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of Credit*

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TAX AVOIDANCE AND THE ALLOCATION OF CREDIT

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Abstract

This paper models the credit-seeking behavior of a firm when applying for a bank loan increases the probability of being monitored by the fiscal authorities. Using Russia as an example of an economy with poorly enforced tax payment, I find that if the probability of paying taxes increases as a result of applying for a bank loan, profit-maximizing firms will be less likely to borrow at a given rate of interest. In addition, firms with less risky projects will be more likely to drop out of the borrower pool. Finally, the more profitable a firm has been in the past, as measured by the return to its existing investments, the less likely it will be to borrow from a bank to finance a new investment project. In an economy where alternative forms of external capital are few, this disincentive to borrow has significant consequences for the overall level and quality of investment in the economy.

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Introduction

Despite major progress in the reform of banking sectors in transition economies, including the privatization of many state-owned banks, entry of successful de novo competitors, and the development of regulatory and supervisory capabilities, financial intermediation in most of these economies remains at a very low level. The ratio of bank credits to GDP is 13% in Russia, 20% in Poland and 23% in Hungary, as compared to levels of 120% typical of Western economies. Existing literature on financial sector reform in transition economies focuses on macroeconomic stabilization and continued development of the banking sector, including the promotion of regulatory and supervisory capabilities in the context of consolidation. This approach overlooks endogenous constraints on efficient credit allocation.

There are many possible constraints on efficient credit allocation in transition economies, and more generally in economies characterized by weak institutions and macroeconomic instability. Among these are the high cost of lending due to poor accounting standards and short credit histories; severe moral hazard problems due to poor corporate governance in the industrial sector; and alternative profit opportunities for banks created by an inflationary environment. This paper looks specifically at tax evasion and the imperfect monitoring capability of fiscal authorities as they relate to the allocation of credit. There is an extensive literature on taxation as it affects the cost of capital (see Auerbach (1983) for an overview). This literature looks at the impact of various forms of taxation on the firm's capital structure, assuming that tax payment is enforceable. In contrast, I focus on the incentive effects of taxation in the context of a weakly enforced tax regime.

This paper rests on the premise that tax payment is weakly and unevenly enforced, and that applying for a loan raises the probability of being monitored by fiscal authorities. In an economy where explicit taxation is relatively new, replacing the implicit taxation that occurred through financial and physical plans, it is reasonable to expect that the government's ability to collect financial information and enforce tax payments will be low. Fiscal authorities in many transition economies have resorted to using the banking sector to monitor firms and enforce tax payment.

Using Russia as a case study, I investigate the effect of these policies on the allocation of credit. Russia serves as an extreme example of tax collection through banks. In addition, Russian business culture clearly tolerates tax avoidance, and new institutional arrangements have arisen to accommodate such behavior. Many Russian firms avoid taxation by operating in the 'gray' market, either eschewing legal status altogether or conducting most of their activities off the books.

While firms are extremely reluctant to disclose financial information and routinely maintain different sets of books for different audiences, banks demand extensive financial disclosure. Applying for a loan in this environment means entering the official economy and potentially disclosing tax liability. Clearly, in an economy where many banks have close ties with the government (as documented in Johnson, Kroll and Horton, 1992) and are under a legal obligation to serve as agents of the state tax service, the possible transfer of information from banks to fiscal authorities reinforces this change in status. A more detailed description of the Russian tax system and its relationship to bank lending is included in Appendix 1.

Although not explicitly included in the analysis, taxation based on financial information derived from banks may come from illegal as well as legal sources. Many Russian firms apparently avoid disclosing information to banks because they feel this is equivalent to disclosing it to the 'Mafia' or organized extortion rackets (see Lotspeich, 1996). Thus, while this analysis refers to fiscal authorities as the source of taxation, in the Russian context it may be more realistic to think of the tax as being some combination of legal and extortionary payment.

This paper models a firm that must decide whether or not to apply for a bank loan to finance a project. The firm operates in an environment in which the fiscal authorities have a very low ability to monitor and in which tax evasion is therefore common. Given the lack of readily available indicators of financial success, and the difficulty of monitoring firms directly, fiscal authorities may turn to banks for valuable information. The process of applying for a bank loan reveals significant information about the firm, yet the bank cannot credibly commit not to reveal this information to the fiscal authorities if requested. Thus, applying for external financing raises the probability of paying taxes by some significant amount. More generally, the model can refer to the decision of a small and growing firm to enter the official economy, when staying in the unofficial economy limits its access to credit but shields it from taxation.

Faced with a higher expected cost of external capital, where the cost is now both the interest rate and the tax rate with some probability, the model shows that a profit-maximizing firm will demand a lower interest rate from the bank. More importantly, the less risky is the current project and the more profitable a firm has been in the past, the

more sensitive it will be to the increased probability of tax payment and the less likely to apply for bank financing.

The Firm's Financing Decision

I model the behavior of a firm that has to decide whether or not to undertake an investment project using bank financing. This firm has no access to outside equity, an assumption that easily approximates reality in countries like Russia with nascent capital markets. The decision is made in the first period and the loan paid off, with interest, in the second period. The expected mean return to the project is $(1+r)B$, where B is the amount of the loan. Using a simple linear version of a mean preserving spread:

$$(1+r)B = z [(1+r)B + d] + (1-z) [(1+r)B - (z/(1-z))d]$$

where z is the probability that the project is successful. Thus for a given rate of return r , a higher d corresponds to a riskier project. I make the further assumption that when the project fails, the return is insufficient to repay the loan and the firm must pay collateral in the amount C . The firm faces an interest rate of i that it treats as exogenous.

In the simplest case, the firm has no retained earnings and the only cost of undertaking the investment is the interest payment on the loan, B , or the collateral payment in the case of failure. The firm's expected profit can be written as:

$$(1) \quad E\Pi(i) = z[(1+r)B + d - (1+i)B] + (1-z)[-C] \\ = z[(r-i)B + d] - (1-z)C$$

Assuming that this firm will apply for a loan as long as expected profit is greater than zero:

$$E\Pi(i) \geq 0 \text{ when}$$

$$(2) \quad i \leq r + d/B - (1-z)C/zB$$

Differentiating i with respect to d gives the Stiglitz-Weiss (1981) adverse selection result. Firms that are willing to pay a higher interest rate for a project with a given return are worse risks. As the interest rate increases, less risky firms will choose not to borrow.

Now consider this firm in the case where applying for a bank loan increases the probability of taxation. The firm is monitored by the government with probability p , and there is an exogenous tax rate of t . Since the investment project is the firm's only source of income in this simple model, there is no taxation if the project fails.

The firm's profit can be written as:

$$(3) \quad \begin{aligned} E\Pi_2(i) &= z[p(1-t) \{ (1+r)B + d - (1+i)B \} + (1-p)\{ (1+r)B + d - (1+i)B \}] \\ &\quad + [1-z](-C) \\ &= z[(1-pt) \{ (r-i)B + d \}] - [1-z]C \end{aligned}$$

Assuming that this firm will apply for a loan as long as profit is greater than zero:

$E\Pi_2(i) \geq 0$ when

$$(4) \quad i \leq r + d/B - (1-z)C/z(1-pt)B$$

For a given project, the reservation interest rate is lower since the tax increases the cost of borrowing for the firm. In addition, the adverse selection effect is aggravated, since riskier firms are less sensitive to the threat of taxation. This follows from solving for d and differentiating with respect to t . The tax rate creates a wedge between the price the bank charges and the price paid by the firm. Adverse selection as described in Stiglitz-Weiss (1981) is reversible if the bank has full information and can charge lower

interest rates to less risky firms. Adverse selection caused by the tax wedge would not be reversible unless the bank absorbed the cost of the tax.

Now assume the firm has retained earnings of R , which earn an exogenous rate of return r . In order to focus attention on the effect of the tax, I assume that retained earnings cannot readily be turned into cash to finance the new project and that the return to their use is known with certainty. The firm's profit if it does not undertake the project is simply the return to retained earnings, and can be written as:

$$(5) \quad \Pi_3(i) = (1+r)R$$

In the absence of taxation, if the firm does undertake the project its expected profit is the return to retained earnings and the expected return on the project minus the cost of the loan:

$$(6) \quad \begin{aligned} E\Pi_4(i) &= z[(1+r)R + (1+r)B + d - (1+i)B] + (1-z)[(1+r)R - C] \\ &= (1+r)R + E\Pi_1(i) \end{aligned}$$

The firm will then apply for a loan as long as the expected profit from doing so is greater than the profit earned from retained earnings only:

$$E\Pi_4(i) \geq \Pi_3(i) \text{ when}$$

$$(7) \quad (1+r)R + E\Pi_1(i) \geq (1+r)R \text{ or}$$

$$(7a) \quad i \leq r + d/B - (1-z)C/zB$$

Since retained earnings cannot be used to finance the project, the firm's decision about whether or not to borrow from a bank and undertake the project is unaffected by their presence. The reservation interest rate is identical to that in the first example.

In the case where the firm has retained earnings and may be monitored by the tax authorities, I assume that tax liability is generated by the return on both retained earnings

and the externally financed project. In other words, once the fiscal authorities choose to monitor a firm, they are able to acquire a fairly accurate assessment of the firm's actual tax liability.

The expected profit function of this firm is:

$$(8) \quad E\Pi5(i) = z[p(1-t) \{ (1+r)R + (1+r)B + d - (1+i)B \} + (1-p) \{ (1+r)R + (1+r)B + d - (1+i)B \}] + (1-z)[p(1-t) \{ (1+r)R - C \} + (1-p) \{ (1+r)R - C \}]$$

$$= z[(1-pt) \{ (1+r)R + (r-i)B + d \}] + (1-z)[(1-pt) \{ (1+r)R - C \}]$$

As before, the firm applies for a loan if the expected profit of doing so exceeds the profit earned from using retained earnings alone:

$$E\Pi5(i) \geq \Pi3(i) \text{ when}$$

$$(9) \quad z[(1-pt) \{ (1+r)R + (r-i)B + d \}] + (1-z)[(1-pt) \{ (1+r)R - C \}] \geq (1+r)R \text{ or}$$

$$(9a) \quad i \leq r + d/B - (1-z)C/zB - pt(1+r)R/zB(1-pt)$$

The reservation interest rate is clearly lower than in the case without the tax, and is also lower than the case with taxation but without retained earnings. If the probability of monitoring is zero, if the tax rate is zero or if the amount of retained earnings is zero, equation 9a reduces to equation 2.

Taxation and the Firm's Credit-Seeking Behavior

The distorting effect of taxation through monitoring of the banking sector occurs when firms have retained earnings. Firms are then trading off the amount they pay in taxes as a result of applying for a loan against the extra income earned from undertaking the project. This can be made clearer by rewriting equation (9) as follows:

$$(9) \quad (1+r)R - (1-z)C - pt(1+r)R + (1-z)ptC + z(1-pt)\{(r-i)B + d\} \geq (1+r)R$$

where $pt(1+r)R + (1-z)ptC$ is the additional tax liability generated by applying for a loan, and $z(1-pt) \{(r-i)B + d\}$ is the additional profit net of taxes generated by the project.

The following propositions can be derived from this analysis:

- In the presence of an increased probability of taxation when borrowing from a bank, the interest rate that a firm is willing to pay to finance a given project is decreased. To put this another way, at a given interest rate more firms avoid bank financing and reduce their investment activities. This result has two significant consequences. First, the overall level of investment is lower. Second, disintermediation results from fewer funds flowing through the banking sector.¹
- When taxation is associated with applying for a loan, the tax rate will adversely affect the quality of the borrower pool.²
- When the firm has taxable retained earnings, and faces taxation with probability p when applying for a loan, the maximum interest rate at which it would borrow
 - ◇ falls as the tax rate t increases.
 - ◇ falls as the probability of taxation p increases.
 - ◇ rises as the rate of return r on the investment project increases.
 - ◇ rises as the probability of success z in the investment project increases.
 - ◇ rises as the size of the loan, B , increases.
 - ◇ falls as the rate of return \underline{r} on retained earnings, i.e. the profitability of the firm, increases.

¹ When the model is adapted to allow for the use of retained earnings to finance the project, retained earnings are preferred as a source of investment funds, a result familiar from the theoretical and empirical literature on the firm's financing choice. All other substantive results remain the same.

◇ falls as the level of retained earnings R , or the net worth of the firm, increases.

This follows from differentiating equation 9a.³ The last two results are noteworthy. The probability of taxation in the presence of retained earnings leads more profitable firms to drop out of the borrower pool and decrease their total investment. The intuition is as follows. In all cases the firm will earn the rate of return r on its retained earnings R . If it also undertakes a new investment project, applying for a loan and increasing the probability of paying taxes, a higher r or R simply increases its tax liability. In other words, the extra profit it will earn from undertaking the project decreases, making it less attractive to use bank funds. The empirical prediction that emerges from this analysis is that the relationship between firm profitability and outstanding debt or investment should be different for firms that exist under this type of tax regime than for firms in economies with more effective fiscal regimes.

From the perspective of the bank, the quality of the borrower pool decreases at any given interest rate. First, less risky firms are more sensitive to the probability of taxation. Second, holding the (expected) quality of the new project constant, the more demonstrably profitable a firm has been in the past the less likely it will be to apply for new loans. Thus, an increased probability of taxation when applying for a bank loan aggravates the adverse selection described by Stiglitz and Weiss (1981).

From a social welfare point of view, not only is the overall level of investment decreased, but investment is less likely to be undertaken by those firms that have been the

² Empirical work by Fan, Lee and Schaffer (1996) finds indication of adverse selection in the Russian credit market.

³ I am making the simplifying assumption that all the equity in the firm is generated as prior earnings, in other words there is no initial capital contribution. In this case, the retained earnings of the firm are equivalent to the net worth or book value of equity, and the rate of return on retained earnings is equivalent to the return on equity. Since capital contribution is not taxed, the results of the model are not altered by this assumption.

most successful in generating a profit on previous investments. An extension of the model can investigate the possibility that the interest rate that good firms are willing to pay, given the additional cost of taxation, is so low as to be unprofitable for the bank. In such a case, banks would charge high interest rates to more risky firms, while less risky firms would choose not to borrow, a story that seems familiar in the Russian context.

Conclusions

Several policy implications can be drawn from this approach to financial intermediation in transition economies, and should be transferable to other economies with underdeveloped financial systems and high rates of either legal or extortionary taxation. The first concerns the effect of fiscal policy on bank credit decisions. If firms are reluctant to apply for bank financing because of distortions in tax incidence, then further development of the banking sector will have only limited impact on the level of lending. Reformers should concentrate on improving both tax policies and other government functions that influence a firm's decision to enter the formal economy. While this paper focuses on only one benefit of joining the formal economy, access to bank credit, and compares this to the accompanying tax burden, the model could be extended to include benefits such as legal protection and access to capital through domestic and international capital markets.

The second policy implication regards financial system development. Alternative mechanisms for financial intermediation, despite clear inefficiencies, are likely to arise in response to an environment that discourages arms-length financial transactions. Specifically, this model of the relationship between tax avoidance and credit-seeking

behavior is consistent with the presence of bank-led financial-industrial groups (FIGs). Firms will seek sources of financing which do not expose them to the threat of taxation. In general, it will be true that as the availability of such sources increases or the cost of capital from them decreases relative to the bank interest rate, banks will be less likely to act as intermediaries. One of the functions of FIGs, as argued in Johnson (1997) and elsewhere, is to redistribute profits among member firms so as to decrease tax liability. The FIG bank will have inside information about the quality and profitability of member firms, and will lend to them even if their accounts make them look unprofitable. Thus tax payments are minimized even if the firm is monitored by the fiscal authorities. It is also likely that the FIG bank can credibly commit to conceal financial information, decreasing the risk of monitoring altogether. The empirical prediction that emerges from this analysis is that the relationship between firm profitability and outstanding debt or investment should be different for firms that are members of FIGs than for firms that are not members.

This argument is consistent with the empirical findings in Perotti and Gelfer (1997), which show that investment is less sensitive to internal liquidity for members of bank-led FIGs. One interpretation of these findings is that FIG member firms are more willing to apply for bank loans, indicating a lower sensitivity to the possibility of taxation. The presence of FIGs should then reverse some of the distortion to credit markets described above, and raise the overall level of investment in the economy.

Appendix 1

Banking and the Russian Tax System

This appendix is not an exhaustive description of the functioning of the Russian tax system. Rather it contains empirical evidence, based on primary and secondary sources, to support the assumption made in the paper that interaction with the banking sector will increase the probability of being monitored by the tax authorities and of paying taxes.

- Tax registration is a requirement for opening a bank account, and the bank is subject to administrative fines and possible loss of license if it opens an account without proper documentation. Registration consists of recording the taxpayer's name with the State Tax Service and receiving a taxpayer identification number. This taxpayer identification number must subsequently appear on all payment documents, allowing the authorities to trace all transactions between buyers and sellers.
- The tax authorities require enterprises to present a balance sheet, income statement, other financial statements and quarterly tax returns, in person at the inspector's office, making tax payment cumbersome and time-consuming.
- Enterprises pay profit (income) tax, a value-added tax, excise taxes and payroll taxes (the latter go to extrabudgetary funds, e.g. social insurance, unemployment insurance, medical and pension funds). According to current income tax law, a flat income tax of 13% goes to the federal budget, and the regional government is allowed to charge from 0% to 22% more, adding up to a maximum rate of 35%. Most transfers between

enterprises are subject to withholding taxes and/or VAT, and banks are legally responsible for ensuring that proper payment has been made. Specifically, the bank is not allowed to make the transfer unless it is given a service contract that shows an order for payment of all required taxes. Noncompliance can result in revocation of the bank's license.

- The low level or even absence of deductions allowed for costs related to investment, including depreciation, capital expenditures, advertising and marketing, and employee training serve as a strong disincentive for firms to engage in these activities. For example, interest on loans for operating cost is deductible up to a rate equal to the official refinancing rate plus 3%. Interest on loans for capital investment is not deductible, and must be paid out of profits that are subject to a 35% tax. (When this type of investment is undertaken, however, if the loan is greater than 50% of the profit of the company, only 50% of profits are taxed.
- Over the past few years, tax inspection and auditing has been focused on high income taxpayers, according to at least one source, providing obvious incentives to hide income (Korolenko and Klein, 1997).
- Lack of institutional support for tax payment includes poor enforcement of property rights, poor corporate governance and lack of contract enforcement. Institutionalized tax evasion is common, in the form of barter transactions and monetary surrogates including veksel (a form of i.o.u.). According to several sources, about 40% of sales were conducted with barter trade in 1997. (Aukutsionek, 1997; Gaddy and Ickes, 1998).

- According to one estimate, 40% of all corporate profits are illegally kept out of the tax base. (Lanyi, McMullen and Polishchuk, 1997).

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