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**The Rationale of Bank
Lending in Pre-Crisis
Thailand**

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Contents

Acknowledgements	
Abstract	1
Kurzfassung	1
1 Introduction	2
2 Literature Review and Motivation of Hypotheses	5
2.1 A Selective Literature Review	5
2.2 Motivation of Hypotheses	7
3 The Data	10
3.1 Data Compilation	10
3.2 Data Representativeness	11
3.3 Description of Variables	14
3.4 Characteristics of Borrowing Firms and Loans	17
4 Empirical Results Based on Ex Ante Information	19
4.1 The General Pricing of Loans	19
4.2 Further Results on the Pricing of Loans	22
4.3 The Availability of Loans	25
5 Empirical Results Based on Ex Post Information	28
6 Concluding Comments	32
References	34
Appendix	37

List of Tables

Table 1: Distribution of Loans by Industry	12
Table 2: Non-Performing Loans (NPL) per Bank	13
Table 3: Variable Description	16
Table 4: Characteristics of Borrowing Firms by Firm Asset Size	17
Table 5: Characteristics of Loans by Firm Asset Size	18
Table 6: Risk and Relationship Factors in the Pricing of Loans	21
Table 7: The Pricing of Small Firm Loans	24
Table 8: Risk and Relationship Factors for the Availability of Loans	26
Table 9: Loan Pricing, Loan Availability and the Ex Post Default Information	29

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Abstract

A data set of 560 credit files from Thai commercial banks is compiled. The loans granted between 1992 and 1996 follow a pattern known from mature markets as a similar set of variables explains much of the variance in interest rate spread. A second finding is the expected higher importance of “relationship banking”. Third, risk is controlled via credit availability and not via pricing. Fourth, the ex post information about riskiness reveals that banks could have made better use of available information. Overall, the problem was not excessive lending to firms with which the lenders had close relationships, but rather one of fully recognizing the risk factors.

Kurzfassung

Ein Datensatz mit 560 Kreditakten thailändischer Banken ist aufbereitet worden. Die Kredite, die zwischen 1992 und 1996 vergeben wurden, folgen dem aus entwickelten Märkten bekannten Muster, da eine ähnliche Gruppe an Variablen die Streuung der Zinsaufschläge erklärt. Ein zweites Ergebnis ist die erwartete höhere Bedeutung von „Relationship Banking“. Drittens, Risiko wird mittels Kreditverfügbarkeit und nicht über den Preis gesteuert. Viertens zeigt die ex post-Information über eingegangene Risiken, dass Banken verfügbare Informationen besser hätten nutzen können. Insgesamt bestand das Problem nicht in übermäßiger Kreditvergabe an Unternehmen zu denen enge Verbindungen bestanden, sondern eher darin Risikodeterminanten voll zu erkennen.

1 Introduction

Whenever a financial crisis in an emerging economy occurs, the local financial institutions seem to be the most natural suspects. Neither their sophistication in risk management nor the ability of national authorities to supervise banks meet the present world standards. It is thus a logical conclusion to blame “bad banking” (Krugman, 1998) for the many financial disasters that happen, and to demand strong policy changes. However, this logic assumes rather than proves a causal link between bad domestic financial institutions and financial crisis. Of course, banks in emerging economies are “weak” in comparison to banks in industrialized countries; but this is trivial as the development process incorporates institution building. Weakness in this sense does not necessarily mean ineffectiveness. To discover more about the rationale of bank behavior, 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. The evidence clearly indicates a pattern of behavior for the core of Thailand's financial system that is by and large consistent with results for industrialized countries. The prominent role of close relations between bank and borrower is not identified as major problem, but inferior use of information about risky borrowers is.

The nature of the Thai banking system has been of high interest in the aftermath of the late 1990s Asian crisis. As the crisis started in Thailand, this is the only country in this episode where contagion can be ruled out as an explanatory variable (see Baig and Goldfajn, 1999). Moreover, the country's structure may be regarded as typical for many emerging economies; it is not a city state such as Singapore or Hong Kong, and also not as politically burdened as Indonesia, the Philippines or some Latin American countries. Finally, the bad banking hypothesis seems to be appropriate, as financial sector problems partially preceded the overall economic crisis in Thailand (see e.g. Warr, 1999, Rajan, 2001).

The unexpected outbreak of the Asian crisis, and the fact that there was no historical precedent for the nature of its progress, initiated a wealth of new research into the functioning of financial systems in emerging economies, thus complementing ongoing debates on liberalization (e.g. Arestis and Demetriades, 1999) and the growth effects of financial development (see surveys by Arestis and Demetriades, 1997, Levine, 1997, World Bank, 2001; on the role of banks e.g. Beck, Levine and Loayza, 2000, Amable and Chatelain, 2001). The starting-point was the insight that weaknesses of the local financial institutions must necessarily be part of a complete understanding about the crisis. The influential paper by Dooley (2000) is typical for several approaches to model distorted incentives – in this case from implicit deposit insurance – in a macroeconomic framework which lead to the collapse of the financial sector (see also Corsetti, Pesenti and Roubini, 1999). This kind of research assumes that banks “appropriate” deposits (Dooley 2000, p.258). A different line of research focuses on elements of the financial

system which characterize different forms of such systems (La Porta et al., 1998, Schmukler and Vesperoni, 2001). This system-oriented approach draws conclusions about the necessary institutional elements for a successful financial system. A third line of research concentrates on the governance structures of companies and their implications for the financing process (Claessens, Djankov and Lang, 2000, Faccio, Lang and Young, 2001). Despite this wealth of work, there has yet been no direct examination of the functioning of the lending process. This may be due to the highly confidential nature of such data.

In relation to earlier work, our study is focused on the same overall research field, i.e. it aims to achieve a better understanding of the functioning of emerging countries' financial systems. The particular objective is, however, to explain the lending process from the banks' perspective, as this piece of evidence has been missing until now. This study therefore differs in several respects: first, we do not use international cross-sectional data, but rather conduct an in-depth country study. We directly analyze the core group of Thailand's financial sector, that is the behavior of Thai commercial banks. Second, these banks are analyzed under the theoretical perspective of relationship lending, as it is precisely these close relations between banks and their customers that seem to characterize lending in emerging economies. Third, 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; another 20% are represented by so-called finance companies, and the remaining 20% are held by specialized state banks and foreign banks. The data cover the period 1992 to 1996.

Thus, this paper is at the intersection of two kinds of literature: on the one hand, there is the question of the functioning of emerging financial banking markets and their respective crises, and on the other there is the question of the nature of relationship banking in a relevant emerging economy. The first kind of literature motivates the research and the second kind of literature provides the theoretical background. This paper differs from earlier studies on relationship banking in two respects: first, there is an advantage from investigating the Asian crisis from a position of hindsight, as we are able to use not only *ex ante* information on lending, but also very rare *ex post* information about the potential failure of loans. Second, this study provides an unusual analysis of an emerging economy. The only other paper directly focusing on an emerging economy of which we are aware (La Porta, López-de-Silanes and Zamarripa, 2002) 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: related lending is thus a way to redistribute wealth from the bank to related companies.

It is interesting to note in this respect that before the Asian crisis, Thailand's banks were regarded as a positive element in the economy. In the World Bank's East Asian Miracle Study (World Bank, 1993), Thailand was among the countries classified as resource-efficient. Consequently, total factor productivity is comparatively high in empirical studies, and it would

be difficult to explain that this outcome is real despite a large inefficient banking sector (Menkhoff, 2000). What are the systematic factors that explain the way in which Thai banks granted credit? Based on the relationship banking literature, we ask two questions: whether, and in which way, risk has been considered and priced, and whether, and in which way, relations between bank and borrower have influenced lending? In addition, we are able to re-examine these questions by drawing on the ex post information on default during the period of observation, that is the period of between four and nine years between granting the credit in 1992-96 and our credit file inspection in 2000/01.

Regarding the empirical examination, regressions similar to earlier studies are applied where the explanatory variables are measures of riskiness, indicators of relation and standard control variables. A major finding from these regressions is that stable structures can be recognized which fit well into the existing literature from industrialized countries. For the Thai case, as expected from theoretical considerations, relationship indicators have relatively greater importance in explaining the interest rate spread. Moreover, credit availability is reduced for more risky borrowers, whereas risk proxies do not seem to influence spread. These results and more can be reasonably integrated with findings for other countries.

In another series of regressions, an additional default variable is used which shows whether the loan has turned into a non-performing loan (NPL) during the period of investigation. Adding this default variable to the baseline regression indicates that banks did not possess hidden knowledge in pricing their loans. This may be seen as another sign of a useful data set. However, adding the default variable in explaining credit availability shows a statistically significant positive coefficient whose interpretation is unclear. Finally, when using default as the dependent variable, relation proxies indicate a desired effect for Thai commercial banks, as close customers did not receive too risky credit. However, 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 discusses how relationships can contribute to the demands of borrowers and lenders, how these theoretical considerations are reflected in empirical studies, and then provides the justification of seven hypotheses. Section 3 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 4. The information from the default variable is analyzed in section 5. Section 6 concludes with a view on possible objections to the results of this research.

2 Literature Review and Motivation of Hypotheses

2.1 A Selective Literature Review

The lending process is always hampered by a lack of knowledge about the quality and the intentions of the borrower. Relationship building between lender and borrower can thus be understood as an institution to partially overcome the incomplete and asymmetric information between the parties involved. In this sense, relationship lending is a means to provide financial resources under unfavorable circumstances. 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. It is thus no surprise that relationship lending has been mostly analyzed for two cases: for the process of development and for small firm finance.

Regarding the process of economic development, prominent examples are the cases of Germany (e.g. Gerschenkron, 1961, Cable, 1985, Arestis and Demetriadis, 1997) and Japan (e.g. Hoshi, Kashyap and Scharfstein, 1991). However, both success stories also demonstrate the downside of close relationships between banks and firms. A criticism sometimes voiced is that the interrelations between banks and firms weaken the governance structures and lead to a blurring of responsibilities (see Agarwal and Elston, 2001). Moreover, the process of economic development seems to weaken the importance of relationship lending in a natural way as alternative sources of finance become available (see e.g. Weinstein and Yafeh, 1998). In the case of Germany, it has become difficult to identify special relations at all (Edwards and Fischer, 1994) although Elsas and Krahnert (1998) still find a specific value in house banks.

Regarding small firm finance, there may be an information gap even in developed markets. Thus, recent empirical studies on relationship lending in industrialized countries have focused on smaller firms. The theoretical expectation of the influence of relationship banking on the interest rate premium charged by the bank is mixed, as an information advantage of banks may result in lower rates, whereas a strong bargaining power of the latter – due to their information advantage relative to competitors – may result in higher rates (Boot, 2000). Empirical studies accordingly do not find an unanimous effect in the lending business between relation and pricing. However, relationship banking seems to influence other aspects of credit granting, such as cheaper *lines of credit*, increased availability of credit and a higher degree of collateral.

We can thus expect – from the earlier literature – that Thailand is a case where relationship lending may play a prominent role, in particular for smaller firms. Due to the less

developed institutions, relationship banking may serve useful purposes (Boot, 2000). It should, however, be open as to whether Thailand really follows the successful earlier history of Germany, Japan and others, or whether it has developed in the direction of more perverse incentives, as exemplified by the Mexican case.

In examining the possible impact from relationship lending, there are four strands of empirical approach: first, studies of “bank uniqueness” literature examine the impact of a banking relationship on enterprise value. As an empirical indicator of “relationship”, some studies find that the renewal of a line of credit is more often regarded as good news increasing enterprise value than the announcement of a newly issued line of credit. Our conclusion from this literature is that lines of credit are a useful variable when examining relationship lending (see Berger and Udell, 1995).

A second empirical approach addresses the identification of “relation” more directly by examining indicators, such as the duration of relation between bank and firm, based on company data. Benchmark studies in this respect are Petersen and Rajan (1994) and Berger and Udell (1995), who examined the possible impact of “relations” in credit granting to small business in the United States. An analogous study for Germany is Harhoff and Körting (1998), with Ferri and Messori (2000) providing a similar study for Italy. The study by Berger, Klapper and Udell (2001) on Argentina is more loosely related as they do not directly focus on relationship lending. Included among the findings are that the duration of relation has no significant impact on the price of total credit, but that the availability of credit is eased (Petersen and Rajan, 1994), or that a relation lowers the price of lines of credit (Berger and Udell, 1995, Harhoff and Körting, 1998). Relationship variables affect availability of credit more strongly than its price (Harhoff and Körting, 1998, p.1349). Again, line of credit seems to be particularly informative. Additionally, the question arises of credit availability.

A third empirical approach uses credit files from banks to identify a particular relation between bank and creditor. Blackwell and Winters (1997), who examined two bank holding companies in the USA, is the pioneering study which proved the value of relationship as such firms received cheaper credit. The studies by Elsas and Krahnert (1998) and Machauer and Weber (1998), based on the same German data set, identify relations from the files of banks which regard themselves as a house bank. They find that a house bank relation is accompanied by no difference in the risk-adjusted credit prices, that collateral is higher (Machauer and Weber, 1998) and that liquidity provision in the event of unexpectedly deteriorating creditor rating is better (Elsas and Krahnert, 1998). It is interesting that in this sample, similar to the methodologically different studies of the second approach cited above, “relation” affects credit availability rather than price. Degryse and Van Cayseele (2000) add from their Belgian study the finding that the duration of a bank-firm relationship (as an indicator of the intensity of the relation) tends to increase loan pricing, whereas a larger scope of the relationship decreases loan pricing. Ongena and Smith (2001) question the usefulness of the duration of relationship as a

reliable indicator of the intensity. It seems obvious that the self-classification of a bank as a house bank is the best proxy that can be found in the studies of relationship lending.

A fourth empirical approach uses a questionnaire survey addressed directly to banks, and asks how they view their relations with certain customer groups (Lehmann and Neuberger, 2000). Of value for our purpose is here the evidence that relations are not just of a mechanical nature, as proxied by the length of relation, but also have several social aspects. This insight applies even more to emerging economies with less developed markets, as social institutions are then substitutes for incomplete markets.

Regarding these four empirical approaches in identifying “relationship banking” which have evolved over time, we draw two methodological conclusions: our study follows the third group by analyzing bank data. Bank data are preferable for identifying special relations because other proxies, such as the duration of relation, are imprecise measures and definitely less reliable than a classification by the bank itself. Moreover, as a second conclusion from the literature, this study focuses on lines of credit in an effort to understand the relationship element in credit granting practices. This seems even more justified by the fact that lines of credit are the “typical” way in which Thai commercial banks grant credit – a fact which may in itself be seen as revealing.

2.2 Motivation of Hypotheses

Equipped with these lessons, the literature motivates us to generate seven detailed hypotheses when examining bank lending in pre-crisis Thailand. First, the studies cited above all find some systematic pattern in bank lending, although the explanatory power is often quite low. Obviously, credit granting involves elements which are difficult to grasp in empirical studies, such as experience, personal impressions, other qualitative information and data which are exclusively relied on by some banks in the sample. These elements cannot be used in general regressions. Despite this limitation, certain standard variables have evolved which are regarded as helpful in understanding credit granting. The expectation is that Thailand, as an emerging economy, should show some similarity with mature markets. Thus, we hypothesize, a set of variables that are similar to those used for industrialized economies in earlier studies will have explanatory power:

H1 The pricing of loans follows a similar structure as in mature markets.

In another set of examinations, hypothesis 1 is shaped further. Hypothesis 2: the particular situation of emerging economies with less developed market institutions may be revealed by a comparatively higher importance of relationship indicators. Independent of this difference between emerging and mature markets, theory suggests in general that loans to

smaller firms will clearer show relationship elements than a loan sample granted to larger firms (hypothesis 3).

H2 Relationship indicators are important in explaining bank lending, rather more so than in mature markets.

H3 Relationship indicators are more important for loans to smaller firms than for loans to larger firms.

Two more hypotheses examine in greater detail how risk and relation are addressed. The literature of bank studies strongly suggests that risk is priced by way of higher interest rate spreads charged by the banks (see e.g. Elsas and Krahnert, 1998, Machauer and Weber, 1998). However, this analysis requires a documented risk evaluation metric of the banks which is not available in the Thai case. Other studies which do not have such a risk evaluation metric fail to find a comprehensive influence of risk proxies on interest spread. Thus, Petersen and Rajan (1994) or Berger and Udell (1995) do not find a significant effect from leverage on interest rates. In addition to this information 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 (hypothesis 4). In this credit rationing regime, relationship matters, as indicated by studies from mature markets: a good relation improves credit availability (hypothesis 5).

H4 Risk proxies are more important in explaining credit availability than in explaining the spread.

H5 A good relationship is helpful in improving credit availability.

The additional use of ex post information from our default variable allows for further examinations. As lagged default informs about the “true” quality of bank lending, we regard these examinations as defining a tougher measure than the usual studies based on ex ante information. In a first approach, the default variable is added to the benchmark regressions used above that explain spread and credit availability. It thus represents a hitherto unobserved variable which might help to explain bank behavior. Due to the limited explanatory power of the other variables, one may plausibly expect a positive value if this variable is included. Hitherto unidentified behavioral patterns by the banks would be revealed by a significant coefficient for this variable.

H6 The inclusion of the default variable significantly helps to explain the interest rate spread and the degree of credit availability.

Finally, the research question may be reversed: whereas hypothesis 6 asks for hitherto unidentified behavioral patterns of banks, possibly revealing “hidden knowledge”, one may also ask whether banks had used all available information efficiently. Accordingly, in a last approach to learn about the rationale of bank lending, the default variable itself may be explained using the available data set. If banks had used all available information in the data, default would be explained only by the same determinants as the variables of bank behavior examined earlier, i.e. “spread” and “credit availability”. What can be expected from this kind of regression?

There are two arguments why hitherto unutilized information may be revealed: first, this measure provides an extremely demanding benchmark, as information can be used which was not available at the time of decision making. This argument applies to all kinds of structural changes which may happen in the course of time. One could thus argue that a shock such as the Asian crisis hits certain kinds of firms, but this pattern cannot be known *ex ante*. In this sense, the measure is unfair to the banks. Nevertheless, it is interesting to see whether there is any unutilized information in the data used by the banks. Second, the lower institutional development of emerging economies can be interpreted as a weaker ability to extract information from available data, and thus to be revealed by an explanatory power of variables beyond structures already detected.

H7 Examining the default variable reveals explanatory power of variables beyond hitherto detected structures.

The theoretical background for this study clearly points at the relationship banking to be expected in an emerging economy such as Thailand. A test of the seven detailed hypotheses based on this literature requires hitherto unavailable data.

3 The Data

3.1 Data Compilation

The greatest hurdle in conducting this study was to receive 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, it would just be “history” and would be unlikely to describe present practices. 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 and has better reputation in Thai society than other civil service institutions. Despite these favorable factors, we feel fortunate to have broken the wall of silence and are grateful to all those persons who trusted the integrity of the project. We are particularly grateful to an open-minded, self-confident and courageous banker who was the first to actively support our research and thus paved the way for others to follow.

Nevertheless, starting in August 2000 we approached all 15 Thai commercial banks that existed before the crisis or their successors in case of closures or 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 banking sector. Traditionally, the 15 commercial banks were classified into small, medium and large and we won support from at least two banks in each group.

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. Our approach in this respect was threefold: first, we tried to get cooperation from as many banks as possible to minimize the impact from distorted selection in a certain bank. Second, we promised strict confidentiality to reduce the incentive for strategic file selection. Third, 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). In any case, we are unable to rule out that banks let us see what they wanted us to see, and hid what they wanted to keep secret. In this sense, we are aware that our sample may overstate the “quality” of the loans made.

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. These efforts resulted in a data set whose characteristics are described below.

3.2 Data Representativeness

The data in our study are only useful if they represent the loans made by Thai commercial banks in a reasonable manner. This concern is therefore a core interest when analyzing the data. 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 loan structure can be compared with the market, and third, the share of non-performing loans can be compared with that for all commercial banks.

All loans must be classified according to 12 industries defined by the Thai central bank, the Bank of Thailand. Thus Table 1 lists the 12 industries, gives the number of loans in our sample per industry, characterizes the size of the firms covered, the median loan size and finally compares the share of loan volume by industry between the sample and all commercial banks.

Table 1: Distribution of Loans by Industry

Industry	Number of sample loans	Asset size of sample firms ¹⁾				Loan size, median ¹⁾	Share of loan volume by industry (in %) ²⁾	
		Min.	Mean	Median	Max.		Sample	All comm. Banks ³⁾
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

¹⁾ in million Baht

²⁾ Dark shading indicates an overrepresentation in comparison with the “sample” or “all commercial banks” by at least 5 percentage points.

³⁾ Source: Bank of Thailand

The most cases in our sample come from manufacturing industry, which makes up 213 of the 560 credit files. In contrast, only two cases come from the mining industry. The latter is, however, characterized by only two larger loans. The minimum 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 about 10 million USD confirms: the sample does not represent the total economy, but rather the medium and larger size 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 decentralized branches.

The Rationale of Bank Lending in Pre-Crisis Thailand

The structure of loans in the sample also shows some deviation from the total population. The by far largest recipient of loans, manufacturing industry, is also the largest in our sample. About 44% of the total loan volume in our sample belongs to this industry. The sample 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.

As a third check of the representativeness of the sample data, the share of non-performing loans can be compared with the total market. Table 2 shows the number of credit files per bank included in the sample and the number and share of NPL cases. The information which can be compared with a market-wide figure is the average share of NPL credit volume of 45.9%. This figure 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 share of the nine banks, the overall figure signals useful information. If there is any distortion, the figure of 45.9% is a bit too low, which may be caused in particular by one participating bank, listed third in Table 2. This bank, one can safely presume, has presented itself in too favorable a light. Due to strong incentives at the loss-making banks, one might have expected more distorted responses in the form of a lower rate of NPL.

Table 2: Non-Performing Loans (NPL) per Bank

Bank number	Number of credit files	Number of NPL cases	Share of NPL cases	Share of NPL credit volume
1	52	6	11.5%	58.3%
2	35	18	51.4%	58.7%
3	85	5	5.9%	14.8%
4	59	13	22.0%	26.1%
5	67	21	31.3%	56.9%
6	50	8	16.0%	55.2%
7	83	14	16.9%	59.1%
8	72	7	9.7%	25.6%
9	57	4	7.0%	28.5%
	560	96	17.1%	45.9%

Overall, the data received are not strictly representative. Loans refer to medium and large size firms, manufacturing industry is over-represented and the NPL share may be rather low. However, bearing this in mind, the data are not misleading and thus appear to be useful for our research.

3.3 Description of Variables

Ideally, the variables covered should be as complete as possible in order to capture any influence from a variable and – more generally – to depict relations comprehensively. However, a look at earlier studies shows that the variables included differ from study to study, most probably reflecting data availability. This limitation also applies to this study about Thai commercial banks, as only variables can be included which are very widely used.

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. Based on Thailand's financial structure, where bank credit mostly comes as L/C, this measure often comes close to an indication about the share of bank finance to total liabilities. However, the L/C is sometimes not fully used and thus larger than the actual credit taken, and often even larger than total actual liabilities. In this sense, there is a rough relation that the larger the BCR, the more important bank finance is for this firm and the greater the probability is that there are 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.

Regarding the independent variables, Table 3 presents the full list and an exact description of variables used. The next group after the dependent variables in the list are 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 3 covers relationship variables. A good relation is expected to be revealed by a positive house bank status, a long relation duration and a small number of competing banks.

Thereafter 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. Other studies name these variables e.g. as firm or relationship characteristics (Petersen and Rajan, 1994). In any case, they are control variables. This is evident for the three kinds of dummies, representing idiosyncratic influences from individual bank policies, years and industry influences. Finally, in section 5 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, lines that generally represent the granting of shorter-term loans, 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 some interesting information. Whereas most values seem to be reasonable, there are some surprising cases, such as the sometimes negative interest rate spread which can be only explained with additional motives beyond the single transaction covered here (for details see Appendix, Table 1). Moreover, the risk proxies behave in a noteworthy manner. There are firms where liabilities are larger than assets. The current ratio can lie between 0, i.e. no liquid assets, and 139, i.e. 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. The extreme cases mentioned are obviously very far off the very reasonable mean values. They can be treated as outliers which may excessively influence the result in a regression and which should be therefore neglected.

In a last attempt to avoid the use of misleading variables, we checked whether their distribution is very far off normal distribution, where extreme cases may influence regression results beyond any meaning. Consistent with other studies, the variable asset size is left-steep distributed with extremely few large firms and has thus been transformed into logarithmic values. The same transformation was chosen for the variables number of banks and L/C volume as these variables also increase very strongly for the few large firms.

Table 3: 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 bank- borrower relationship prior to the credit decision
Number of banks that lend to the borrower	The number of banks that the borrower has relationship with
<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 as percentage of the line of credit granted
<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

3.4 Characteristics of Borrowing Firms and Loans

The last part in this section 3 relates to information about borrowing firms and loans. This presentation shows 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 4. In this table, firms are ordered according to their asset size. 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.

Table 4: Characteristics of Borrowing Firms by Firm Asset Size

Characteristics	Asset percentiles						Mean	Trend
	0-10	10-25	25-50	50-75	75-90	90-100		
Book value of assets ¹⁾	< 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 ¹⁾	2.69	11.39	34.04	124.11	418.42	3,439	463.87	↑
Liabilities ¹⁾	5.80	36.11	106.92	389.28	1,263	13,917	1,702	↑
Liabilities/assets	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	↘

¹⁾ Figures are in million Baht.

More detailed information about the variables covered can be taken directly from the table. Most important for our purposes is the last column in Table 4, which indicates how the means of the variables develop with percentiles of increasing asset size. Of course, asset size goes strictly and clearly upwards, but other size related figures, such as age, equity and liabilities do as well. 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 5. As can be expected, all variables reveal a clear size-dependent pattern. 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, the expected systematic influence from size becomes obvious: banks have fewer house bank relations with larger firms, relation duration goes up with size and larger firms have more lending banks.

Table 5: Characteristics of Loans by Firm Asset Size

Characteristics	Asset percentiles						Mean	Trend
	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 % ¹⁾	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	↑

¹⁾ Weighted by volume

In summary, Tables 4 and 5 provide evidence that the data set includes economically rational information and that this structure is similar to well-known structures from mature markets. On this data basis, empirical examinations first analyze bank lending behavior using ex ante information (section 4), and then using ex post information in addition (section 5).

4 Empirical Results Based on Ex Ante Information

The frequently expressed skeptical view on the quality of Thailand's financial institutions assumes that risk had not been priced appropriately and that close relations between banks and borrowers had instead dominated lending decisions. This section addresses these concerns by applying the standard empirical technique of the relationship banking literature to the case of Thailand. The most frequently examined question in this respect is: which variables explain the pricing of loans?

4.1 The General Pricing of Loans

In accordance with the literature, we estimate an ordinary least squares regression 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:

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

In specification (1), all variables are taken in an unmodified way which means that due to some missing values, in particular for the interest coverage ratio, 479 cases are included. From this starting point on, three more specifications are presented here in order to come to a reasonable and robust benchmark regression. One problem already mentioned is the outlier problem with the risk proxies. Therefore, specification (2) proceeds as suggested by Petersen and Rajan (1994), i.e. to set a negative value of the interest rate coverage ratio to zero as well as to exclude the most extreme 5% of cases. The disadvantage of this procedure is that the case number goes down to 416. To check whether the result depends mainly on this reduced figure, specification (3) explores the opposite direction, i.e. to enlarge included cases by neglecting the interest coverage ratio in specification (2).

In a final examination, the sample of specification (2) is recalculated for various sub samples. Exclusion of bank 7 is the only modification that leads to a much lower explained variance. The reason is the particular structure of the firms from bank 7. By chance, this bank provided most of the small firms in our sample. 18 out of 26 firms with assets below 10 million Baht are from bank 7. Small firms are of particular importance, as both theory and earlier empirical work suggest that relationship patterns are most obvious for this group. There is also

an econometric argument as about half of our cases have an interest rate spread of zero, and only the smaller firms exhibit high spreads of 3 or 4 percentage points – spread is necessary to detect any structure. In this sense, one might argue that small firms are part of the total population and should thus be included, independent of their origin. This assessment is supported by the notion that small firm loans are important for a high explained variance, but not necessary to detect a certain structure in loan pricing. Even though the 18 cases stemming from bank 7 follow a certain pattern and their exclusion thus markedly reduces explained variance – shown as specification (4) – coefficient signs and significances remain virtually unchanged. Thus we take specification (2) as the benchmark regression.

Table 6 shows the results for all four specifications mentioned above. Starting with the benchmark regression, the signs of almost all variables are as expected from the 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 receive cheaper money. The other two risk proxies have the expected negative sign. Turning to the group of relationship variables, these show the expected signs. The same is true for the asset size. The literature is ambivalent about the sign on collateral which may either be negative, signaling less risk than without collateral, or positive, signaling that collateral was necessary to partially cover the high risk. In the Thai case, the latter interpretation is favored. Finally, the age variable is expected to show a negative sign, but obviously the effect is already inhibited in other correlated variables, such as size, and the remaining effect is close to zero.

Table 6: Risk and Relationship Factors in the Pricing of Loans

Independent variables	Specification			
	(1)	(2)	(3)	(4)
Liability to asset ratio	-0.058 (0.079)	-0.231 (0.186)	-0.100 (0.169)	-0.043 (0.188)
Current ratio	-0.002 (0.003)	-0.065 (0.042)	-0.024 (0.034)	-0.034 (0.041)
Interest coverage ratio	0.008 (0.005)	-0.015 (0.015)		-0.008 (0.015)
House bank status	-0.235** (0.092)	-0.220** (0.095)	-0.239*** (0.090)	-0.209** (0.095)
Relation duration	-0.013** (0.006)	-0.009 (0.007)	-0.012* (0.006)	-0.010 (0.007)
Ln (Number of banks)	-0.145** (0.058)	-0.141** (0.060)	-0.146** (0.057)	-0.162*** (0.058)
Ln (assets)	-0.230*** (0.030)	-0.236*** (0.034)	-0.227*** (0.030)	-0.188*** (0.036)
Age	0.002 (0.004)	0.001 (0.004)	0.002 (0.004)	0.002 (0.004)
Collateral	0.002* (0.001)	0.002 (0.001)	0.002 (0.001)	0.001 (0.001)
(Constant)	1.989*** (0.247)	3.143*** (0.307)	2.283*** (0.291)	2.185*** (0.360)
Bank dummies	yes	yes	yes	yes
Year dummies	yes	yes	yes	yes
Industry dummies	yes	yes	yes	yes
Number of cases	479	416	490	398
Adjusted R ²	0.472	0.456	0.449	0.306
F-statistic	14.376***	11.891***	13.856***	6.470***

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 and interest rate spread as dependent variable. Specification (1) uses unmodified risk proxies, whereas in specification (2) to (4) negative values of the interest coverage ratio are set to zero and the most extreme 5% cases of each risk proxy are excluded. Specification (4) additionally excludes 18 small firm loans of bank 7.

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. In comparison to bank 7 with the high spread (which results from the high share of small firms being not fully captured by the asset size variable), the other banks still differ by almost one percentage point. 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 disinter mediation 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, four coefficients are statistically significant, except of 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, two of them are significant, i.e. the house bank variable as well as the number of banks lending to the firm. The fourth significant variable – not shown here – is for the construction industry, which makes sense for this highly cyclical and leveraged business.

In comparison to the specification (2) just discussed, the other specifications confirm the findings. Specification (1), relying on possibly misleading risk proxies, and specification (3), abandoning the interest coverage ratio, show similar explanatory power. Only specification (4) yields clearly lower explained variance. It is reassuring, however, that the signs of the coefficients in all four specifications remain virtually unchanged. The reaction of the regressions is thus not sensitive to some changes of the sample size. We conclude that there is a recognizable stable structure in lending by Thai commercial banks which supports hypothesis 1. What can be found about further structures in bank lending that have been identified in earlier studies?

4.2 Further Results on the Pricing of Loans

Knowing that there is a robust structure in Thai commercial banks' lending, we now turn to details of this structure. Is the empirical evidence on the earlier stated hypotheses 2 and 3 supportive or not? Hypothesis 2 stated the importance of relationship indicators. The existence of the effect has already been shown above, but not its relative importance compared with mature markets. In similar settings for the USA (Petersen and Rajan, 1994) or Germany (Elsas and Krahen, 1998) a significant effect cannot be identified. Only Berger and Udell (1995) – relying on L/C as we do – find that related loans are cheaper. Comparing the result for Thailand, which reveal three correct signs and two significant coefficients for the relationship indicators, with other studies, the Thai case is clearly in favor of hypothesis 2.

Hypothesis 3, the connotation of relationship lending with smaller firms, has also been indirectly addressed before. To explicitly test this hypothesis we follow Berger and Udell (1995) and split the total sample into two sub samples of the same size each. Running the benchmark regression from above, i.e. specification (2) in Table 6, separately on these two sub samples, the hypothesis receives some support. Only the sample of smaller firms provides a result similar to the total result (see specification 1 in Table 7). The loans to larger firms, however, show some

new characteristics (see specification 2): first of all, the explained variance is quite low, indicating that further influences are important which have not been covered by the available data. Second, asset size becomes insignificant and a house bank status does not explain anything, whereas relation duration and the number of banks become the only almost statistically significant variables (except dummies) at a 11% level. This result indicates three lessons: first, the loan market for large firms may be governed by somewhat different rules than the loan market for small firms. Second, relationship is always important but changes its expression. Third, house banks are characteristics of small firm lending, whereas the power of competition by way of multiple lending sources is important for large firms. The hypothesis is thus supported if one accepts the house bank variable as decisive for identifying the relationship.

Table 7: The Pricing of Small Firm Loans

Independent variables	Specification	
	(1)	(2)
Liability to asset ratio	0.067 (0.290)	0.272 (0.181)
Current ratio	-0.043 (0.056)	0.016 (0.045)
Interest coverage ratio	-0.008 (0.028)	-0.007 (0.013)
House bank status	-0.269* (0.142)	-0.029 (0.117)
Relation duration	-0.006 (0.013)	-0.012* (0.007)
Ln (number of banks)	-0.108 (0.111)	-0.106 (0.064)
Ln (assets)	-0.483*** (0.064)	-0.037 (0.043)
Age	0.004 (0.009)	0.001 (0.003)
Collateral	0.002 (0.002)	0.001 (0.001)
(Constant)	4.159*** (0.370)	0.341 (0.484)
Bank dummies	yes	yes
Year dummies	yes	yes
Industry dummies	yes	yes
Number of cases	208	208
Adjusted R ²	0.505	0.123
F-statistic	7.825***	1.910***

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

The table presents OLS regressions with White heteroskedasticity-consistent standard errors and interest rate spread as dependent variable. All specifications are variations of the benchmark regression (2) from Table 6, i.e. excluding the most extreme values. Specifications (1) and (2) show results for smaller and bigger firms each, where the marginal firm size is about 300 mill. Baht.

It can be thus concluded that the pricing of loans by Thai commercial banks roughly follows a pattern that is already well-known from mature markets, such as the main connotation of relationship lending with smaller firms. There are, however, certain differentiating characteristics which can be expected from an emerging economy: the importance of the house bank variable – as the best relationship indicator – is higher than in mature markets and

relationship may also matter for larger firms. These findings give support to hypotheses 2 and 3. Having addressed pricing, we now turn to the question of availability of loans.

4.3 The Availability of Loans

The issue of credit availability was discussed in section 2 with the outcome that the institutional setting of emerging economies, where information from balance sheets etc. is less reliable, is inductive for credit rationing behavior. Hypothesis 4 takes up this point by stating implicitly that consideration of risk is not so much reflected in the interest rate spread. Indeed, earlier regressions in Tables 6 and 7 have already demonstrated that the risk proxies are no significant determinants of the spread. It is noteworthy that two of the three risk proxies in the benchmark regression show the expected sign although the “wrong” sign for the liability to asset ratio is somewhat disturbing. This may be an artificial result, however, as larger firms have larger loans, higher leverage and lower spread. The sign of the liability to asset ratio-coefficient changes when splitting the sample according to asset size from minus (see the benchmark specification 2 in Table 6) to plus (see Table 7), indicating that size effects may spill over into other variables. In any case, some influence from risk on loan pricing is recognizable but not statistically significant, consistent with hypothesis 4. This raises the question of how risk may be considered by Thai commercial banks.

According to the theoretical literature, another alternative for banks to address risk is the rationing of credit. Hypothesis 4 states that risk proxies are better in explaining credit availability than loan pricing. The set of explanatory variables can thus be regressed on the “bank credit ratio”-variable which aims to capture credit availability. The result presented as specification (1) in Table 8 shows, indeed, an reassuring result: 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, hypothesis 4 receives clear support as two of the three risk proxies show the expected sign and the liability to asset ratio is now even statistically highly 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.

Table 8: Risk and Relationship Factors for the Availability of Loans

Independent variables	Specification			
	(1)	(2)	(3)	(4)
Liability to asset ratio	-0.330*** (0.052)	-0.350*** (0.061)	-0.365*** (0.090)	-0.387*** (0.051)
Current ratio	-0.003 (0.011)	0.001 (0.011)	-0.014 (0.024)	-0.013 (0.011)
Interest coverage ratio	0.004 (0.005)	0.005 (0.006)	0.000 (0.007)	0.002 (0.005)
House bank status	0.096*** (0.023)	0.089*** (0.031)	0.089** (0.036)	0.095*** (0.022)
Relation duration	0.003 (0.002)	0.000 (0.002)	0.005* (0.003)	0.003* (0.002)
Ln (number of banks)	0.000 (0.017)	-0.041 (0.026)	0.010 (0.023)	0.008 (0.016)
Ln (assets)	-0.057*** (0.006)	-0.052*** (0.013)	-0.067*** (0.011)	-0.070*** (0.006)
Age	-0.001 (0.001)	0.001 (0.002)	-0.003** (0.001)	-0.002* (0.001)
Collateral	-0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
(Constant)	0.850*** (0.072)	0.787*** (0.089)	1.069*** (0.139)	0.925*** (0.079)
Bank dummies	yes	yes	yes	yes
Year dummies	yes	yes	yes	yes
Industry dummies	yes	yes	yes	yes
Number of cases	416	208	208	398
Adjusted R ²	0.454	0.445	0.371	0.494
F-statistic	11.775***	6.354***	4.820***	13.120***

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

The table presents OLS regressions with White heteroskedasticity-consistent standard errors and the bank credit ratio (BCR) as dependent variable. Specification (1) uses identical cases and variables as the benchmark regression (2) from Table 6. Specifications (2) and (3) show results for small and large firms, respectively. Specification (4) excludes 18 small firm loans of bank 7, as had been done in regression (4) of Table 6.

Further results seem noteworthy: a house bank relation improves credit availability, as identified by earlier literature on mature markets, supporting hypothesis 5 (e.g. Petersen and Rajan, 1994, Machauer and Weber, 1998). 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 systematic 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 spreads (see Table 7). The only new significant result for small firms is the detrimental influence from many lending banks, possibly signaling some problems in attracting large amounts from a few lenders (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 in Table 7. Moreover, it is interesting to note that the variable age shows a statistically negative sign. The sign is quite robust in several specifications and is already there in the pricing equations; only its significance is new, which we interpret as a disadvantage for older firms without established durable relations with banks. Finally, the sensitive reaction of the explained variance of pricing regression on the exclusion of smallest firms loans (see specification 4 in Table 6) does not apply here (see specification 4), confirming the robustness of these relations.

We would like to emphasize three results as an interim summary of section 4, which examined ex ante available information: first, the robust structure in the credit files demonstrates that there is a rationale of bank lending. Second, the signs in the respective regressions are consistent with theoretical expectations and with earlier findings on mature markets. In this sense, bank lending in Thailand was similar to bank lending in other markets. Third, however, Thai commercial banks also reveal some peculiarities: first, relationship is more important in explaining behavior. Second, risk is rather addressed by credit rationing than by increasing spread. These characteristics of the Thai data are consistent with expectations on bank lending in an emerging economy, as the institutional setting is different from mature markets. Overall, theoretical expectations formulated in hypotheses 1 to 5 are largely confirmed. The next section 5 repeats the basic research questions from section 4, but exploiting the advantage from ex post information.

5 Empirical Results Based on Ex Post Information

This section tests the rationale of bank lending from a somewhat unfair perspective, as it relies on information that was not available at the time of decision making. This additional information is the default variable, i.e. the information whether the loan has turned into a non-performing loan between loan granting and data compilation. Although this information is hypothetical for decision making, insights can be expected from this information that are rare in the literature.

The examination here is governed by hypotheses 6 and 7. Hypothesis 6 states that the default variable contains information and may be thus helpful in explaining the pricing and availability of loans. This hypothesis is tested by including the default variable as an additional variable in the regressions run above. In particular, specification (2) from Table 6 is taken for pricing, and specification (1) from Table 8 is taken for credit availability. Results of both regressions are presented as specifications (1) and (2) of Table 9.

Looking at the pricing regression, i.e. specification (1) in Table 9, reveals an unexpected result as the default variable has a very small and insignificant coefficient. As the explanatory power of the other variables is virtually unchanged, it can be concluded that the information expressed by the default variable was not used in any way at the time of decision making. Hypothesis 6 is therefore – regarding pricing – not consistent with the data. A consequence is that banks did not possess hidden knowledge about riskiness of loans beyond the three risk proxies applied. However, this possibly does not matter, as credit rationing appears anyway to be more important.

Hypothesis 6 also states that the credit availability regression can be improved by including a default variable. Specification (2) in Table 9 confirms this hypothesis as the default variable is statistically highly significant and of reasonable economic importance. The interesting point is the sign of the default variable, indicating that those firms which had more generous credit availability tended to default. This signals some malfunctioning of bank lending, at least at first glance. If one interprets the default variable – due to its sign in the regression – as an implicit relationship variable, the relative importance of relation versus risk can be compared by relying on non-reported standardized coefficients. This calculation reveals that the sum of standardized relation coefficients is even somewhat larger than the respective sum for risk proxies. The finding holds irrespective of whether only significant coefficients count or not.

The Rationale of Bank Lending in Pre-Crisis Thailand

Table 9: Loan Pricing, Loan Availability and the Ex Post Default Information

Independent variables	Specification			
	(1)	(2)	(3)	(4)
Liability to asset ratio	-0.230 (0.187)	-0.321*** (0.050)	-0.577 (0.432)	-0.783* (0.432)
Current ratio	-0.064 (0.043)	0.001 (0.011)	-0.328** (0.132)	-0.336** (0.131)
Interest coverage ratio	-0.015 (0.015)	0.006 (0.005)	-0.082 (0.051)	-0.110** (0.051)
House bank status	-0.219** (0.095)	0.100*** (0.022)	-0.266 (0.219)	-0.486** (0.230)
Relation duration	-0.009 (0.007)	0.003 (0.002)	0.009 (0.017)	0.006 (0.018)
Ln (number of banks)	-0.141** (0.060)	-0.000 (0.017)	0.052 (0.137)	0.021 (0.142)
Ln (assets)	-0.237*** (0.033)	-0.061*** (0.006)	0.176*** (0.055)	0.016 (0.072)
Age	0.001 (0.004)	-0.001 (0.001)	-0.031** (0.012)	-0.028** (0.013)
Collateral	0.002 (0.001)	-0.000 (0.000)	0.000 (0.002)	0.001 (0.003)
Default	0.023 (0.126)	0.108*** (0.027)		
Ln (L/C volume)				0.319*** (0.082)
(Constant)	2.532*** (0.345)	0.805*** (0.076)	-1.687* (0.864)	-1.766** (0.853)
Bank dummies	yes	yes	yes	yes
Year dummies	yes	yes	yes	yes
Industry dummies	yes	yes	yes	yes
Number of cases	416	416	416	416
Adjusted R ² , McFadden R ²	0.455	0.474	0.299	0.337
F-statistic, LR-statistic	11.502***	12.336***	109.845***	123.776***

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

The table presents OLS regressions with White heteroskedasticity-consistent standard errors in specification (1) and (2), where the default variable is added to earlier regressions. Specification (1) is based on the benchmark regression (2) in Table 6 with interest rate spread as dependent variable. Specification (2) is based on regression (1) of Table 8 with bank credit ratio as dependent variable. Specifications (3) and (4) are probit regressions with Huber/White robust covariances and default as dependent variable. The data set is the same as in the other specifications but in specification (4) the variable L/C volume (“line of credit volume”) is added.

This proves the high importance of relationship lending, but not necessarily its inefficiency. It is only the default term that may indicate inefficiency, and the respective standardized coefficient is less than half of the risk coefficients taken together. Moreover, causality may be unclear, as e.g. Machauer and Weber (1998) find a higher share of “credit line to asset” for more risky firms which will default easily in a crisis. This argument of reverse causality may be further sharpened, considering the credit crunch in Thailand's early post-crisis years in which credit-dependent firms were hardest hit (see Agénor, Aizenman and Hoffmaister, 2000). The financial structure of firms is then the reason for default, in particular when the economic crisis is complemented by a banking crisis. To further examine this issue, it would be interesting to understand whether non-performing loans – which should have been identified ex ante as entailing higher risk – have more to do with risk proxies or relation indicators.

Hypothesis 7 states that explaining the default variable as a dependent variable would reveal information beyond the already known structures of the two benchmark regressions regarding loan pricing and loan availability. Due to the 1-0-nature of the default variable, probit regressions are used here. The respective regression is shown as specification (3) in Table 9. The overall explanatory power is lower than for the earlier regressions, but nevertheless revealing. 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, only a house bank relation tends to be related with lower rather than higher default probability, controlling for other determinants. In this specification, larger assets and younger firm age are also positively related with default, whereas loans granted in the year 1992 are negatively related. These results seem reasonable, with the unexpected exception that larger firms default more easily.

This raises the question whether other influences may be hidden in the asset variable. In particular, the effect of higher credit volume mentioned above could disturb the information from asset size. Both variables are highly correlated and therefore neglected in other regressions, but their joint inclusion could be informative here. Is default more related with a high credit burden or with being a large firm? Specification (4) in Table 9 just adds a single variable to specification (3) and leads to an interesting result. The credit volume variable has a positive and highly significant coefficient, whereas the asset variable loses significance. Three more changes can be recognized: the significance of the house bank variable, of the interest coverage ratio and the liability to asset ratio. The two newly significant risk proxies have contradictory signs, however, revealing possibly interpretative problems with the liability to asset ratio as before. Nevertheless, these changes indicate that a high credit volume is rather more important than being a large firm for subsequent default. Considering the other control variables, such as age, risk proxies etc., the impact of the credit volume variable is indeed consistent with the above mentioned financial structure argument of weak credit-dependent firms. The positive impact of a house bank on non-default may be caused by better understanding of the firm and/or by better credit availability for the firm.

In summary, the analysis of ex post information, i.e. the default variable, has revealed some new insights. First, Thai commercial banks do not seem to have used hitherto unidentified knowledge when pricing loans, which rejects hypothesis 6. Second, credit availability was better for firms where loans defaulted subsequently, supporting hypothesis 6. Competing explanations have been advanced for this unpleasant effect: a possible inefficiency in bank lending (too generous credit granting for lower quality firms), reverse causality (firms with financial problems rely more on credit and then default due to an external shock) or existence of a third explanatory financial structure variable (firms with a highly credit-oriented liability structure were hit hardest by the credit crunch). Third, contrary to the positive correlation between default – indicating probably relation – and credit availability, relationship indicators in explaining default point towards an economically neutral impact of relation. Factoring L/C volume into the regression leads even to a stabilizing impact of house banks. Fourth, default is hindered by relation but eased by risk factors. This indicates – from the ex post perspective – a rational use of information on many variables, such as liability to asset ratio, relation duration, assets or industry and an “insurance” function of the house bank. These findings support the claim of hypothesis 7 to reveal new structures. The shortcoming in Thai commercial banks' lending decisions was thus not easy lending to close customers, but an underutilization of information on the riskiness of borrowers.

6 Concluding Comments

In contrast to other literature on the Asian crisis, this research does not assume how local banks behaved and does not conclude from macroeconomic information how they might have behaved – instead, the behavior is directly analyzed from several hundred credit files of Thai commercial banks. The findings show a structure in lending determinants that is quite similar to that found in mature markets. The comparatively higher weight of relationship in decision making is theoretically expected for more opaque financial markets. Also, the importance of credit availability as a preferred instrument for controlling risk has been identified before. However, Thai commercial banks did not operate without problems. The analysis of ex post default cases shows that ex ante available risk information could have been used better to restrict default. This underutilization of information may be not unexpected for an emerging market. Given the dominating claim of “bad banking” and “related lending”, however, the unimportant or – depending on the specification – stabilizing role of relationship in default regressions is more surprising. Therefore, Thai commercial banks' lending rationale is similar to that of banks in industrialized economies and their shortcoming is quite conventional, as they fail to fully recognize risk factors. This result may be criticized from several angles.

Most fundamentally, the data quality may be regarded as doubtful due to either non-representative or non-reliable information. Both issues have been addressed and checked, however. Arguments in favor of representativeness are the participation of most banks, the reasonable structure of the firm data regarding industry classification (see Table 1) and the high share of non-performing loans. Regarding reliability, we could control the selection of files to some degree, structures of the firm data are inherently reasonable (see Tables 4 and 5), regression coefficients are mostly as theoretically expected and regression results are not dependent on the inclusion of single banks.

Unfortunately, there are some limitations in the sample. First, the sample represents Thai commercial banks as the largest financial group, but finance companies are not included. The latter group operated in a less sound manner as can be seen, for example, by the many closures of finance companies that preceded and followed the outbreak of the crisis. Second, the sample is distorted in the sense that credits granted under illegal conditions are missing. Third, firms in the sample better represent medium-size and larger firms as the files were collected from headquarters.

A major issue to be addressed is the inconsistency of our results with the study of La Porta, López-de-Silanes and Zamarripa (2002) on the Mexican banking system. A possible explanation is that our relationship factors are much looser and more generous in defining related parties than the quite precise definition for Mexico. However, even with lesser data quality, one

could expect that Mexican circumstances would be at least expressed in respective signs such as e.g. a positive impact of the house bank variable on default. In the Thai case, however, somewhat contrary results have been found. It thus seems quite reasonable to accept that emerging financial systems function in different ways. A prominent example in this respect is the different impact of financial repression that may be a burden in India (Demetriades and Luintel, 1996) or an advantage in Korea (Demetriades and Luintel, 2001). There is further evidence regarding the heterogeneity of financial development on outcomes in different countries (Demetriades and Hussein, 1996, Luintel and Khan, 1999), in particular evidence on problematic effects in Latin America (De Gregorio and Guidotti, 1995). Complementing this information are studies on high factor productivity and reasonable governance structures in Thailand (Wiwattanakantang, 2001). Finally, Ferri and Messori (2000) report contradictory results of relationship banking between different regions in Italy. It seems thus probable that relationship banking in Mexico turned into looting, whereas it worked rather more efficiently in Thailand.

In summary, more work on bank lending decisions in emerging economies appears to be warranted. Judging by the evidence presented here, domestic banks in emerging economies may function somewhat differently to banks in mature markets. Closer relations between bank and borrower do not necessarily signal misbehavior. The problem in the Thai case was rather one of fully recognizing the risk factors.

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Appendix

Table 1: Descriptive Statistics of the Variables

	N	Minimum	Maximum	Mean	Standard deviation
Interest rate spread	560	-.50	4.25	0.76	1.13
Collateral %	560	0.00	100.00	52.95	42.04
L/C volume ¹	560	0.30	6539	240.58	582.08
House bank status in %	555	0	100	49	50
Relation duration	555	0.0	36.0	7.96	6.51
Number of banks that lend to the borrower	557	1	44	4.36	4.76
Age	559	0	66	14.65	10.82
Assets ¹⁾	560	1.45	90582	2165	8426
Liability to asset ratio	560	0.00	6.06	0.74	0.44
Current ratio	551	0.00	139.00	3.18	11.47
Interest coverage ratio	489	-37.35	96.59	3.17	8.97
Valid N (list wise)	479				

¹⁾ Figures are in million Baht

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