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## On the Rationale of Bank Lending in Pre-Crisis Thailand

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# On the Rationale of Bank Lending in Pre-Crisis Thailand

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## Abstract:

Evidence from credit files is provided to examine bank lending determinants of Thai commercial banks. Their lending practice follows reasonable patterns as a standard set of variables, including indirect risk variables, explains much of the variance in interest rate spread. Reflecting institutional differences with mature markets, we find higher importance of relationship banking and risk control via credit availability. Information about later default reveals prudent relationship lending. However, banks could have made better use of available information about borrowers' riskiness. These findings do not support a general verdict of bad banking but indicate room to improve lending decisions.

JEL-Classification: G 21, O 16

Keywords: Financial system, bank lending, relationship lending, financial crises, emerging economies, Thailand

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# On the Rationale of Bank Lending in Pre-Crisis Thailand

## 1 Introduction

Banks are more important in developing economies than in industrialized countries (Levine 1997). Moreover, bank-based financial systems seem to be more successful in developing economies than in industrialized countries. These results reflect the general opinion that developing countries ought to be judged different in their institutions. Thus, we cannot expect that our insights in respect to bank lending in mature markets will remain when examining emerging markets. Despite this fact, there is hardly any micro-based empirical analysis of bank lending in developing countries. Indeed our case study does show that lending decisions of Thai commercial banks are determined differently to those in industrialized economies. We find that relationship lending is more enunciated than in mature markets, credit availability is used as an instrument of risk control, and that information on default risk is not extracted very well from balance sheet data.

The Thai case seems to be of particular interest beyond covering an emerging market, because the Asian crisis of 1997/98 started in Thailand. Consequently, contagion as an explanatory variable can be excluded here (see Park and Song, 2001). Moreover, the domestic financial sector should be analyzed as its problems preceded the overall economic crisis in Thailand (see e.g. Warr, 1999, Alba et al., 2001, Rajan, 2001). However, we entertain doubts to some general verdict of bad banking practices: before the Asian crisis, Thailand's banks were regarded as a positive element in the economy and Thailand was among the countries classified as resource-efficient (World Bank, 1993). The resulting comparatively high total factor productivity would be difficult to explain in light of a large and inefficient banking sector (Menkhoff, 2000).

Thus, first-hand micro-level evidence helps to improve our understanding of the rationale of bank lending before the crisis: were lending determinants any different from those in mature markets, reflecting different institutions and therefore indicating any degree of functionality? Was risk-taking – the main indicator of bad banking practices – inappropriate? Were relations between the bank and its borrowers – a typical motivation for bad banking – too close to allow for prudent banking?

We conducted an in-depth case study of the lending decisions of Thai commercial banks before the Asian crisis, based on their internal credit files. Thus, our study fits into a large new literature on the functioning of financial systems in emerging markets. The unexpected outbreak of the Asian crisis, and the fact that there was no historical precedent for the nature of its progress, initiated this wealth of new research.<sup>1</sup> It complements ongoing debates on liberalization and the growth effects of financial development.<sup>2</sup> Our contribution is to explain the lending process from the banks' perspective, as this piece of evidence has been missing until now. We analyze Thai commercial banks under the theoretical perspective of relationship lending (Boot, 2000), as it is precisely these close relations between banks and their customers that characterize lending in emerging economies. For this purpose, a new data set was compiled in 2000/01, consisting of 560 credit files sourced from the majority of Thai commercial banks. These banks form the core of Thailand's financial system, accounting for around 60% of total assets.<sup>3</sup> The data cover the period 1992 to 1996.

The only other similar kind of paper focusing on an emerging economy of which we are aware (La Porta, López-de-Silanes and Zamarripa, 2003) examines related lending in Mexico. The result is striking, as the information gathered, clearly indicates that related lending in Mexico is accompanied by more favorable credit terms for the borrowers and worse repayment for the lending bank than non-related lending. So, risk is not priced appropriately and relations are misused. The Thai case is very different from the Mexican experience.

We discover stable determinants of lending decisions which add new insights to the existing literature from industrialized countries. For the developing economy, as expected from theoretical considerations, relationship indicators have relatively greater importance in explaining the interest rate spread than direct risk variables. Furthermore credit availability is reduced for more risky borrowers, whereas direct risk proxies do not seem to influence spread. When using the later default of a loan as the dependent variable, relation proxies indicate a positive effect for Thai com-

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<sup>1</sup> See e.g. La Porta et al., 1998, Corsetti, Pesenti and Roubini, 1999, Sarno and Taylor, 1999, Dooley, 2000, Claessens, Djankov and Lang, 2000, Goh and Groenewold, 2000, Faccio, Lang and Young, 2001, Martinez Peria and Schmukler, 2001, Demirgüç-Kunt and Huizinga, 2004, Agbola and Kunanopparat, 2005.

<sup>2</sup> See surveys by Levine, 1997, World Bank, 2001; on the role of banks e.g. Beck, Levine and Loayza, 2000, on the impact of liberalization e.g. Arestis et al., 2002.

<sup>3</sup> Another 20% of assets are represented by so-called finance companies, and the remaining 20% are held by specialized state banks and foreign banks.

mercial banks, as close customers did not generally receive too risky credit. There is some evidence, however, that large (and tentatively related) customers did. Moreover, risk proxies help to explain default and thus have obviously not been fully exploited beforehand, indicating limited efficiency in Thai commercial banks' lending practice.

The rest of the paper is structured as follows: Section 2 gives a detailed description and analysis of the data used. The systematic examination on the ex ante nature of lending in Thailand is presented in Section 3. The information from the ex post available default variable is analyzed in Section 4. Section 5 concludes with a view on possible objections to the results of this research.

## **2 The data**

### **2.1 Data compilation**

The greatest hurdle in conducting this study was to gain the cooperation of Thai banks in allowing researchers to study their credit files. It seems to be obvious that these banks had no direct interest in such work and that – due to the history of the banking system – they feared outcomes that could attach blame to them. In getting the support of banks, three factors were helpful: first, the passing of time helped to heal wounds as many responsible persons changed positions, and procedures were upgraded so that if the outcome might blame anything, it would just be "history". Second, all participants were promised strict confidentiality so that nobody could identify unprofessional practices and no bank or person can be singled out. Third, the study is a pure research project which is not intended to gain any private information advantage but aims to improve knowledge. It thus produces a public benefit which was honored by a supporting letter from the Thai Ministry of Finance, which is involved in banking supervision.

Starting in August 2000 we approached all 15 Thai commercial banks that existed before the crisis or their successors in case of mergers. Nine banks finally agreed to cooperate and are thus included in our sample. As their number is so limited and we promised confidentiality, we cannot say much about their participation except that it is quite representative for the size and structure of the banking sector.

Regarding the selection of credit files, there is the problem of an uncontrollable selection bias which could distort our sample and produce misleading results. In particular it is to be expected that banks want to present themselves in a favorable light,

although the personal incentive was probably low due to changing responsibilities and confidentiality should reduce the incentive for strategic file selection. So we tried to get cooperation from as many banks as possible to minimize the impact from distorted selection in a certain bank. Within the banks, we asked for a randomized sample. As the depository of files often follows some criteria, in these cases we decided on a diversified selection. In some cases the banks presented lists of customers revealing size and industry, so we could choose the files (preferring the critical industries construction and real estate).

Between September 2000 and March 2001, the nine participating banks were each visited for about two to three weeks. Between 35 and 85 credit files of the predetermined five-year period from 1992 to 1996 were analyzed in each bank. In all 560 cases, we focus only on a single loan grant. For each loan, we personally extracted the information from the credit file or supervised the bank employee doing so to ensure that the information was compiled in a comparable way.

## **2.2 Data representativeness**

Do the data in our study represent the loans made by Thai commercial banks in a reasonable manner? There are basically three ways to find out whether the credit files compiled largely represent the total population. First, the average firm size may be analyzed, second the industry structure of loans can be compared with the market, and third, the share of non-performing loans (NPLs) can be compared with that for all commercial banks (see Menkhoff and Suwanaporn, 2003, for more details).

The minimum firm asset size realized in the sample of about one million Baht equals roughly 40,000 USD at the historical exchange rate. The maximum size of about 90 billion Baht equates to around 3.6 billion USD. This indicates what the median value of 10 million USD confirms: the sample does not represent the total economy, but rather the medium and larger sized segments of Thailand's economy. The reason is that the credit files stem from the headquarter offices, which handle all larger loan cases, whereas the really small loans may be decided at the branches. So whatever this study reveals, there is still the possibility that results may differ for really small-scale loans.

The industry structure of loans in the sample also shows some deviation from the total population as it is classified by the central bank (see [Table 1](#)). The by far largest recipient of loans in the country, manufacturing industry, is also the largest in

our sample with a 44% share. The sample, moreover, consciously over-represents "real estate" and "construction", which are regarded as industries deeply involved in the crisis, and necessarily under-represents all other industries with the exception of services. Those two industries with the smallest median loan size – i.e. personal consumption and wholesale/retail trade – are clearly underrepresented in our data, probably reflecting the sample's focus on medium and large size firms.

Finally, non-performing loans have a share of 45.9% in the sample. This is in the same dimension as published figures, which at the height of the crisis mentioned a figure of slightly more than 50%. Although there are large differences between the NPL shares of the nine banks, the overall figure signals useful information.

Overall, the data received represent only firms with bank loans and they are not strictly representative of commercial banks. Loans refer to medium and large size firms, industries are over- or under-represented to a certain degree and the NPL share may be slightly too low. However, bearing this in mind, the data are not misleading and thus appear to be useful for our research.

### **2.3 Description of variables**

Due to the purpose of the study, there are two dependent variables, the interest rate spread (IRS) and credit availability. The IRS is measured as the difference between the interest rate charged and the minimum overdraft rate. The latter is the reference rate charged to first class customers for overdraft credit and lines of credit. Credit availability is more difficult to grasp. Petersen and Rajan (1994, p.18) advise against taking the actual debt ratio as this may be an ambivalent figure, either reflecting credit demand – which is not of interest here (good firms may not need credit) – or credit supply as seen from the bank's point of view (the bank possibly rations a firm). We therefore rely on the "bank credit ratio" (BCR) which is the line of credit (L/C) divided by the sum of L/C plus liabilities. Its central advantage is that the L/C includes available future credit because the L/C is usually not fully used. The larger the BCR the greater the probability of there being unused L/C, indicating good credit availability. This is, of course, still a crude measure of credit availability, as there is no information about the extent to which the L/C has already been used. Moreover, the L/C is also influenced by credit demand and supply factors similar to the actual credit used. The advantage of using the BCR against the debt ratio, however, is the – admittedly imprecise – indication about available credit in the future.

Regarding the independent variables, [Table 2](#) presents the full list and an exact description of variables used. The next group after the dependent variables in the list is three variables that aim to directly capture the riskiness of loans. Higher risk is expected to be indicated by a higher liability-to-asset ratio (or leverage), by a lower current ratio and a lower interest coverage ratio. The following group of variables in [Table 2](#) covers relationship variables. A close relation is expected to be revealed by a positive house bank status, a long relation duration and a small number of competing banks.

Accordingly, control variables are introduced. Some frequently used variables are classified as "indirect risk variables", as large assets, old age and high collateral can be regarded as risk reducing. Moreover, there are three kinds of dummies, representing idiosyncratic influences from individual bank policies, years and industry influences. Finally, in Section 4 of the study, two more variables are used: L/C volume, informing about the volume of all lines of credit by the respective bank to a firm, and default, informing about a non-performing status of the loan in the period between credit granting and data compilation according to the latest regulations.

The descriptive statistics of these variables reveal that in particular the risk proxies can behave in an extreme manner. Regarding the liability-to-asset ratio, there are firms where liabilities are larger than assets. The current ratio can lie between 0, i.e. for firms with no liquid assets, and 139, i.e. for firms with hardly any short-term liabilities. Finally, the interest coverage ratio takes values between  $-37$ , i.e. where earnings or possibly interest expenses are negative, and 97, i.e. where interest expenses are extremely low. Note, moreover, that this last risk proxy is available only for less than 90% of all cases, indicating that this kind of calculation is not always applied, e.g. because it may be hypothetical in the case of a new firm. These sometimes extreme values of risk proxies justify treating them – in line with the literature – as outliers.

Finally, and consistent with other studies, the variable asset size is right-skewed distributed with extremely few large firms and has thus been transformed into logarithmic values. The same transformation was chosen for the variable number of banks and L/C volume as these variables also increase very strongly for the few large firms.



## 2.4 Characteristics of borrowing firms and loans

The last part in this Section 2 gives average values of variables and their deviation by way of the relation of these variables with the asset size of borrowing firms (see also Petersen and Rajan, 1994). Firm-related variables are shown in [Table 3](#). The smallest 10% of firms covered has assets below 22.1 million Baht, i.e. slightly less than 1 million USD. The largest firms have assets of more than 2,947 million Baht, i.e. roughly 118 million USD.

Means of the variables develop with percentiles of increasing asset size. Size related figures, such as age, equity and liabilities clearly go upwards. The behavior of the three risk proxies may therefore be more interesting: the liability-to-asset ratio increases slightly, the current ratio shows a hump-shaped pattern, whereas the interest coverage ratio clearly goes down, with the exception of the smallest firms. This means that larger firms tend to be identified as unanimously more risky than medium sized firms and also as somewhat more risky than small firms.

The characteristics of loans depending on the asset size of borrowing firms is presented in [Table 4](#). Absolute volume of lines of credit (L/C) goes up with asset size, as well as the default share. By contrast, interest rate spread declines, as well as the bank credit ratio (BCR) and collateral with increasing firm size. Regarding the three indicators for relationship lending, banks have fewer house bank relations with larger firms, relation duration goes up with size and larger firms have more lending banks.

In summary, Tables 3 and 4 provide evidence that the data set includes economically rational information and that this structure is similar to well-known structures from mature markets. Empirical examinations first analyze bank lending behavior using ex ante information (Section 3), and then using ex post information in addition (Section 4).

## 3 Bank lending analyzed by use of ex ante information

We find that lending of Thai commercial banks was by and large functional. The benchmark for this assessment is earlier results on lending determinants of banks from industrialized countries. The comparison with these mature markets shows, moreover, that the importance of lending determinants differs in the emerging Thai market, reflecting institutional differences. In particular, relationship banking is pronounced.

We analyze lending behavior by applying the standard empirical technique of the relationship banking literature. According to this procedure, the price and the availability of loans are explained by a set of theoretically reasonable variables. The data used for these regressions stems from the information that was available to the bank at the point of decision making. In our case, this is the information contained in the credit files.

### **3.1 The pricing of loans**

The pricing of loans extended by Thai commercial banks does not really support the verdict of bad banking. The extensive research on lending decisions in mature markets found that risk factors play a surprisingly small role, that relationship sometimes matters and that the size of a firm is always important.<sup>4</sup> In the case of an emerging market, such as Thailand, we expect that the credit granting technology is less developed and information from balance sheet data is more opaque so that risk factors are unimportant for loan pricing. In the case of a bad banking environment, one may even expect that lending decisions become largely independent of economic determinants. However, our evidence is different.

Moreover, the institutional environment of an emerging economy seems favorable to the widespread use of relationship lending. Relationship building between lender and borrower can be understood as an institution to partially overcome the incomplete and asymmetric information between the parties involved. The more perfect markets are and the better the quality of information is, the more contracts are expected to be reliable and enforceable and the smaller is any possible advantage from relationship lending. We can thus expect that Thailand is a case where relationship lending may play a prominent role, in particular for smaller firms.

What is less clear is whether relationship lending will make loan prices cheaper or more expensive. Arguing that a close bank has intimate private knowledge of the borrowing firm and can thus assess risks more precisely would justify the realization of lower interest rates. One can, however, also argue that the close bank is in a strong bargaining position as it is the main provider of credit and as its potential withdrawal of credit would provide a strong negative signal to other lenders. In this sense,

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<sup>4</sup> In addition to studies mentioned on the US see e.g. Degryse and Van Cayseele (2000) on Belgium, Elsas and Krahnert (1998), Lehmann and Neuberger (2001) and Elsas (2005) on Germany and Ferri and Messori (2000) on Italy.

a firm is to some degree "caught" in the particular relation with a close bank. In the situation of an emerging economy both arguments seem to be of particular relevance: information asymmetry is very important and would lead to a negative correlation between interest rate spread and the incidence of relationship lending. However, competition between banks is also rather lower than in mature markets and would thus allow a close bank to more easily exploit its position. This would lead to a positive correlation between spread and relationship lending. In summary, higher interest rates for "related" loans indicate low competition in the market. Lower spreads, however, can be problematic too: they indicate bad banking if risk-taking is inappropriate.

To empirically examine the Thai case, we estimate – in accordance with the literature – OLS regressions where variables are included which have been previously identified as important in such examinations. To consider conflicting aspects, several specifications of the following general form are used:

$$\begin{aligned} \text{Interest rate spread} = & \beta_0 + \beta_1 \text{ risk proxies} + \beta_2 \text{ relationship indicators} \\ & + \beta_3 \text{ indirect risk variables} + \beta_4 \text{ bank dummies} \\ & + \beta_5 \text{ year dummies} + \beta_6 \text{ industry dummies} + \varepsilon \end{aligned}$$

Specification (1) in [Table 5](#) proceeds as suggested by Petersen and Rajan (1994) and serves as the benchmark. In order to avoid possibly distorting influences from extreme values of the risk variables (see Section 2.3), Petersen and Rajan suggest setting a negative value of the interest rate coverage ratio to zero as well as excluding the most extreme 5% of cases from the three risk variables. The disadvantage of this procedure is that the case number goes down to 416.

In this benchmark specification, the signs of almost all variables are as expected from theory. Neglecting the constant term, it is unfortunately the first risk proxy – the liability-to-asset ratio – which presents an unexpected negative sign, indicating that firms with higher leverage would receive cheaper money.<sup>5</sup> The other two risk proxies have the expected negative sign. Turning to the group of relationship variables, these show negative signs too, indicating that related loans are cheaper (see e.g. Berger and Udell, 1995). The lower spread resulting from more lending banks indicates competition in the industry. The sign of the asset size variable is as theoretically expected. Collateral has a positive sign, indicating that collateral could only partially cover the high risk, collateralized loans being still riskier than others

(see detailed in Menkhoff, Neuberger and Suwanaporn, 2005). Finally, the age variable is expected to show a negative sign, but obviously the effect is already included in other correlated variables, such as size, and the remaining effect is close to zero.

The behavior of the dummies – not shown here – is as follows: the large and different coefficients for the nine banks are remarkable, indicating either quite different borrowers or strategies. The year dummies have low coefficients, indicating slightly growing spreads over time. This time trend may be caused by two effects: first, the economic conditions have become rather worse over time and second, some disintermediation has happened (see Menkhoff, 2000) which may not be fully captured by the other variables. Finally, the coefficients of the industry dummies are of small size and often point to the expected direction, such as higher spreads for construction and real estate and lower spreads for (the preferred industry of) agriculture or banks. Overall, the signs of the coefficients are rational.

Turning to the explanatory strength of the variables, three coefficients are statistically significant, apart from the constant term and bank dummies. First of all, the asset size variable is dominant. The risk proxies are not statistically significant in contrast to the relationship indicators. Among the latter, even two of them are significant, i.e. the house bank variable as well as the number of banks lending to the firm.<sup>6</sup> This indicates the importance of relationship lending, a finding that is robust throughout further analyses. The relationship determinants were insignificant for loan pricing in the USA (Petersen and Rajan, 1994) or in Germany (Elsas and Krahenen, 1998).<sup>7</sup>

In summary, loan pricing determinants of Thai commercial banks are similar in structure but different in importance to those in industrialized countries. The significant determinants include an indirect risk variable and important relationship factors. There is some evidence of functional competition in the lending market. All these findings on loan pricing do not signal the existence of bad banking.

In order to check the robustness of findings we examine several modifications. Specification (2) aims at better capturing the non-linear firm size effect. Taking account of the increasing interest rate spread for the ten per cent largest firms (see Ta-

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<sup>5</sup> No significant effects of leverage have been found among others by Berger and Udell, 1995, or Petersen and Rajan, 1994, the latter also with a negative sign in two specifications.

<sup>6</sup> We confirm the finding of Elsas (2005) that a house bank variable probably better captures relationship lending than a duration variable.

<sup>7</sup> Another significant variable – not shown here – is for the construction industry, which makes sense for this highly cyclical and leveraged business.

ble 4), we add a second size term to the benchmark specification which effectively models this non-linearity. The result is, indeed, an improvement towards theoretical expectations as the overall fit becomes better, the collateral coefficient becomes significant and the "wrong" sign of the liability-to-asset ratio is now of negligible size. In another examination we follow Berger and Udell (1995) and split the total sample at the median firm size of about 300 million Baht (i.e. 12 million USD at historical rate) into two subsamples of small and large firms. It is expected that the small firm sample has a higher influence of relationship variables. Specification (3) shows respective findings for the smaller firms, which has the expected higher overall fit than the regression of larger firms (specification 4). Coefficients do not change in comparison with the benchmark – except for the liability-to-asset ratio becoming positive – but significance of coefficients goes down, probably due to the smaller sample size. Again, these results underline the existence of principally reasonable lending practices. By contrast, in the large firm specification (4) neither asset size nor house bank status explain anything. Only the variable relation duration is statistically significant and the number of banks becomes significant at a 11% level. This suggests in combination with the comparatively low explained variance two lessons: relationship is always important in Thailand but can change its expression and further influences may be important in the loan market for large firms which are not so well covered here.

In a related exercise, specification (5) picks up the influence from house banks on the liability-to-asset ratio by integrating both variables into a new interactive variable. It is found that the unexpected sign of this risk proxy is generated by house banks only, whereas non-house banks set higher loan rates to firms with higher leverage. This result may be interpreted as imprudent lending by house banks or as the outcome of the house banks' function, such as to finance younger firms or to allow firms' operations with higher leverage. The role of house banks will be examined in more detail later.<sup>8</sup>

Having addressed pricing, we now turn to the question of availability of loans.

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<sup>8</sup> To check whether results depend on the sample size, various specifications – e.g. with less restrictions on the risk variables – have been run without major changes (see Menkhoff and Suwanaporn, 2003).

### 3.2 The availability of loans

Thai commercial banks use credit availability as a means of controlling the risk of their loan portfolio. This reveals even more clearly than for the pricing regression that risk matters in lending decisions and it confirms the above finding that emerging markets operate differently from mature markets.

The theory of credit rationing links rationing to informational asymmetry in credit markets (Stiglitz and Weiss, 1981). As asymmetric information between lender and borrower is even more pronounced in emerging markets, one may expect reduced possibilities for discriminative pricing by Thai commercial banks. Instead, banks may then rely more on rationing, i.e. influencing credit availability according to the perceived riskiness of borrowers. Studies from mature markets indicate another consequence of relationship banking: a good relation improves credit availability.

The empirical examination of the Thai case uses the same set of explanatory variables as above. They are regressed on the "bank credit ratio"-variable which aims to capture credit availability. The outcome presented as specification (1) in [Table 6](#) shows, indeed, a reassuring finding: as can be expected from theoretical reasoning, the sign of coefficients is mostly opposite to the pricing regressions – meaning that banks react to the same set of variables with higher spreads and/or relatively lower amount of loans. In addition, two of the three risk proxies show the expected sign and the liability-to-asset ratio is now even statistically significant and of high economic importance. This result – in combination with the earlier findings on loan pricing – suggests that Thai commercial banks address risk more by limiting the amount of credit than by increasing the price of loans. Regarding the concern of bad banking, loan markets seem to be functioning in the sense that risk is considered by setting prices and even stronger by controlling loan volumes.

Further results seem noteworthy: a house bank relation improves credit availability, as identified by earlier literature on mature markets (e.g. Petersen and Rajan, 1994, Lehmann and Neuberger, 2001). The asset size variable does not seem to capture the riskiness of a firm but rather reveals a limitation of our credit availability indicator as large firms rely much less on bank credit and thus also need less open credit lines (see also Table 4). Moreover, the differences between the nine banks are much smaller regarding the provision of credit availability than regarding their loan pricing (not reported). This may be interpreted as a further indication that the sys-

tematic component of lending behavior of Thai commercial banks can be better understood by looking at the relative volume of loans rather than at prices.

Further regressions indicate the importance of credit availability for the lending decisions of Thai commercial banks. Splitting the sample into loans to small and large firms does not influence the outcome much, and particularly not so drastically as it did for interest rate spreads. The only new significant result for small firms is the detrimental influence from many lending banks, possibly signaling some problems in attracting large amounts when there are "too many" banks necessary (see specification 2). Regarding large firms, another variable becomes significant, i.e. the positive influence of relation duration (see specification 3), a result already known from the pricing regression. This may indicate that a longer lending relationship increases credit availability because the bank learns more about the borrower. The variable age, however, shows a statistically negative sign, which we interpret as indication of other financing alternatives of established large firms. Finally, specification (4) informs about determinants of house bank relations only. Sign, size and significance of coefficients are very similar to earlier findings, indicating that house banks also conduct risk control via credit availability.

Summarizing Section 3, we find that risk is priced. Risk is controlled even more rigorously by adapting credit volume. Relationship variables are very important, as close relations go along with better prices and better credit availability. Moreover, relationship lending and credit rationing seem to be fruitful concepts in understanding bank lending in emerging markets. The next Section 4 will put the rationale of Thai banks' lending under an ambitious test: how did banks perform from an ex post perspective?

#### **4 Bank lending analyzed by use of ex post information**

The tough test of an ex post analysis, which goes beyond most literature in this field, reveals some weaknesses in Thai banks' lending policy but does not confirm the bad banking hypothesis. We distinguish in our analysis between the motivation towards bad banking, signaled by a misuse of relation, and the practice of bad banking, signaled by underutilization of information on riskiness.

As new ex post information we introduce the default variable. Default happens in our data if the loan has turned into a non-performing loan between loan granting in 1992-96 and data compilation in 2000/01. This means for our sample that in most

cases the Asian crisis caused default. Accepting that this crisis was difficult to forecast, the incidence of default is largely influenced by a macro shock and may be thus a noisy indicator for imprudent lending behavior (Caprio and Klingebiel, 1997).

Nevertheless, even a simple correlation analysis of default with lending determinants shows that available credit file information indicated vulnerability of firms. Analysis (1) in [Table 7](#) shows that two out of three risk variables are significantly related to default and that all of them have the expected sign. This is remarkable as it reveals the potential usefulness of risk proxies to forecast later default. Moreover, size predicts – contrary to conventional wisdom – later default as well as a younger age of firms. Finally, the signs of relationship variables indicate that related firms had a lower probability of default, although only a longer relation duration indicates this significantly. So simple correlations help to understand the relation of non-performing with high risk and the presence of relationship lending: it is clearly risk that matters. We interpret this as evidence against the bad banking hypothesis that too close relations would hinder prudent lending. It is less clear whether risk should have been anticipated better. We analyze these issues in a multivariate setting by regressing lending determinants on default.

Due to the 1-0-nature of the default variable, probit regressions are used here. The respective benchmark regression is shown as specification (2) in [Table 7](#). Two of the three risk proxies have the expected sign, the current ratio is statistically highly significant and the interest coverage ratio is almost significant (at 11%). The case of relationship proxies is somewhat different as none of them are statistically significant. In particular, house bank relations, as well as a smaller number of lending banks, tend to be related with lower rather than higher default probability. In this specification, younger firms and – surprisingly again – larger assets are positively related with default. This result confirms the correlation analysis (see analysis 1 in [Table 7](#)).

It raises the question as to which influences may be hidden in the unexpectedly signed asset variable. Splitting the sample into small and large firms shows no contradiction between both regressions – presented as specifications (3) and (4) respectively – but different importance in determinants. The asset factor is a particular problem of large firms. As it is only for house banks where firm size becomes significant (not reported), this indicates that there might be influences on credit granting beyond economic rationale for the group of large and close firms in the sense of La Porta, López-de-Silanes and Zamarripa (2003). Another finding seems noteworthy, i.e. the



opposite signs for the liability-to-asset ratio. The theoretically unexpected negative sign in specification (2) is obviously driven by small firm financing where it may represent rather a positive signal from already existing external financial sources.

In another effort to better understand the influence of the asset variable, specification (5) distinguishes the effect of higher credit volume from asset size. Both variables are highly correlated and therefore neglected in other regressions, but their joint inclusion could be informative here. The credit volume variable has a positive and highly significant coefficient, whereas the asset variable loses significance. Three more changes towards significance can be recognized when compared with specification (2): in the house bank variable, the interest coverage ratio and the liability-to-asset ratio (this latter variable for small firms only, see above). How to interpret these results?

First, specification (5) confirms earlier evidence that relationship banking does not "generate" default. By contrast, house banks are related to non-default which may be caused by better understanding of the firm and/or by better credit availability for the firm. Second, several direct and indirect risk proxies (current ratio, interest coverage ratio and age) seem to be useful in capturing riskiness. As they have not been used *ex ante* to full extent, banks may want to improve risk consideration in the future.<sup>9</sup> Third, a high credit volume is rather more important than being a large firm for subsequent default. This result may indicate imprudent aggressive lending policies, in particular regarding large firms. However, it is also consistent with the argument that the credit crunch in Thailand's early post-crisis years hit credit-dependent firms hardest (see Agénor, Aizenman and Hoffmaister, 2004). The financial structure of firms is then the reason for default, in particular when the economic crisis is complemented by a banking crisis.

In summary, the analysis of the default variable helps to discriminate between the motivation and practice of bad banking: close relations to borrowers do not seem to be the core issue in explaining default with the exception of some easy lending to large, close customers. The major problem in bank lending was rather some underutilization of information on the riskiness of borrowers.

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<sup>9</sup> Additional analyses on this issue are performed in Menkhoff and Suwanaporn (2003).

## 5 Concluding comments

This research directly analyzes the behavior of local banks in an emerging market from several hundred credit files of Thai commercial banks. The findings show that the available risk variables are not important in pricing loans, a result that is similar to that found in mature markets. New is, however, the high weight of relationship in decision making – when compared to mature markets – which is theoretically expected. Also, the importance of credit availability as a preferred instrument for controlling risk is sensible in more opaque financial markets. However, Thai commercial banks did not operate without problems. The analysis of ex post default cases shows that there is an element of too generous credit granting to related large firms. Moreover and quite generally, available risk information could have been used better to restrict default. Both elements of negative related lending as well as underutilization of information may not be unexpected for an emerging market. Given the verdict of bad banking, however, the unimportant or – depending on the specification – stabilizing role of relationship in default regressions is more surprising. Therefore, Thai commercial banks' lending rationale provides a rather "good" example of relationship lending, in contrast to the Mexican case. Thai banks' main shortcoming is quite conventional, as they fail to fully recognize risk factors. This failure indicates that banks could improve operations but it does not indicate outright bad banking.

Several general lessons seem to emerge for the understanding of bank lending in developing countries, although more work appears to be warranted: first, emerging countries can be, but do not have to be, characterized by largely functional lending markets. The lesson from Thai commercial banks is that – despite the heavy financial crisis in 1997 – risk was considered and relations were not generally misused in lending decisions before the crisis (see also Levy-Yayati et al., 2004). Second, the tentatively higher degree of asymmetric information in emerging economies explains the way bank lending works: our case study shows that relationship lending and credit rationing play a larger role than in mature markets (see also Demetriades and Luintel, 2001). Third, the functioning of a developing banking market can be clearly improved (see e.g. Hahm, 2004). Even the notoriously unreliable balance sheets in Thailand provided useful information on later default, information that was not fully used by domestic banks. It is thus most important to upgrade financial technology in accordance with the institutional possibilities (World Bank, 2001, Assane and Grammy, 2003).

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**Table 1. Distribution of Loans by Industry**

Industry	Number of sample loans	Asset size of sample firms <sup>1</sup>				Loan size, median <sup>1</sup>	Share of loan volume by industry (in %) <sup>2</sup>	
		Min.	Mean	Median	Max.		Sample	All comm. Banks <sup>3</sup>
Agriculture	15	102	743	770	1831	100	2.0	4.6
Mining	2	1000	1150	1150	1300	150	0.2	0.6
Manufacturing	213	3	2622	303	90582	56	44.0	25.0
Construction	71	2	2721	272	58440	53	11.1	4.2
Wholesale/ Retail trade	90	2	1104	143	35300	30	5.5	17.7
Import	28	15	751	146	10596	55	1.8	3.4
Export	19	5	668	300	4239	62	2.0	4.7
Banking and finance	13	32	539	395	1825	100	2.3	6.9
Real estate	47	1	1856	192	18984	70	15.3	10.3
Public utilities	5	54	2028	417	7539	160	0.9	2.4
Service	52	3	3967	528	60023	108	12.8	7.7
Personal consumption	5	3	750	5	3650	3	2.2	12.5
Overall	560	1	2165	246	90582	56	100	100

<sup>1</sup> in million Baht

<sup>2</sup> Dark shading indicates an overrepresentation in comparison with the "sample" or "all commercial banks" by at least 5 percentage points.

<sup>3</sup> Source: Bank of Thailand

**Table 2 Variable Description**

Variable Name	Description
<i>Dependent variables</i>	
Interest rate spread (IRS)	Interest rate spread over minimum overdraft rate (MOR)
Bank credit ratio (BCR)	Volume of the line of credit (L/C) granted in relation to the sum of liabilities plus L/C
<i>Direct risk variables</i>	
Liability-to-asset ratio	The book value of liabilities divided by assets in the same year
Current ratio	Current assets divided by current liabilities in the same year
Interest coverage ratio	Earnings before interest expense, tax, depreciation and amortization divided by interest expense
<i>Relationship variables</i>	
House bank status	The code is 1 if bank considers itself as a house bank of the borrower and 0 if otherwise
Relation duration	The number of years of an active bank-borrower relationship prior to the credit decision, normally the period since first credit granting
Number of banks that lend to the borrower	The number of banks that the borrower has relationship with (as stated in the credit files)
<i>Indirect risk variables</i>	
Assets	The latest book value of assets of the firm prior to the credit decision
Age	Number of years that the borrower has been in operation prior to the credit decision
Collateral	Collateral value given by the firm as percentage of the line of credit granted (degree of collateralization, not its incidence)
<i>Dummy variables</i>	
Bank	Dummy variables for the nine lending banks covered
Year	Dummy variable for the years 1992 to 1996
Industry	Set of 12 dummy variables indicating the industry
L/C volume	Total volume of lines of credit granted by the respective bank, generally representing short-term loans
Default	Loan became non-performing between granting and data compilation



**Table 3 Characteristics of Borrowing Firms by Firm Asset Size**

Characteristics	Asset percentiles						Mean
	0-10	10-25	25-50	50-75	75-90	90-100	
Book value of assets <sup>1</sup>	< 22.1	22.1-76.0	76.0-246.1	246.1-1,000	1,000-2,947	> 2,947	2,165
Age (in years)	7.78	13.30	12.78	17.92	18.61	17.20	14.65
Equity <sup>1</sup>	2.69	11.39	34.04	124.11	418.42	3,439	463.87
Liabilities <sup>1</sup>	5.80	36.11	106.92	389.28	1,263	13,917	1,702
Liability-to-asset ratio	0.61	0.74	0.75	0.76	0.76	0.78	0.74
Current ratio	1.57	3.77	4.64	3.12	1.02	0.93	3.18
Interest coverage ratio	3.70	4.91	3.00	2.93	3.15	2.30	3.17

<sup>1</sup> Figures are in million Baht.

**Table 4 Characteristics of Loans by Firm Asset Size**

Characteristics	Asset percentiles						Mean
	0-10	10-25	25-50	50-75	75-90	90-100	
L/C volume (in million Baht)	14.33	39.73	83.97	188.81	492.51	840.30	240.58
Interest rate spread	2.53	1.23	0.74	0.34	0.17	0.26	0.76
BCR	0.60	0.45	0.38	0.29	0.23	0.10	0.34
Default in % <sup>1</sup>	16.34	10.92	25.50	22.19	64.88	50.01	45.90
Collateral in %	78.95	63.40	62.62	44.15	32.77	34.06	52.95
House bank status in %	76	51	56	47	34	28	49
Relation duration (in years)	5.51	7.06	7.36	8.86	8.93	9.26	7.96
Number of lending banks	1.76	2.50	3.51	5.04	5.78	8.53	4.36

<sup>1</sup> Weighted by volume

**Table 5 Risk and Relationship Factors in the Pricing of Loans**

Independent variables	Dependent variable: Interest rate spread				
	(1)	(2)	(3)	(4)	(5)
Liability-to-asset ratio	-0.231 (0.186)	-0.008 (0.176)	0.067 (0.290)	0.272 (0.181)	
Current ratio	-0.065 (0.042)	-0.031 (0.036)	-0.043 (0.056)	0.016 (0.045)	-0.060 (0.040)
Interest coverage ratio	-0.015 (0.015)	-0.011 (0.014)	-0.008 (0.028)	-0.007 (0.013)	-0.014 (0.015)
House bank status * (-1) Liability to asset ratio					0.360*** (0.118)
House bank status	-0.220** (0.095)	-0.181** (0.090)	-0.269* (0.142)	-0.029 (0.117)	
Relation duration	-0.009 (0.007)	-0.011 (0.007)	-0.006 (0.013)	-0.012* (0.007)	-0.009 (0.007)
Ln (Number of banks)	-0.141** (0.060)	-0.144*** (0.056)	-0.108 (0.111)	-0.106 (0.064)	-0.145** (0.061)
Ln (assets)	-0.236*** (0.034)	-0.856*** (0.087)	-0.483*** (0.064)	-0.037 (0.043)	-0.235*** (0.033)
Ln (assets) * Ln (assets)		0.053*** (0.007)			
Age	0.001 (0.004)	0.003 (0.004)	0.004 (0.009)	0.001 (0.003)	0.001 (0.004)
Collateral	0.002 (0.001)	0.002 (0.001)	0.002 (0.002)	0.001 (0.001)	0.002 (0.001)
(Constant)	3.143*** (0.307)	4.387*** (0.301)	4.159*** (0.370)	0.341 (0.484)	2.970*** (0.268)
Bank dummies	yes	yes	yes	yes	yes
Year dummies	yes	yes	yes	yes	yes
Industry dummies	yes	yes	yes	yes	yes
Number of cases	416	416	208	208	416
Adjusted R <sup>2</sup>	0.456	0.527	0.505	0.123	0.461
F-statistic	11.891	15.010	7.825	1.910***	12.471

Standard errors are in parentheses. \*\*\* Significant at the 1 percent level (\*\*: 5 percent level, \*: 10 percent)

The table presents OLS regressions with White heteroskedasticity-consistent standard errors. Negative values of the interest coverage ratio are set to zero and the most extreme 5% cases of each risk proxy are excluded. In specification (2) the variable Ln (assets) \* Ln (assets) is added. Specification (3) refers to small firms only, specification (4) to large firms respectively and in specification (5) house bank status is interactively linked to the liability-to-asset ratio.

**Table 6 Risk and Relationship Factors for the Availability of Loans**

Independent variables	Dependent variable: Bank credit ratio (BCR)			
	(1)	(2)	(3)	(4)
Liability-to-asset ratio	-0.330*** (0.052)	-0.350*** (0.061)	-0.365*** (0.090)	-0.351*** (0.072)
Current ratio	-0.003 (0.011)	0.001 (0.012)	-0.014 (0.024)	0.009 (0.012)
Interest coverage ratio	-0.004 (0.005)	0.005 (0.006)	-0.000 (0.007)	0.002 (0.009)
House bank status	0.096*** (0.023)	0.089*** (0.031)	0.089*** (0.036)	
Relation duration	0.003 (0.002)	0.000 (0.002)	0.005* (0.003)	0.007*** (0.003)
Ln (Number of banks)	-0.000 (0.017)	-0.041** (0.026)	0.010 (0.023)	-0.001 (0.023)
Ln (assets)	-0.057*** (0.006)	-0.052*** (0.013)	-0.067*** (0.011)	-0.052*** (0.009)
Age	-0.001 (0.001)	0.001 (0.002)	-0.003** (0.001)	-0.004*** (0.001)
Collateral	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	-0.001 (0.000)
(Constant)	0.850*** (0.072)	0.787*** (0.089)	1.037*** (0.138)	0.975*** (0.097)
Bank dummies	yes	yes	yes	yes
Year dummies	yes	yes	yes	yes
Industry dummies	yes	yes	yes	yes
Number of cases	416	208	208	201
Adjusted R <sup>2</sup>	0.454	0.445	0.371	0.355
F-statistic	11.775	6.354	4.816	4.675

Standard errors are in parentheses. \*\*\* Significant at the 1 percent level (\*\*: 5 percent level, \*:10 percent)

The table presents OLS regressions with White heteroskedasticity-consistent standard errors. Negative values of the interest coverage ratio are set to zero and the most extreme 5% cases of each risk proxy are excluded. Specification (2) presents small firms and specification (3) large firms. In specification (4) only house bank cases are included.

**Table 7 Risk and Relationship Factors in Explaining Default**

Independent variables	Correlations with default		Dependent variable: Default		
	(1)	(2)	(3)	(4)	(5)
Liability-to-asset ratio	0.025	-0.577 (0.432)	-2.958*** (0.804)	0.755 (0.642)	-0.783* (0.432)
Current ratio	-0.150***	-0.328** (0.132)	-0.550** (0.251)	-0.165 (0.165)	-0.336** (0.131)
Interest coverage ratio	-0.109**	-0.082 (0.051)	-0.400*** (0.152)	-0.071 (0.061)	-0.110** (0.051)
House bank status	-0.044	-0.266 (0.219)	-1.052*** (0.363)	-0.204 (0.323)	-0.486** (0.230)
Relation duration	-0.090*	0.009 (0.017)	-0.034 (0.052)	0.021 (0.026)	0.006 (0.018)
Ln (Number of banks)	0.066	0.052 (0.137)	0.227 (0.286)	-0.159 (0.179)	0.021 (0.142)
Ln (assets)	0.206***	0.176*** (0.055)	0.301* (0.181)	0.276*** (0.106)	0.016 (0.072)
Age	-0.098**	-0.031** (0.012)	-0.018 (0.039)	-0.037*** (0.014)	-0.028** (0.013)
Collateral	0.014	0.000 (0.002)	0.013** (0.006)	0.000 (0.003)	0.001 (0.003)
Ln (L/C volume)					0.319*** (0.082)
(Constant)		-0.522 (0.591)	-0.526 (0.978)	-1.844* (1.119)	-0.751 (0.635)
Bank dummies		yes	yes	yes	yes
Year dummies		yes	yes	yes	yes
Industry dummies		yes	yes	yes	yes
Number of cases		416	208	208	416
McFadden R <sup>2</sup>		0.299	0.533	0.368	0.337
LR-statistic		109.845	77.077	78.976	123.776

Standard errors are in parentheses. \*\*\* Significant at the 1 percent level (\*\*: 5 percent level, \*: 10 percent)

The table presents Pearson rank correlations in column (1) and probit regressions with Huber/White robust covariances in columns (2) to (5). Negative values of the interest coverage ratio are set to zero and the most extreme 5% cases of each risk proxy are excluded. Specification (3) presents small firms and specification (4) large firms. In specification (5) the variable L/C volume ("line of credit volume") is added.