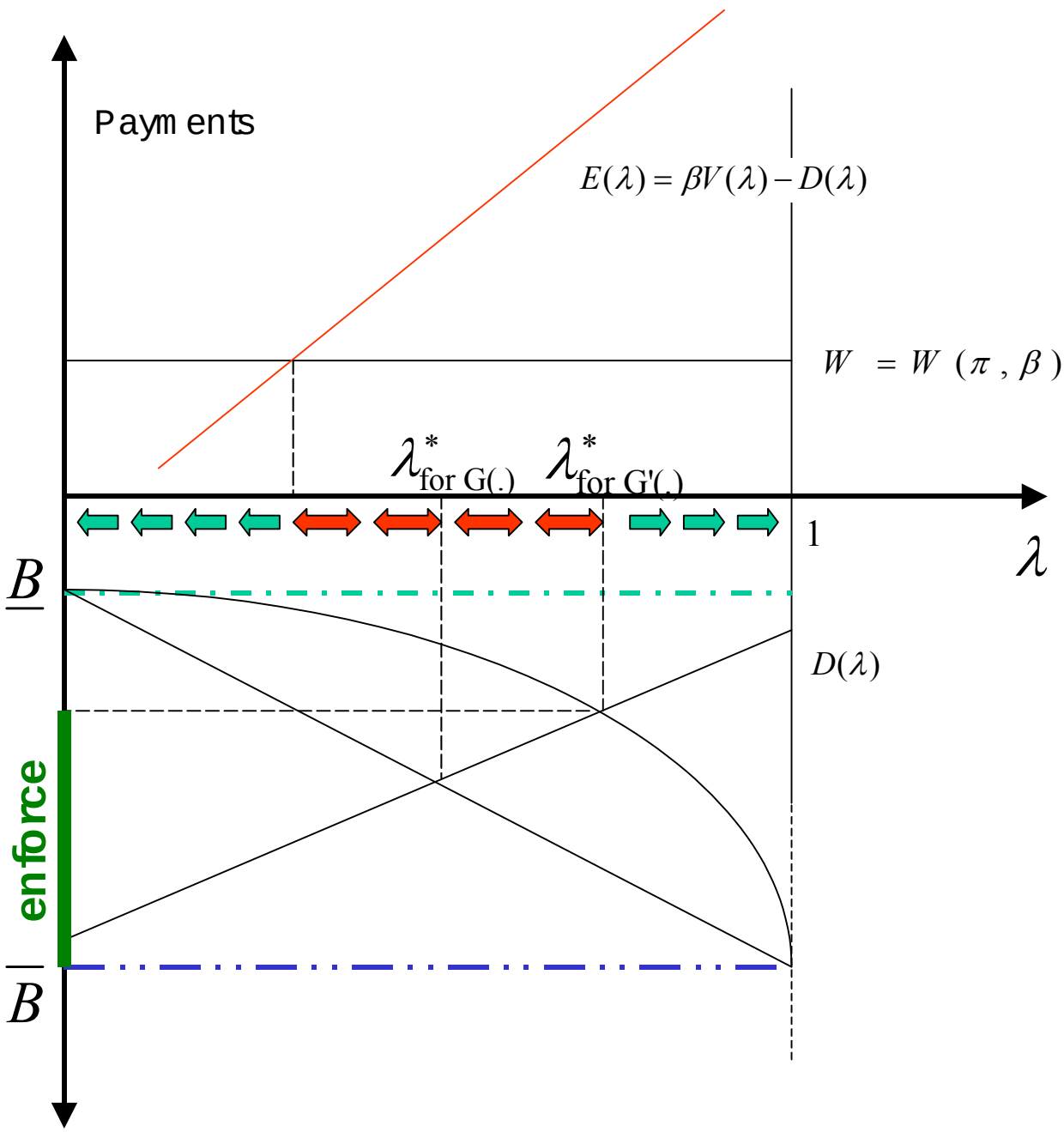


Figure 5: The effect of bank heterogeneity

| *Country* | *1993* | *1994* | *1995* | *1996* | *1997* | *1998* | *1999* | *2000* |
|---|---|---|---|---|---|---|---|---|
| Bulgaria | 6.7 | 6.8 | 12.5 | 15.2 | 13.0 | 11.8 | 17.5 | 10.9 |
| Croatia | na | 12.2 | 12.9 | 11.2 | 8.2 | 12.6 | 20.6 | 19.7 |
| Czech R | na | na | 26.6 | 21.8 | 19.9 | 20.3 | 21.5 | 19.3 |
| Estonia | na | 3.5 | 2.4 | 2 | 2.1 | 4 | 2.9 | 1.5 |
| FR Yugoslavia | na | 10.3 | 12 | 12.3 | 15.1 | 13.1 | 10.2 | 27.8 |
| Macedonia | na | na | na | 21.7 | 21.1 | 7.8 | 9.4 | 26.9 |
| Hungary | 29.6 | 20.2 | 12.1 | 9 | 5.3 | 6.8 | 4.4 | 3.1 |
| Latvia | na | 11.0 | 19 | 20 | 10.0 | 6.8 | 6.8 | 5.0 |
| Lithuania | na | 27.0 | 17.3 | 32.2 | 28.3 | 12.5 | 11.9 | 10.8 |
| Poland | 36.4 | 34.0 | 23.9 | 14.7 | 11.5 | 11.8 | 14.5 | 15.9 |
| Romania | na | 18.5 | 37.9 | 48 | 56.5 | 58.5 | 35.4 | 3.8 |
| Russia | na | na | 12.3 | 13.4 | 12.1 | 30.9 | 25.8 | 15.3 |
| Slovakia | 12.2 | 30.3 | 41.3 | 31.8 | 33.4 | 44.3 | 32.9 | 26.2 |
| Slovenia | na | 13.8 | 9.3 | 10.1 | 10.0 | 9.5 | 8.6 | 8.5 |
| Ukraine | na | na | na | na | na | 34.6 | 34.2 | 32.5 |

Figure 6: Table 1 Bad loans as a proportion of total loans in selected transition countries

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