Risk taking by banks in the transition countries

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ABSTRACT

Although the performance and privatization of transition banks have been widely studied already, little is known about their risk taking and risk management activities. We use a new EBRD survey data set of banks to examine risk taking by banks in the transition countries. We find no indication of excessive risk taking by specific ownership or size categories of banks. Also, we find no connections between risk taking and the quality of the institutional environment although an unsound environment is associated with higher levels of capital.

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The banking sectors of the transition countries have progressed remarkably in the last 15 years. In fact, banking in most transition countries has largely shaken off the traumas of the transition era. At the start of the 21st century banks in these countries looks very much like banks elsewhere. That is they are by no means problem free but they are struggling with the same issues as banks in other emerging market countries. There have been a surprisingly large number of studies that have told us about the performance of these banks but we know very little about their risk taking behavior and how the banking environment influences it.

In this paper we examine risk taking by banks in transition with information from the EBRD's 2005 survey of bank managers[1] and balance sheet and income data prepared by Bank Scope. The institutional environment differs considerably among the countries in our sample. The Western European countries that joined the EU in 2004 were obliged to establish creditor rights and ensure proper law enforcement while many of the other countries were not exposed to these external pressures for reform. Thus, institutions in these countries offer, on average, less protection for lenders as compared to the new member states (see EBRD, Survey on Secured Transaction, 2004 and Pistor, 2000). In this paper, we examine the relationship between the institutional environment and risking-taking by banks.

The role of financial intermediaries such as banks is to channel savings to investors. In a modern economy, banks do this by maintaining a delicate balance between risk taking and managing risk. Our aim here is to examine the link between banks' risk-taking and risk management activities and the quality of the institutional environment. An examination of the relationship is interesting because theory is ambiguous about its direction. We can demonstrate this by considering the role of collateral, a widely used mechanism for ameliorating risk.

Bankers face information asymmetries when they engage in lending since only the borrowers know about the 'true' risk of their investment projects. However, there are several covenants that bankers can include in their credit contracts to overcome information asymmetries. Bester (1986) showed that collateral can serve as a signaling device, so that borrowers reveal their true riskiness by the amount of collateral they are willing to offer. To ensure that devices like collateral can be effective, laws that define collateral relationships and adequate institutions for enforcement are essential. More reliable collateral laws and arrangements could result in greater use of collateral to overcome asymmetric information and an overall reduction of risk. In a poor legal environment, a borrower might use the same asset as collateral in several lending agreements or might refuse to surrender the collateral in case of default. In this view, a better institutional environment will be associated with a greater willingness to use

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[1] The Banking Environment and Performance Survey (BEPS) was a random sampling of banks in 20 transition countries with a common questionnaire that was translated into each local language and presented to a senior bank officer in an interview (EBRD, Transition report, 2006, chapter 4).

collateralized loans and more lending. This is consistent with results in the law and finance literature that show a positive relationship between good creditor rights and credit market development (La Porta, et. al. 1997, 1998, commonly called LLSV).

However, Berger and Udell (2002), Berger, Klapper and Udell (2004) and Haselmann and Wachtel (2006) have shown that banks behave differently under different institutional settings. For example, Berger and Udell (2002) find that banks are more willing to provide financing to information opaque borrowers in a better legal system. That is, with reliable collateral arrangements, banks will lend to more risky borrowers even if 'hard' information such as audited financial statements are unavailable. In this view, improvements in the institutional environment are associated with greater risk taking by banks.

We find no indication of excessive risk taking by any specific group of transition banks. Overall banking markets in transition economies are relatively homogenous with only small differences among the average bank operating in different regions, belonging to different ownership groups or having a different size. Interestingly, we find no connection between the level of risk banks take and the institutional environment they operate in. Nevertheless, banks that operate in an unsound environment generally maintain a higher level of capital. Furthermore, banks with higher risk measures compared to their competitors also do more risk management activities. This suggests that banks in transition economies have learned how to manage their risks by now.

Section I discusses the relationship between the banking environment and risk taking, as well as the relevant literature. The next section presents the bank data and the relationship of bank performance to ownership and size. Our measures of bank risk are presented in section III. The relationship between risk and bank characteristics is discussed in section IV. In section V we relate bank risk measures to risk management activities and specific types of risk taking. Finally, conclusions are in section VI.

I. The banking environment in transition

Banking in the transition countries has quickly passed through four stages (see Bonin and Wachtel, 2003).   The first stage of banking development in the transition economies involved the establishment of banking institutions in the early 1990s. During the planned economy era, the only financial institutions were adjuncts of the state mechanism and banking in the contemporary sense of the word was largely unknown. Commercial banks were established as spin offs of the central bank payments system and new banks were chartered. However, the role of these institutions was largely unchanged. The state owned banks financed state owned enterprises and were soon insolvent. The second stage of transition banking involved bank failures and systemic crises that affected every transition economy in the middle of the 1990s (see Bonin and Wachtel, 2005). The third stage involved a lengthy process of restructuring through privatization and the entry of foreign banks. By the end of the century, most banks were privately owned and in virtually all of the transition countries foreign banks predominated. The fourth stage brings us to the present. In most transition economies

banks are largely sound, appropriately regulated and competitive institutions. Banking in transition has largely shaken off its planned economy heritage.

Although research on banking on transition is fairly extensive, the issues of risk taking and risk management remain unexamined. The earliest studies of banking in transition focused on the creation and design of banking institutions (see for example Corbet and Mayer, 1992 and Udell and Wachtel, 1995). As the transition proceeded, research interest turned to bank performance (see for example Fries, Neven, Seabright and Taci 2006, and Claeys and Van der Vennet, 2003) and, later on, bank efficiency (Fries and Taci, 2005, Bonin, Hasan and Wachtel 2005a, and Weil, 2003). More recently, research examined the banking crisis, restructurings and privatizations that characterized transition (see for example Tang, Zoli and Klytchnikova, 2000, Bonin and Wachtel, 2005 and Bonin, Hasan and Wachtel, 2005b). Finally, de Haas and Lelyveld (2006) and Haselmann (2006) focus on the consequences of foreign banking penetration on banking sector stability.

Studies on risk taking and risk management by banks in transition economies are rare because data on specific banking activities are limited.[2] Schardax and Reininger (2001) examine the vulnerability to financial contagion of the financial sectors in transition economies at the macroeconomic level. Focusing more on individual banks, Kager (2002) shows that the problem of bad loans persisted in many banks in transition economies.

II. Bank data and bank performance

The BEPS survey was based on a random sample of 423 banks in 20 countries (with an over sampling of banks in the smaller countries and also in Russia). The response rate was 50% but it rises to 63% when Russia is excluded. The countries with the lowest response rates were in addition to Russia, the Ukraine and also Hungary and the Czech Republic.[3] Each bank was linked to the Bank Scope (2006) data after a careful examination to make sure that the correct Bank Scope data was used. That is, care was taken to make sure that the Bank Scope data used had the proper bank identification and level of consolidation.[4] When the Bank Scope data for the entire sample frame was compared to the data for the banks that responded to the survey, there was no indication of systematic response bias.[5] Sample sizes in the analysis are somewhat smaller than the

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[2] The Bank Scope data generally only include aggregate balance sheet items.

[3] Successful bankers in the advanced transition countries might have been less inclined to set aside the time for an EBRD interview than others. In the tense environment in Russia and the Ukraine bankers might have had other reasons to avoid responding.

[4] The Bank Scope data were checked for anomalies. Several corrections were made using information provided by the banks in the survey and one bank in Serbia was eliminated. The Bank Scope data set was prepared with the help of Dr. Anita Taci of the EBRD.

[5] In most countries the average asset level and the return on assets are about the same for responding and non-responding banks. The correlation of the average country ROAs from full sample and from the survey respondents is 0.97 and the rank correlation is 0.76.

number of survey respondents because Bank Scope does not provide data for a few banks that responded to the survey and survey respondents often did not provide answers to all the questions.[6]

In order to relate bank risk to the banking environment we use both objective institutional indicators of the environment and indicators based on the banks' own assessments as provided in the BEPS survey. The objective measures are based on the EBRD Legal Transition Program (LTP) evaluations of each country's legal system relating to secured transactions. The first indicator is an index of the quality of collateral law (LTP – Quality) and the second is an index of the quality of law enforcement (LTP – Enforcement). The component questions for each index are found in Haselmann and Wachtel (2006).

The BEPS survey asked bank managers about their perceptions of collateral laws, and the quality of law enforcement and bank regulation. In each instance the survey respondent was asked for his or her opinions on several relevant criteria and the responses were aggregated into an overall index that measures their confidence in the banking environment. Three perceptions indexes based on BEPS were constructed (see Hoshi, 2006, for similar indices with these data). The first two measure perceptions of the quality of the laws regarding collateral on movable assets and collateral on immovable assets. The third measures their confidence in the ability of the court system to resolve disputes.

All of the banking environment indices are sums of several subjective survey responses and thus provide an ordinal ranking rather than a meaningful measure of intensity. Therefore, we divide the legal indicators into below and above median groups to differentiate among banks with lesser and greater confidence in the environment.

Summary statistics for the banks in our data set are shown in Table 1. Means for common performance measures are shown for the whole sample and several sub-groups. To begin, we distinguish among three bank ownership groups using BEPS information to determine majority ownership.[7] Bank ownership is important for several reasons. First,

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[6] The survey design included all banks in the country, which might include some institutions that are not picked up by Bank Scope. There were 17 respondent banks excluded because there was not adequate Bank Scope data for 2004 in Moldova, 3 in Macedonia, 3 in Belarus, 2 in Slovakia and 1 in each of Bosnia, Bulgaria, Poland, Serbia, and Ukraine. One additional Serbian bank is eliminated because of inconsistencies in the Bank Scope data.

[7] Only 8% of the banks were government owned at the time of the survey. The privatization process was largely completed and even banks that reverted to government ownership during banking crises in the late 1990s (e.g. in Romania and Croatia) had been privatized when the survey was conducted in 2005. Fully 54% of the respondent banks are foreign and that number proportion would be much higher if the FSU were excluded. The foreign banks include both greenfield banks and banks acquired by mergers and acquisitions.

government banks might still face soft budget constraints that affect their willingness to take on risk. Second, private domestic and foreign owned banks will also have different risk profiles. Foreign banks are likely to have less local expertise or 'soft' information that enables banks to reduce risk through customer relationships.

Next, differences in transition progress will affect risk characteristics of banks. Since the number of respondent banks in many countries is quite small, a comparison of country averages is not particularly informative. Instead, we show the means for three country groups: the transition countries that are now members of the European Union (EU), the countries of the former Soviet Union (FSU) with the exception of the Baltic countries which are already part of the EU, and the countries of south Eastern Europe (SEE).[8] Finally, we group the banks into three size groups with roughly about a third of the banks in each group: assets less than $200 million, between $200 million and $1 billion and in excess of $1 billion. Since the largest banks tend to be concentrated in larger countries, we also group the banks by their share of aggregate domestic credit in the country where they are located.[9] Many of the banks in our dataset have a small market share; 42% are in the smallest share category and only 16% in largest share category.

Foreign and domestic banks perform similarly and both out perform the government banks. The government banks are on average twice the size of foreign banks and the domestic banks are on average much smaller. The return on assets (ROA) and return on equity (ROE) are negative for the government owned banks and about the same for the foreign and domestic banks. Similarly, net interest margins (NIM) are smaller for the government banks and about the same for the others. The few banks that are still state owned are in very poor shape, although efforts are underway to improve accounting standards and make them ready for privatization.

Average return on assets is quite similar across the three regions. Return on equity is about the same in the EU and FSU but lower in SEE. Net interest margins (NIM) are much lower in the EU countries than elsewhere. Banks in the SEE countries are considerably smaller according to asset size than banks in the other two regions. Grouping our sample by assets or by market share yields similar conclusions. Smaller banks have a lower ROA and ROE compared to their larger competitors.

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[8] The BEPS respondents are about evenly divided among the regions (29% are from the FSU and about 35% from each of the other regions). The countries in each region are:
EU: Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia, Slovenia
FSU: Belarus, Kazakhstan, Moldova, Russia, Ukraine
SEE: Albania, Bosnia, Bulgaria, Croatia, Macedonia, Romania, Serbia.
[9] Domestic credit (IMF IFS line 32) includes credit from non-bank sources as well; so small shares are expected even when we know that banking is highly concentrated. Further, no domestic credit measure was available for Serbia; so Serbian banks are excluded from market share analyses, as are banks that did not report assets to Bank Scope.

III. Measuring bank risk

As noted earlier, banking is the business of balancing risk taking and risk management. However, there is no ideal single measure of risk and, in fact, there any number of measures. We will consider three approaches to risk measurement. First, we present accounting measures that utilize various balance sheet ratios that are standard indicators of riskiness. Second, we will use out of sample forecasts from a default probability model to predict the default probability for each bank in our sample. Finally, we offer Basel type risk measures based on each bank's asset composition.

Accounting risk measures. The Bank Scope data are used to construct standard accounting measures of risk activity. We examine the following balance sheet ratios to describe the risk taking behavior of banks:

Name	Definition
Solvency	Equity / assets
Liquidity	Liquid assets (Deposits with banks + treasury bills) / assets
Custdepo	Customer deposits / assets
Contliab	Contingent liabilities / assets
Loan	Total customer loans / assets
Loanloss	Loan loss reserves / customer loans
Shortloans	Short-term loans / customer loans

The default probability model. Estimation of a default probability (DPM) model requires a sample that includes default experiences. Since the BEPS survey (conducted in 2005) does not include failed banks, we estimated the model with a different data set and applied the estimates to the banks in our sample to obtain out of sample forecasts of default probability.

The basic idea of a DPM is to predict whether a bank will default with the help of different accounting and macro measures. The model estimated here is based on a different sample of banks (including, of course, those that failed) and a somewhat different group of transition countries. We use these results to make out of sample estimates of default probabilities for the banks in our sample.[10]

The data consists of all banks in the Czech Republic, Hungary, Slovakia and Poland from the period of 1994 until 2002. In order to determine whether a bank has defaulted further information from Bankers Almanac was collected for each bank. Once a bank has been characterized as defaulted, the actual years of default as well as the two

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[10] Our intention is to develop a simple DPM that can be used for out of sample forecasts rather than fully investigate the specification of such models.

previous periods are classified as defaulted. All other observations for a defaulted bank are excluded from the sample in order to prevent any bias.[11]

The logit model has been widely used to estimate bank default probability.[12] It can be written as:

$$p(L=1) = \frac{e^z}{1+e^z}, \text{ with } z = a + \sum_{j=1}^{J} \delta_j X_{ij} + \varepsilon_i$$

where i indexes the bank year observations and j the proximate determinants of default. In the above equation, L is a binary variable, taking the value of one if a bank defaulted and zero otherwise. The probability function is described by $p\,(L)$. For estimating $p\,(L)$ an empirically not observable latent variable z is introduced that is determined by the independent variables X_{ij}. Thus, a linear relationship is assumed for the determination of z, however, not for the estimation of $p\,(L)$.

The variables in X_{ij} include measures of the risks that a bank faces, which include credit risk, market risk, operational risk and liquidity risk.[13] Specifically, the variables X_{ij} in our model along with their expected effect on default probability are:

Credit risk measures:	Equity / assets	-
	Loan loss reserves / loans	+
	Loans / assts	+
Market risk measure:	Net interest margin / assets	-
Operations risk measure:	Personnel expenses / operational expenses	-
Liquidity risk measures:	Short term deposits / assets	+
	Liquid assets / assets	-
	Loans / deposits	+
General risk measures:	Net income / assets	-
	Net income / equity	-
Bank characteristics:	Log of assets	-
	Customer deposits / assets	+

The multivariate model was estimated with a rolling forward routine to exclude insignificant variables. The final model included six independent variables and all except the loan to asset ratio have the expected sign. The Nagelkerke R-squared, which estimates the explained variance of the dependent variable by the independent variables, is above 40%. The variables and coefficient estimates of the final model are:

Constant 10.071

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[11] There are in total 631 bank year observations of which 36 represent banks in default. For a detailed description of the underlying dataset see Haselmann (2006).

[12] The main advantage of logit models over other methods is that no strict assumptions are imposed on the estimation. Furthermore, the results can be directly interpreted as default probabilities.

[13] For different specifications of DPMs with accounting measures and other data see for example Claeys and Schoors (forthcoming) who use Russian data.

Loan loss reserves / loans	4.641
Loans / assets	-16.122
Personnel expenses / operational expenses	-2.209
Liquid assets / assets	-19.909
Log of assets	-1.218
Customer deposits / assets	9.545

In order to further evaluate the underlying model, we examine the accuracy of the model predictions. There are two types of possible prediction errors. First, a bank that has actually defaulted might be classified as non-defaulted by the model (a type I error). As shown below, 28 of the 36 problem bank year observations (78%) have been correctly detected. Second, there is the possibility that a healthy bank will be classified as defaulted (a type II error). 95% of the 595 non-defaulted bank year observations are classified as such.

	Predicted		Percentage of
	No-default	Default	correct prediction
Observed			
No-default	566	29	95.1%
Default	8	28	77.8%
Overall			**94.1%**

While the overall fit of the model is extremely high, the question of applicability of these results to the broader set of countries and later time period of the EBRD survey remains. In order to answer this question, we examine the influence of year and country specific controls in the estimated DPM. That is, the model was estimated with year fixed effects and three country level macro variables (the ratio of private credit to GDP, GDP growth and interest rate spreads). The results show that only the ratio of private credit to GDP turns out to have a significant effect on the banks default probability. The magnitude of this coefficient is, however, in relationship to the coefficients of the bank specific variables rather small and the overall detection rate of the model including macro and year controls decreases. Therefore, we concluded that the estimation of default probability is not specific to the countries or years included in the sample, but to measures describing the conditions of the individual banks. Thus, we apply the coefficients from the DPM shown above to obtain default probabilities for the banks in the BEPS sample.

Risk adjusted assets and credit risk. Finally, the EBRD questionnaire asked banks to provide more detailed information about the characteristics of their assets than can be found in Bank Scope. This information is used to construct two risk measures: a credit risk measure that uses risk weights like those found in the Basle agreements and also a measure of risk adjusted assets.[14]

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[14] The familiar Basle measure is the ratio of capital to risk adjusted assets. The well known minimum capital requirement is that the ratio of Tier 1 capital to risk adjusted assets should be at least 8%. The Basle criterion is our credit risk measure (assets to risk adjusted assets) multiplied by the capital asset ratio. The credit risk ratio can be

The BEPS survey provides a breakdown of assets by type that is more detailed than the classifications available in Bank Scope. We use this information to construct risk adjusted assets, $\sum w_i A_i$ where A_i is the holdings of the i-th asset category and w_i is the risk weight for that asset category. The risk weights are based on the Basel II risk buckets although the available categories do not match the Basel definitions exactly. The weights assigned are in the spirit of the Basel agreement and are a reasonable approximation. The asset categories and the risk weights assigned are:

Mortgage loans	50%
Other household borrowing	100
Loans to small corporations	100
Loans to medium corporations	75
Loans to domestic subsidies of foreign corporations	20
Loans to state owned enterprises	20
Loans to government or government agencies	10
All other assets	100

We construct two risk measures using the risk adjusted assets. First, our measure of credit risk is the ratio of risk adjusted asset to total assets:

$$CR = \sum w_i A_i / A$$

Second, we will examine a risk adjusted capital adequacy measure, which is the ratio of capital to risk adjusted assets.

IV. Bank risk, region, ownership and size

Table 2 provides the means for bank groups of the various risk measures. It starts with balance sheet measures based on Bank Scope data for 2004. The first five columns show ratios to total bank assets for equity (solvency), liquid assets, customer deposits, contingent liabilities and loans. The next two columns provide the ratio of loan loss reserves to total loans followed by short term loans to total loans. Many banks fail to report contingent liabilities and only about half provide the break down of loans between short and long term. The default probability predicted by the model in the previous section is next. The last three columns provide capital adequacy measures that use BEPS data. First is the Tier I capital ratio which was only reported by about one-half the bank respondents. It is followed by the credit risk measure and, finally, the ratio of capital to risk adjusted assets where risk adjusted assets are based on the Basle type weights described above.

There are some noticeable differences in balance sheet characteristics among bank ownership groups and across regions as well. The government banks have more capital, larger loan loss reserves and more short term loans than the others. The domestic banks

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constructed for all respondent banks because it does not rely on Bank Scope data. Further many additional banks do not provide data on capital in Bank Scope.

make less use of contingent liabilities and are less liquid while the foreign banks maintain less equity than the others.

EU banks have smaller solvency ratios and loan loss reserves but they maintain more liquid assets. The use of contingent liabilities is rare except for EU region banks. Finally, there are some differences by bank size or share. There is clearly an inverse relationship between the solvency ratio and bank size or market share. Also, the very large banks and those with shares over 10% make fewer short term loans than others.

The estimated default probability summarizes the risk characteristics of the balance sheet. It is lower among EU banks, foreign banks and large banks (both size and share). Reported Tier I capital is very high for all bank types. Although the credit risk measure is widely dispersed overall, the means for all of the bank type groups are very similar. There is some variation with bank size; credit risk is higher for small banks, since these banks generally provide a larger fraction of SME lending. The capital to risk adjusted assets varies in the same way (just more so) than the Tier I capital to asset ratio. Government, SEE and small banks have a considerably higher capital to risk adjutsted asset ratio than their competitors which might well reflect a desire to signal their creditworthiness.

V. Bank risk and the banking environment

The differences in bank risk by bank type discussed in the previous section are generally not large. A bank's taste for risk might well be independent of its size, ownership and even location and depends instead on its perceptions of the banking environment. Banks with greater confidence in the banking environment or in countries with an objectively better legal environment for banking might be willing to take on more risk.

In order to test this presumption we present means of our risk measures grouped by the institutional indicators in Table 3. We examine how average bank risk differs between those with below median and above median quality of law or perceptions of the legal environment. Interestingly, there is no clear pattern between estimated default probability and the institutional environment. When bankers have better perceptions of the quality of law and when the laws are objectively better their default probability is higher. This suggests that bankers are willing to take on risky lending when the legal environment for dealing with bad loans is better. However, better perceptions of the courts and better law enforcement are associated with lower default probabilities. Also no clear pattern could be detected for the relationship between bank risk and credit risk.

On the other hand, we can find a clear pattern for the relationship between our capital risk adjusted assets ratio, solvency and institutional environment. By all our indicators no matter whether they are based on subjective surveys or bankers' own perception show that banks that operate in a poor environment tend to keep a higher capital risk adjusted assets and solvency ratio. Results for the Tier 1 capital support this conclusion. The data leads us to conclude that the legal environment itself does not

influence the banks' overall riskiness.[15] However, banks respond to their environment by adjusting their own capital.   In Haselmann and Wachtel (2006) we show that differences in the legal environment effect the composition of loan portfolio.

Previous findings are supported when we use the actual index values as continuous variables. Correlations of the quality indexes and the bank risk measures as presented below yield some interesting observations. There are consistently negative relationships between the quality of the environment and measures of bank capital (the Tier I ratio, capital to risk adjusted assets ration and solvency). Credit risk and default probability do not exhibit a consistent pattern with the indexes of the quality of the banking environment.

	Tier1	Credit risk	Capital assets	Default	Solvency	Liquidity
LTP Law of the book	-0.068	0.012	-0.209	0.166	-0.160	0.069
LTP Enforcement of law	-0.155	-0.128	-0.229	-0.052	-0.209	0.137
BEPS Perception of law on movable assets	-0.311	0.034	-0.339	-0.030	-0.249	0.091
BEPS Perception of law on immovable assets	-0.131	0.023	-0.184	0.087	-0.110	0.109
BEPS - Court perception	-0.024	-0.003	-0.072	0.012	0.012	0.080

Correlation coefficients of risk measures and institutional variables

Panel I from Table 4 reports the relationship between further characteristics of a bank's environment and our risk measures. BEPS collected information about the banks access to credit registry and risk management activities of banks. Banks that have access to a credit registry show a considerable lower default probability than banks that have no access. If such a credit registry exists, the bankers' assessment about the reliability of the registry seems of minor importance.

In Panel II of the same table we turn to the relationship between risk and the banker's reported risk management behavior. Generally banks with active risk management show a higher default probability (except to those banks that have an internal risk rating system). However, banks that manage their risk more actively are mostly more solvent, liquid and have a higher capital risk adjusted asset ratio.

 Overall, evidence for a relationship between banks' risk and their institutional environment is not very strong with one exception. Banks that have access to a credit registry clearly show a lower probability of default. Nevertheless, this does not mean that

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[15] In contrast, Claeys and Van der Vennet (2003) indicate that reform, as measured by the EBRD transition indicators, is associated with an increase in bank risk.

the institutional setting is unrelated to banking risk. One reason for our finding could be the specific nature of banking risk. Bank lending involves uncertainty and an efficiently functioning bank needs to take on risks. Under bad institutional settings, banks are less active lenders (e.g. Qian and Strahan, forthcoming, and Haselmann, Pistor and Vig, 2006) and mostly lend to borrowers about whom they can easily obtain information like large enterprises and the government (see Haselmann and Wachtel 2006). Such lending is, however, less risky than lending to information opaque borrowers like households and SMEs. This could explain why we do not find a clear pattern between a solid institutional environment and banks' probability of default.

On the other hand, we find that those banks that operate in an unsound environment have more capital. This finding shows that banks adapt to their environment by adjusting their capital. Furthermore, banks that take on more risk also actively manage their risk by creating a risk management department or obtaining credit histories from their borrowers. These findings suggest that banks are aware about the level of risk they take on.

VI. Conclusion

For the first time, data are available to examine the risk taking and risk management behavior of transition banks. In this paper we relate various measures of bank risk – solvency, liquidity, default probability and credit risk among others – to the size, location, ownership, institutional settings and management characteristics of banks. The following three points summarize our findings:

- Certain groups of banks differ in their riskiness; e.g. foreign, EU and large banks show a lower probability of default compared to their competitors. Nevertheless, these differences are not large and generally not statistically significant. This suggests that banking markets are relatively homogenous and no clear groups of banks with excessive risk taking can be identified.
- We find no clear relationship between banks' risk taking and their institutional environment (with banks' access to a credit registry being an exception). Our findings do, however, suggest that banks that operate in an unsound institutional environment respond to their situation by holding more capital and taking less credit risk.
- Banks that take on more risk also actively manage their risk by, for example, establishing a risk management department or obtaining information on borrowers' histories. Such banks also tend to hold more capital.

Overall we find that no group of banks is subject to excessive risk taking and that those banks that take on risks also take on a higher share of capital and undertake active risk management. Thus, we conclude that the transition banks in our sample seem to basically operate and mange risk as banks in other developed markets.

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		ROA	ROE	NIM	Assets
Total Sample	mean	0.014	0.115	0.051	19617
	obs	194	191	193	212
Ownership groups					
government	mean	-0.016	-0.017	0.035	44472
	obs	16	16	16	18
domestic	mean	0.018	0.129	0.051	10385
	obs	68	66	67	80
foreign	mean	0.016	0.126	0.053	21541
	obs	110	109	110	114
Region groups					
EU	mean	0.013	0.138	0.039	36426
	obs	71	71	71	72
FSU	mean	0.019	0.143	0.060	11555
	obs	49	47	48	62
SEE	mean	0.011	0.074	0.056	8609
	obs	74	73	74	78
Asset groups					
0-200mill	mean	0.007	0.042	0.057	1034
	obs	55	53	54	63
200mill-1bill	mean	0.017	0.105	0.061	5364
	obs	73	72	73	83
>1bill	mean	0.016	0.184	0.034	50304
	obs	66	66	66	66
Market share groups					
<2%	mean	0.010	0.084	0.043	5766
	obs	83	83	83	90
2%-10%	mean	0.025	0.298	0.062	14147
	obs	58	58	58	60
>10%	mean	0.015	0.157	0.034	71279
	obs	34	34	34	34

Table 1: Means of performance measures by ownership, region, assets and market share, 2004

Notes: Assets in million of dollars.

	Solvency	Liquidity	Custdepo	Contliab	Loan	Loanloss	Shortloans	Default	Tier1	Creditrisk	Capitalassets
Total Sample	0.138	0.170	0.569	0.255	0.554	0.046	0.587	0.123	0.184	0.748	0.271
Ownership groups											
government	0.195	0.180	0.562	0.282	0.547	0.091	0.689	0.158	0.358	0.722	0.641
domestic	0.151	0.153	0.587	0.130	0.545	0.049	0.583	0.154	0.185	0.770	0.239
foreign	0.122	0.178	0.559	0.336	0.560	0.037	0.566	0.106	0.167	0.735	0.239
Region groups											
EU	0.103	0.234	0.562	0.518	0.512	0.027	0.540	0.100	0.126	0.739	0.181
FSU	0.150	0.091	0.536	0.080	0.597	0.046	0.651	0.139	0.182	0.728	0.286
SEE	0.164	0.159	0.596	0.119	0.567	0.062	0.578	0.142	0.237	0.760	0.316
Asset groups											
0-200mill	0.223	0.177	0.563	0.106	0.549	0.067	0.611	0.173	0.261	0.781	0.339
200mill-1bill	0.121	0.176	0.554	0.226	0.558	0.037	0.681	0.129	0.158	0.751	0.205
>1bill	0.089	0.156	0.590	0.400	0.553	0.038	0.507	0.078	0.132	0.712	0.205
Market share groups											
<2%	0.152	0.235	0.547	0.347	0.496	0.041	0.630	0.136	0.184	0.790	0.237
2%-10%	0.110	0.115	0.564	0.166	0.608	0.034	0.592	0.110	0.138	0.677	0.211
>10%	0.095	0.136	0.655	0.243	0.582	0.042	0.423	0.102	0.137	0.754	0.194

Table 2: Means of risk measures by ownership, region, assets and market share, 2004

	Tier1	Creditrisk	Capitalassets	Default	Solvency	Liquidity
LTP Qualtiy of law						
Below median	0.190	0.743	0.286	0.105	0.148	0.156
Above median	0.198	0.750	0.251	0.153	0.122	0.206
LTP Enforcement of law						
Below median	0.202	0.749	0.308	0.129	0.147	0.163
Above median	0.186	0.744	0.241	0.121	0.131	0.185
BEPS Perception of law on movable assets						
Below median	0.223	0.740	0.324	0.109	0.169	0.163
Above median	0.158	0.755	0.210	0.142	0.113	0.204
BEPS Perception of law on immovable assets						
Below median	0.213	0.736	0.321	0.094	0.151	0.176
Above median	0.175	0.752	0.227	0.146	0.134	0.187
BEPS - Court perception						
Below median	0.211	0.757	0.305	0.132	0.152	0.166
Above median	0.173	0.735	0.238	0.102	0.135	0.184

Table 3: Means of the bank risk measures grouped by legal indicators, 2004

	Tier1	Creditrisk	Capitalassets	Default	Solvency	Liquidity

I. Banks' environment

Does credit agency exist?

	Tier1	Creditrisk	Capitalassets	Default	Solvency	Liquidity
Yes	0.206	0.753	0.280	0.077	0.144	0.197
No	0.179	0.733	0.262	0.168	0.126	0.134

Is information of credit registry accurate and reliable

Yes	0.238	0.746	0.310	0.087	0.126	0.218
No	0.207	0.754	0.265	0.075	0.146	0.184

Loan applicants were rejected due to a lack of acceptable collateral

Yes	0.165	0.733	0.241	0.124	0.124	0.175
No	0.232	0.758	0.310	0.092	0.157	0.182

Lack of creditworthy customers was the main constraint on bank's ability to make customer loans?

Yes	0.205	0.771	0.263	0.090	0.139	0.185
No	0.187	0.720	0.280	0.121	0.131	0.163

II. Banks' risk management

Did your bank obtain information on credit histories of borrowers from credit information registries?

Yes	0.196	0.757	0.352	0.087	0.146	0.207
No	0.209	0.753	0.265	0.071	0.142	0.197

Did your bank have a separate department responsible for the risk management?

Yes	0.306	0.787	0.415	0.159	0.187	0.247
No	0.167	0.738	0.240	0.100	0.131	0.165

Does your bank measure the value at risk in its trading portfolio?

Yes	0.200	0.764	0.286	0.129	0.158	0.167
No	0.196	0.735	0.273	0.087	0.126	0.205

Has your bank an internal ratings based approach for the measurement of credit risk?

Yes	0.158	0.755	0.224	0.097	0.167	0.237
No	0.208	0.747	0.292	0.116	0.135	0.167

Table 4: Means of the bank risk measures, 2004, grouped by BEPS management responses