

# **Regional differences in banks' interest rate setting - The impact of local banking competition and local economic structure \***

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## **Abstract**

This paper analyzes the impact of local banking competition and local economic structure on banks' interest rate setting. Recent cross-country studies try to explain differences between banks' interest rates on national levels neglecting the relevance of more narrow market delineations. To fill part of this existing research gap, examination of the German case turns out to be particularly promising as the German banking market continues to be fragmented for a large variety of banking products. Our analysis is designed to provide insights as to whether local factors have declined in importance as a determinant of bank pricing over the 1992 to 2006 period. Results of this paper indicate that recent increases in overall competition do not apply to all banking products alike. We find gross bank interest rates spreads to still be correlated with proxies for local bank market power for overdraft credit to businesses and short-term time deposits of private households. For other products considered, we generally find no such effects. Consistent with banking theory, banks' franchise in local markets seems to be valuable for products where they provide liquidity services to their customers.

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\* The views expressed in this paper represent the authors' personal opinion and do not necessarily reflect the views of the Deutsche Bundesbank.

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# 1. Introduction

According to a widely held view, integration of European retail banking markets is lagging far behind what has been expected 15 years ago, when the European Commission's agenda for financial market integration was put on the table.<sup>1</sup> By any measure, cross-border trade in retail financial services is small as compared to national figures of member countries. For instance, the vast majority of consolidation in retail banking has occurred within national borders and as of yet no successful Pan-European business model has been established even by the largest European retail banks. Differences in taxation as well as in the legal and regulatory framework have been detected as being major obstacles on the way to full market integration. For many observers therefore, further policy initiative is warranted aimed at harmonizing the regulatory and legal framework within Europe. In an attempt to measure market fragmentation across Europe and to track the process of convergence of retail banking markets, many refer to interest rate differentials for comparable bank products. Obviously the law of one price serves as a useful general benchmark for market integration as in many other instances as well.<sup>2</sup>

While price dispersion can have many sources, critics of the European Commission's activity plan have claimed that many of the retail banking markets considered are local by their very nature. Preference for locality, asymmetric information and search costs are named as major problems to match customers and non-local banks.<sup>3</sup> If economic fundamentals of this type strongly favour local as compared to more distant suppliers of financial services, part of the price dispersion observed might be due to local economic factors not directly addressed by harmonization within the European Union.

Recent cross-country studies try to explain differences between banks' interest rates on national levels not focussing on the relevance of more narrow market delineations.<sup>4</sup> The aim of this paper is to provide a longer term comparison of the relevance of factors of market competition measured well below the national level. As a well established fact during the

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<sup>1</sup> See the contributions in Giovannini/Mayer (1991) for a detailed account of these expectations and a retrospective on the assessment of likely obstacles to financial market integration.

<sup>2</sup> While appealing from a theoretical perspective, in reality the law of one price seems to be an exception rather than the rule. Lach's (2002) contribution strongly reconfirms this notion as he finds significant price dispersion even for products like coffee, flour or refrigerators. For many apparently homogenous products, price dispersion seems to be pervasive. Even for Internet retailing no strong convergence to the law of one price could be observed. See Pan et al. (2003) for a survey of the empirical evidence for non-bank internet retailing price dispersion

<sup>3</sup> For instance, while internet banking becomes a viable alternative for more and more Europeans, stationary distribution channels still account for the largest part of customer bank interaction.

<sup>4</sup> See for example, Valverde/Fernández (2007), Maudos/Fernández de Guevara (2004), Demirgüç-Kunt et. al. (2003) or Courvoisier/Gropp (2002).

1990s, local markets seemed to matter in explaining the within country variation of interest rates for loans and deposits in Europe.<sup>5</sup>

Have these local factors declined in importance as banking became more competitive at the industry level recently? Do the benefits of more competition accrue to all groups of bank customers – depositors and borrowers – alike?

Answers to these questions might as well be relevant from a policy perspective. For instance, if retail interest rate dispersion is low within countries but significant differentials prevail between countries this could be strongly supportive of the Commission's harmonization approach. If, on the other hand, interest rate dispersion is already high across regions within a given country jurisdiction, economic fundamentals might be responsible for narrow market delineations at the more regional or local level. While this latter finding does not preclude targeted public policy actions to overcome market fragmentation and to foster market integration, policy actions advisable under this latter scenario could be quite different from those advocated under the harmonization approach.

In this study we compare the explanatory power of local market variables for bank interest rates in Germany over a longer term interval. We run regressions for bank interest rates taken from the previous bank interest rate statistics of the Deutsche Bundesbank for a sample covering the 1992 to 1995 period and compare them with results obtained for the most recent available data from the MFI Interest Rate (MIR) statistics of the Eurosystem. As we are interested in a longer-term comparison, for our analysis we select product categories ensuring at least a minimum degree of comparability over time.

This long term comparison allows us to draw first inferences as to whether local factors still matter for bank pricing. However, it is to be stressed that the data used in this study and the empirical methodology applied are not tailored to draw any inference with respect to the aggregate German interest rate level nor to cross-country differences. They only allow us to analyze the relevance of local market structure for the pricing decisions by local banks for specific bank products.

Our findings suggest that the impact of local market power of banks still matters for short-term time deposits and overdraft credit to enterprises. For other retail products like consumer loans and retail mortgages, we find no direct effects of banks' local market power in either sub-period, while the data display some sensitivity to factors likely to affect the shape of local demand. Overall, our findings add support to the notion that banks are unique as a source of

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<sup>5</sup> See e.g. Degryse/Ongena (2005), Sapienza (2004).

liquidity for firms and households and that incumbent banks' franchise in these market segments could not easily be threatened by market entry.

## **2. Bank interest rates and local banking competition**

European banking has undoubtedly undergone significant changes over the last decade and according to industry observers the process of transformation is expected to proceed in the future. In particular the process of regulatory and technological innovation has been paralleled by increasing competitive pressures from non-banks and capital markets. While the academic literature on the consequences of these developments is thin, there are several findings that seem to confirm this widely accepted notion. For instance, Angelini/Cetorelli (2004) find that competition markedly intensified in Italian banking during the 1993 to 1997 period. The authors attribute their findings by and large to deregulation activities beginning in the early 1990s and the European Commission's Single market programme in particular. In a related study Fischer/Hempell (2006) find a similar pattern of decreasing bank market power for Germany for the 1993 to 2001 period. While comparable empirical work is limited in number most of these findings seem to support a general perception held by the public. According to this, competition in European banking has substantially increased recently. While it seems reasonable to suggest that these developments might as well seriously constrain banks' ability to exercise market power at the local level, as of yet no evidence on this question is available.

From a theoretical perspective, the degree of locality reflects the unique features of financial services provided by banks. The modern theory of financial intermediation emphasizes informational proximity between banks and their customers as a prerequisite for the unique functions that banks perform. Banks gathering of private customer related information is a centrepiece of this theory. Informational proximity necessitated by close bank borrower relationships is most easily achieved by geographical proximity. The transmission of information referred to as "soft information" by economists often requires frequent personal contact.<sup>6</sup> This close link between informational and spatial distance has only partly been weakened by the introduction of modern information and communication technologies.<sup>7</sup> As a consequence, local market power of banks might be an inherent feature of many of the

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<sup>6</sup> See Petersen/Rajan (2002) and Petersen (2004) for an in-depth discussion.

<sup>7</sup> For empirical evidence related to the US see Amel/Starr-McCluer (2002) or Dick (2007), for Euro area countries, to our knowledge unfortunately no comparable empirical analysis exists though anecdotal evidence strongly points to the relevance of local markets, as well,

business relationships banks traditionally establish. Pricing power here might, therefore, be less prone to effects of deregulation and harmonization.

As our analysis tries to shed some light on this issue, we rely on findings in Fischer/Hempell (2006) to derive meaningful measures of local market power of German banks. In this earlier work, we estimated Lerner indices at the bank level<sup>8</sup> and were thus able to assess competition in local markets by aggregating these measures for savings banks and co-operative banks active in a specific local market.<sup>9</sup> Figure 1 displays the distribution of these estimated local Lerner indices for local banking markets in Germany for the 1994/95 and 2000/2001 sub-periods respectively.

The distribution of markups experienced a leftward shift during the 1990s signalling an intensification in competition in German local banking markets. As a first check of plausibility Fischer/Hempell (2006) use data from the Bundesbank's interest rate statistics for the 1992 to 1993 period to verify whether deposit rates are lower and loan rates are indeed higher in markets classified as being less competitive by their estimates. Figures 2 to 4 display some of their results for gross margins on selected loan and deposit products.

As is obvious from Figures 2 to 4, market classification based on estimated Lerner indices seems to be consistent with banks' pricing patterns across narrowly defined geographic regions within Germany in the early 1990s. It is worth mentioning here that interest rate data displayed in these figures is not restricted to data from savings banks and co-operative banks alone but comprise price data from other banking groups as well.<sup>10</sup> This is important as supra-regional banks at least at that time did not pursue uniform pricing strategies but adjusted their pricing taking the respective local conditions into account.

For our empirical assessment of the impact of local banking competition on banks' pricing behavior, we, therefore, use Lerner indices estimated for the 1994/1995 and 2000/2001 subperiods respectively as a comprehensive measure of banks' local market power. As an alternative, we also use the Herfindahl measure of market concentration as a more standard metric of local competitiveness. Within the framework of static oligopoly theory these two

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<sup>8</sup> The simultaneously estimated panel-econometric model consisted of a price equation and a cost function. Here, the first derivative of total costs with respect to output is included in the pricing equation to account for marginal cost in bank pricing decisions.

<sup>9</sup> We thus make use of the fact that within Germany's so called three-pillar banking system the principle of market demarcation still applies to municipal savings banks and co-operative banks alike. These banks are doing business within narrowly defined local market areas.

<sup>10</sup> This does not apply to the new German MIR statistics starting in 2003; here, banks do not report locally differentiated interest rate data by branch but volume weighted averages per bank.

measures are related. So for example, in asymmetric Cournot equilibrium, the Lerner index can be expressed as the product of the Herfindahl index and the inverse elasticity of demand.

### **3. Empirical assessment**

#### **Data**

In the empirical analyses we use a rather broad combination of different data sources<sup>11</sup> in order to, firstly, undertake an assessment of local determinants in banks' interest rate setting and, secondly, to perform somewhat of a comparison of their local price setting over time, i.e. in the first half of the 1990s and the first half of this decade. To pursue these aims a whole range of obstacles regarding data availability are to be circumvented. In what follows, we describe the various data sources in greater detail to motivate our model specifications chosen.

#### *Interest rate data*

For the analysis we use individual bank interest rate data for Germany as collected in the new MIR statistics of the Eurosystem. These monthly data cover the period from the beginning of 2003 up to September 2006. For the MIR statistics rates are reported on the bank level. Banks' individual reported rates are mean rates weighted by the banks' overall respective volumes of new business in the respective product categories.<sup>12</sup> Thereby, they differ from rates reported in the former German bank interest rate statistic where modal values had been reported on the level of the participating banks' branches (see below).

For an assessment of the impact of local competition and economic structure on bank interest rates, we, therefore, had to restrict our sample to only regionally active reporting banks due to the reporting scheme of the new MIR statistics. We excluded large private banks, head institutions of network banks (i.e. savings banks and cooperative banks), building societies, mortgage banks as well as supra regional cooperative banks, special purpose banks and financing companies/banks (e.g. for automobile companies) and direct banks; this regional

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<sup>11</sup> Deutsche Bundesbank: new MIR interest rate statistics, previous bank interest rate statistics, monthly bank balance sheet items statistics (BISTA), yearly bank profit and loss accounts (PaL), bank branch statistics; Federal Statistical Office: regional statistics; Federal Office for Building and Regional Planning: regional socio-geographic statistics; and own earlier estimates of Lerner indices for local banking markets.

<sup>12</sup> For a detailed description see the statistical guidelines published by the Deutsche Bundesbank in 2003 as well as the descriptive article on the new MIR statistics in the monthly bulletin of the Deutsche Bundesbank in January 2004.

sub sample covers 97 out of 197 banks reporting to the German MIR statistics during that period. Apart from a few private commercial banks, the regional sub sample comprises mostly savings banks and cooperative banks which are due to their regional demarcation rules bound to operate on a regional level only. The analyzed sub sample is more homogenous than the overall sample; its average variance is generally close to the average variance of a 5%-quantile adjusted<sup>13</sup> variance for the overall sample.

Our analysis comprises the following bank rates included in the new MIR statistics: short-term time deposits by private households and non-financial enterprises (initial maturities of up to one year), medium-term and long-term consumer loans (initial interest rate fixations from one to five years and more than five years, respectively), longer-term private housing loans (interest rate fixations of five to ten years) as they include the most typical type of mortgage loan in Germany with rates fixed for period of ten years, and for loans to non-financial enterprises: overdraft credit and short-term loans with interest rate fixations of up to one year for small (volumes up to 1 mill. Euro) and large (more than 1 mill. Euro) denominations. We put a special focus on overdraft credit (containing current account credits) as current account credits were the only rates for corporate loans covered by the previous interest rate statistic already at the beginning of the 1990s and thereby allow for comparison over time. Furthermore, they reflect banks' provision of liquidity to their corporate customers being a type of business potentially especially prone to the exercise of market power by banks due to a rather low elasticity of demand of (at least temporarily) locked-in customers.

To have a comparison with banks' price setting a decade ago, we employ data from the previous bank interest rate statistics for Germany. For this analysis we used anonymized monthly data from reporting bank branches sorted by postal code containing all reporting institutes pertaining to regional active as well as supra-regional active banks (all banking groups; however no building societies) for the time period of 1992 to 1995 as provided to one of the authors by the Deutsche Bundesbank.<sup>14</sup> Here reported bank specific rates reflect the most frequent rate (modal value) charged by category for new business or renewals within the middle two weeks per month.<sup>15</sup> Apart from differences in categories covered and the change in reporting mode from branch level to bank level, this characteristic constitutes the most important difference to the new MIR statistics comprising bank level means weighted by the volume of new business instead of these modal values as already explained above.

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<sup>13</sup> Elimination of the largest and smallest 5 % of all reported rates per category and month.

<sup>14</sup> For a detailed description see Fischer (2001).

<sup>15</sup> For further details also see Weth (2002).

Bank rates analyzed from the previous interest rate statistic include short-term time deposits (denominations of up to 50,000 Euro), consumer loans with initial interest rate fixations between 24 to 48 months, mortgage loans with initial interest rate fixations of ten years and current account credit for small and large denominations (less than 500,000 Euro and 500,00 to 2.5 mill. Euro).

In the analyses we use yearly averages of calculated monthly spreads as a proxy for banks' individual gross spreads per category. For the calculation of the approximated gross interest rate spreads we use the relevant market rates, i.e. three-month rate for short-term time deposits as well as current account credits or short-term loans to enterprises; running yields of respective maturity for medium-term and longer-term consumer loans, longer-term housing loans, and long-term loans to enterprises.<sup>16</sup> Data are included if at least nine monthly observations per year<sup>17</sup> are available for a reporting bank.

#### *Data for bank specific control variables*

To control for bank specific effects in our regressions with the MIR data, we calculated the following control variables using individual bank data from the monthly balance sheet statistic (BISTA) and banks' yearly profit and loss accounts (PaL)<sup>18</sup> of the Deutsche Bundesbank: total assets (*TASSET*), loans to deposits (*LOANDEP*), short term customer loans to overall customer loans (*LOANSTR*), depreciation and write-down on receivables and certain securities and additions to provisions for the loan business relative to customer loans (*LOANLOSS*), loan commitments to customer loans (*COMMIT*).

#### *Data on local level*

Variables accounting for the local economic structure are calculated recurring on data sets available from the Federal Statistical Office on the district (*kreis*) level for all 439 local districts in Germany. Based on this data source we calculate disposable income per capita (*PCINCOME*), changes in the rate of unemployment (*DUNEMPL*), and the rate of

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<sup>16</sup> Running yields on German bearer debt securities outstanding with a mean residual maturity of three to four and three to five years for medium-term consumer loans with a maturity of 24 to 48 months (for data from the previous interest rate statistics) and one to five years for (for data from the MIR statistics), respectively; running yields on German government bonds with a mean residual maturity of 9 to 10 years for longer-term housing loans and long-term loans to enterprises.

<sup>17</sup> For 2006 we restrict the sample to banks with at least six monthly observations due to the truncated sample including observations only until September 2006.

<sup>18</sup> PaL data are only available up to the year 2005; regressions including bank specific control variables using PaL data are therefore restricted to the 2003 to 2005 period.

insolvencies (*INSOLV*) per local district<sup>19</sup>. Socio-geographic data available from Federal Office for Building and Regional Planning are employed to create an indicator dummy variable for urban type of districts (*CITY*) and for the number of regional centers within a district used as an indicator for market fragmentation (*FRAGM*).

For the degree of local banking competition prevailing in local districts, two indicators are implemented in our study: firstly, estimates of local Lerner indices (*LERNER*) based on estimations by Fischer/Hempell (2006) using a panel data set for all German banks for the years 1994-2001 as already mentioned above. Secondly, as a market structure variable we include a Herfindahl-Hirshman index (*HERF*); its calculation is based on the number of bank branches per local market as obtained from the bank branch statistics of the Deutsche Bundesbank<sup>20</sup>.

## Empirical Analysis

For our analysis, we try to set up a framework where we can get a closer look at the determinants of regional banks' interest rate setting despite the limited number of observations available. As exercised market power results from the interplay of strategic interaction on the supply side and the elasticity of demand on the demand side, we need to control on the supply side for bank specific factors such as balance sheet composition etc. as well as banking market structure as a proxy for potential strategic interaction. On the demand side, we aim to control for the economic structure of a region in general affecting the prevailing local elasticity of demand; here, variables such as disposable income, unemployment, etc. come into play.

We obtain coefficient estimates by running the following regression for both sub periods considered:

$$SPREAD_{i,t} = cons + \beta \cdot COMP_j + \sum \partial_k \cdot Z_{j,t} + \gamma \cdot W_{i,t} + \sum \eta \cdot D_{TIME} + \sum \kappa \cdot D_{REGION} + \varepsilon_{i,t}$$

Here *SPREAD* is the annual average gross spread of bank *i* in year *t* for the deposit or loan category considered. *COMP* is a measure of local banking competition in market *j*, where bank *i* is doing business (either the Herfindahl index or the Lerner index) and  $Z_{j,t}$  is a set of control variables measured at the local market level. All regressions include a set of time

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<sup>19</sup> As disposable income, unemployment and insolvencies as well as the number of manufacturing firms per district are only available up to the year 2004, we use lagged values in our analysis and employ replicated 2005 data for the year 2006 until contemporaneous data for 2005 are available.

<sup>20</sup> For more details on the calculation and further discussion of this index see Fischer (2001).

dummies  $D_{\text{TIME}}$  and a set of regional dummies,  $D_{\text{REGION}}$ .<sup>21</sup> Extensions of regressions for interest rate spreads from the MIR statistics also include a set of bank specific controls  $W_{i,t}$ .

Interpretation of our results along the lines of static oligopoly theory might yield interesting insights. As we chose gross spreads as our dependent variable, they provide an approximation to the mark up of price over marginal costs which in static oligopoly theory should depend on market concentration and the inverse of the elasticity of demand. Therefore, we would expect demand side factors to have an impact when we use *HERF* as a measure of local competition. By contrast, when we replace *HERF* by *LERNER* we would generally expect these demand side factors to be of less significance given that *LERNER* itself is an approximation to the price-cost margin without being adjusted to the elasticity of demand. Regional *LERNER*, therefore, already encompasses the effects of demand elasticity driving a wedge between prices and marginal costs.

As we use anonymized data for the earlier period, we cannot adequately control for differences at the individual bank level. Given that our specification reflects a reduced form price equation, interpretation of the coefficients for the other covariates at the market level is complicated by the fact that they might either shift or rotate the demand curve for retail deposits / loans or might even proxy for factors affecting banks' costs.<sup>22</sup> While controlling for market level characteristics is essential to our approach, we face data constraints on this highly disaggregate level especially for the earlier sub sample.<sup>23</sup>

As mentioned above, a further aim of our analysis is to compare results for the recent MIR statistics with earlier data from the 1990s of the bank interest rate statistics collected by the Deutsche Bundesbank. As for these anonymized data bank specific variables have not been available, we restrict the estimated models in a first step for both periods to local explanatory variables. In a second step, using recent data from the MIR statistics, we add bank specific variables to our regressions.

While comparable studies often neglect the likely endogeneity of right hand-side measures of market structure or market power, in all of our regression we use instrumental variable two stage least squares (TSLS) to circumvent the likely bias from which OLS estimates would

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<sup>21</sup> For the earlier period these regional dummies control for federal states; for the MIR statistics regressions we include regional dummies comprising federal states in the northern and in the eastern part of the country due to small sample sizes.

<sup>22</sup> For a discussion on the limitations of reduced form price equations see for instance Borenstein (1989).

<sup>23</sup> In Germany the Statistical Offices of the states only began a coordinated collection of local data in the mid 1990s.

suffer.<sup>24</sup> As an instrument for both Herfindahl and Lerner index, we use the number of banks as of 1985 (1991 for eastern part of Germany).<sup>25</sup> The instrument chosen correlates well with the market structure variables but can be expected to exert no influence on equilibrium pricing behavior for our sample periods. Because of the large number of mergers among small banks that have taken place in the meantime correlation between our instrument and the endogenous variable is strong but far from perfect.<sup>26</sup> For the eastern parts of Germany, however, our recursive calculations end in 1991 as a natural consequence of German unification. Minor inaccuracies stem from our inability to properly account for market exits by branch closings.

In our regressions, we are primarily interested in explaining the cross sectional variation in interest rate spreads. Therefore, we aggregate monthly observations into annual average spreads for each cross sectional unit of observation. Using annual aggregates is preferred against higher frequencies for two reasons: firstly, the sluggishness of interest rate adjustments observed in the data would unnecessarily inflate standard errors of estimated coefficients if monthly observations were used. Secondly, we observe most of our market level covariates at an annual frequency only.

Given the limited number of yearly observations in each sample period and the difficulties arising from time invariant covariates, we refrain from using panel data estimation techniques. Instead we use pooled instrumental variable regressions allowing for arbitrary correlation of standard errors of observations for individual banks.

In the following, we discuss our empirical results for customer deposits, retail loans to households and short-term loans to enterprises.

### *Customer deposits*

Tab. 4 summarizes our results for the early 1990s explaining bank interest rate spreads for short-term time deposits with a maturity of up to three months. As indicated by our coefficients for *HERF* and *LERNER*, there are statistically and economically significant competitive effects in pricing retail deposits. According to these results, a standard deviation move in market Herfindahl (based on the full distribution of Herfindahl indices across local

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<sup>24</sup> See Evans et. al. (1993). Given that *LERNER* itself is an estimate containing an error component, TSLS addresses this issue as well.

<sup>25</sup> Approximated by the sum of the number of banks per district in 1995 and the cumulated number of mergers between banks registered within the district since 1985 up to 1995.

<sup>26</sup> As common, we checked for the relevance of our instruments using the F-statistic of the first stage regression where we always obtained values well in excess of 10 (only in specifications for short-term loans to enterprises including bank specific control variables the first stage regression for *LERNER* renders an F-statistic of 9.5 concerning two specifications in tab. 8 – with statistically insignificant coefficients for *LERNER* – and one specification in tab.7 yielding a highly significant coefficient for *LERNER*).

markets in Germany in 1995) increases banks' gross spread by 16 bp (given average spreads for that period of about 150 bp). In comparison a similar exercise based on our results for the Lerner index yields an increase in gross spreads of about 18 bp.

With respect to market level covariates expected to proxy for demand side factors, we have already pointed to difficulties in interpreting signs of the estimated coefficients further above. Market fragmentation reflected by the variable *FRAGM* tends to increase gross spreads but remains insignificant at conventional levels of significance. The impact of unemployment and disposable income are in general difficult to interpret as they might influence banks' margins through different channels. Replacing *HERF* by *LERNER* wipes out any effect of demand side variables as discussed further above.

While we do not report coefficients for time dummies, it is worth mentioning that for retail deposits the time effects are extraordinarily strong. This is partly due to stickiness of retail time deposit rates leading to narrowing margins as interest rates decline steadily as was the case in our sample period 1992 to 1995.<sup>27</sup> In addition to this there is anecdotal evidence that competition for retail deposits significantly increased at the beginning of the 1990s as more and more retail customers shifted funds to money market mutual funds based in Luxembourg.<sup>28</sup>

Comparing these results to the ones for recent MIR data also summarized in Tab 4, our latter findings indicates that ten years later local competition in retail deposit market still matters. A one standard deviation move in both indicators of market competition yields an estimated widening of the interest rate spreads in the range of 17 to 19 bp depending on model specification. Contrasting this with the average spread for this period of around 23 bp leads us to conclude that banks' local franchise in retail deposit has potentially grown even more valuable over the last decade. Apart from a regional dummy for the northern states further local variables did not prove to be significant. With respect to the bank specific variables, total assets and the ratio of loan commitments to total customer loans (*COMMIT*) have been significant only for the specification with the Herfindahl index.<sup>29</sup> Here again the effect of loan commitments as a potential proxy for the demand faced by banks in the particular market might well be captured by the Lerner as a compound measure of banks' pricing power. In a

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<sup>27</sup> Going back to the pre 1992 period, we find exactly the opposite of widening margins as market rates steadily increased in Germany from 1989 to 1992.

<sup>28</sup> In 1994, money market mutual funds were allowed to operate in Germany leading to an instant and significant decline in bank deposit margins (Fischer/Pfeil (2004)).

<sup>29</sup> The significance of *COMMIT* would lend some support for the theory advocated by Kashyap et. al. (2002) in that more commitment lending leads banks to bid up for liquid deposits.

similar vain, for the regional banks in our sample total assets might be a good proxy for local market share potentially already better captured by the Lerner index than the Herfindahl.

### *Loans to private households*

Findings of a preliminary univariate analysis (not reported here) suggest a strong and counter intuitive pattern of competitive effects on consumer loan pricing displaying lower loan rates in markets classified as being less competitive. For the early 1990s, multivariate regression results display some tendency confirming the results of univariate analysis; large standards errors partly contributable to the non standard estimation of the covariance matrix render these findings statistically insignificant.

Using MIR data for the years 2003 to 2006, these effects, however, vanish as we control for further socio-geographic structuring of the local market (see tab 5). Nevertheless, local market fragmentation (*FRAGM*) has a significant negative impact on banks' spreads for consumer loans leaving part of the counter intuition unsolved and open for further research.<sup>30</sup>

To test whether branching strategies of rather aggressive retail focused non-regional banks might help resolve this puzzle, we compiled data on branching and local market presence of three of the most important banks of this type. Accounting for their market presence, however, did not add any explanatory power to our model or diminish the effect of market fragmentation.

To account for a major factor of delinquency in household loan repayment, we consider changes in local unemployment in our regressions, which, however, at the same time affect the demand for consumer loans leaving the expected sign of coefficients indeterminate. For the early 1990s, we find an unexpectedly strong depressing impact of changes in unemployment. At least for that period a likely explanation for our findings based on anecdotal evidence might be as follows: while consumer loans for many banks have only been a marginal product until very recently, this product in the 1990s has frequently been used as a means to restructure troubled household debt often at below market rates. This might partly explain the depressing effect of an increase in local unemployment on banks' loan margins as indicated by the results in table 5. However, for the more recent estimates (again tab. 5), we find an opposite tendency which might reflect the increased willingness of banks to lend to subprime household customers; this especially holds for long-term consumer loans.

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<sup>30</sup> Unfortunately, there are only a few contributions to the academic literature addressing the pricing for consumer loans (e.g. Lown/Peristiani (1996) and Khan et. al. (2006) generally find significant positive effects of market concentration on consumer loan rates).

For private housing loans with a maturity of five to ten years, average spreads are rather thin amounting to 95bp for the period of 2003-2006 (105bp for the earlier sample period). Moreover, housing loan spreads exhibit only low cross sectional variation. In neither sample period do we find a meaningful effect of standard measures of the competitiveness of a local market. For the mid 1990s our empirical model is barely able to explain any variation across local markets in Germany. While we find a moderate widening of margins in 1993 to 1995 as compared to 1992, the data indicate comparatively immediate adjustment of mortgage rates to innovations in market interest rates. For the more recent period robust statistical significance of per capita income and changes in unemployment might be indicative of a higher price sensitivity of wealthier and more sophisticated customers on the one hand and an inward shift in market demand curves respectively.

#### *Short-term loans to enterprises*

Next we analyze gross interest rate spreads of loans to enterprises. Unfortunately, the data only allow for a ten year comparison for current account credit (for the 1992 to 1995 period) and “overdraft credit” (including current account credit) for the 2002 to 2006 period. While banks’ short-term lending to firms makes up the smaller part of total bank lending to the corporate sector on an aggregate stock basis, the provision of liquidity is an important business for the banking sector and a crucial factor of corporate financing; especially, when internally generated cash flow is low enterprises resort to banks to bridge the temporary cash short-fall. The former Bundesbank bank interest rate statistics provided differentiated data for smaller and larger denominations.<sup>31</sup> Overdraft credit covered by the MIR statistics does neither specify denominations nor customer size.

For the 1990s the exercise of market power in banks’ SME loan business seems to be a well established empirical fact.<sup>32</sup> In our analysis for the early 1990s, we consider rates charged on small denomination current account credit (up to 500,000 Euro) and for larger denominations (from 500,000 to 2.5 mill Euro). As indicated by the results listed in tab. 7, there was a strong effect of local bank market power on the cross sectional distribution of loan rates in Germany. For instance, a coefficient of 9.3 for local market Herfindahl (*HERF*) translates into 81 bp widening of a gross spread for one standard deviation shift in the local Herfindahl. Similar comparative statics for our estimates of the local Lerner index (*LERNER*) yield 98 bp for a

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<sup>31</sup> However, even larger denominations were only covered up to denominations of 2.5 mill Euro.

<sup>32</sup> This especially true for local banking markets in the U.S. (see for instance Hannan (1991), Petersen/Rajan(1994, 1995); by contrast, for European banking markets there are only a few contributions (a.o. Degryse/Ongena (2005), Sapienza (2004)).

one standard deviation shift. With average gross spreads ranging from 4.2 (1992) to 6.4 (1995) for smaller denominations and 2.5 (1992) to 4.2 (1995) for larger denominations these effects of market power are substantial by any measure. Surprisingly, for larger denominations of current account loans we find even stronger price effects ranging from 153 bp to 158 bp for one standard deviations of *HERF* and *LERNER* respectively. While it is generally perceived that smaller borrowers are more strongly exposed to market power exercised by banks, this finding is somewhat at odds with conventional wisdom. The control variables introduced generally exhibit low explanatory power.

To compare these results with more recent data, we have to rely on a product category covered by the recent MIR statistics that comes closest to the earlier definitions. Here, we focus on overdraft credits containing current account credits but not being limited to them. Therefore, findings to some extent lack full comparability to the aforementioned results. Nevertheless, we consider these differences in underlying product characteristics to be of minor importance and not to invalidate inference to be drawn with respect to the impact of local market factors. We find significant effects of competition indicators for overdraft credits while among the local controls only insolvencies enter highly significantly into specifications containing *HERF* and bank-specific variables remain insignificant. Comparative statics reveal that banks' potential to exercise market power over customers with highly flexible short-term liquidity needs has not declined over the ten year period considered. A one standard deviation move in *HERF* or *LERNER* still marks an economically meaningful change in spreads in the range of 114 bp and 126 bp. This interesting finding is consistent with the notion that banks have an ultimate franchise in liquidity provision and that rents earned there are less exposed to outside competition.<sup>33</sup>

To check whether these results carry over to other loan categories including at least some liquidity components, we additionally analyze corporate loans with an initial interest rate fixation of less than one year. Here, we only find some limited influence of local competition for smaller denominations of up to one mill Euro (see tab. 8) being statistically significant at conventional levels for one specification. For larger denominations we find no such impact independent of the type of specification chosen. Our covariates measured at the market level generally fail to appropriately account for demand side effects. Variables covering bank specific effects such as the ratio of provisions to customer loans, loans to deposits or the term

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<sup>33</sup> See Kashyap et. al. (2002) and Gatev/Strahan (2005) for theoretical and empirical evidence supporting this conjecture.

structure within the banks' loan portfolio by contrast enter our regressions significantly with the expected signs.

Overall, our results for overdraft credits to enterprises indicate that banks' ability to exercise market power seems to be limited to instances where enterprises have short-term liquidity needs. It is reasonable to assume that here price elasticity of demand is comparatively low.

## 4. Conclusions

In this paper we have analyzed local determinants of banks' pricing behavior over a ten year period in Germany. Our findings suggest that the impact of local market power of banks still matters for short-term time deposits and overdraft credit to enterprises. In particular banks still seem to be able to exercise market power in concentrated local banking markets whenever they act as providers of liquidity services. Our findings lend support to this notion both for loans and deposit products alike. On the asset side of banks' balance sheets, according to theory, liquidity provision to opaque borrowers is an especially information sensitive business. This highlights the relevance of bank-borrower relationship and banks' incentives to invest in proprietary borrower related private information. The literature has pointed to the subtle interrelations between information intensity and bank market power.<sup>34</sup> Banks with market power are more willing to invest up-front into borrower related private information which in turn makes them a unique source of liquidity especially in situations of cash shortages. On the other side of the bank balance sheet, banks are still unique in providing very short term investment vehicles – demand deposits and very short term time deposits – to provide liquidity insurance to their customers. While near-banks and non-bank providers of financial services now compete in many traditional banking areas, short term deposit products are still offered almost exclusively by banks.

For other retail products like consumer loans and retail mortgages, we find no direct effect of banks' local market power in either sub-period, while the data display some sensitivity to factors likely to affect the shape of demand. Overall, our findings add support to the notion that markets for liquidity provision could not easily be threatened by market entry of non-bank financial services providers.

With respect to the Commission's harmonization approach, for several banking products analyzed we find local economic and socio-geographic determinants to significantly explain

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<sup>34</sup> See Petersen/Rajan (1995), Cetorelli and Gambera (2001), and Fischer (2000).

part of the observed price dispersion at the national level. As our results seem to lend support to the notion of some banking markets being inherently local, it will be interesting to observe and analyze the effects of the European harmonization agenda in retail banking. One interpretation of our results could be that policy action aimed at fostering cross-border acquisition of banking assets and brands might have a more pronounced effect on market integration than any attempt to harmonize retail banking products and their legal framework.

## References

- Amel, D.F. and Starr-McCluer, M. (2002): "Market definition in banking: recent evidence", *The Antitrust Bulletin*, Spring, pp. 63-89.
- Borenstein, S. (1989): "Hubs and high fares: Dominance and market power in the US airline industry", *Rand Journal of Economics*, Vol. 20, pp. 344-365.
- Berger, A.N., Hannan, T.H. (1989): "The price concentration relationship in banking", *Review of Economics and Statistics*, S. 291-299.
- Cetorelli, N. and Gambera, M. (2001): "Banking market structure, financial dependence and growth: International evidence from industry data", *Journal of Finance* 56, pp. 617-648.
- Corvoisier, S. and Gropp, R. (2002): "Bank Concentration and Retail Interest Rates", *Journal of Banking and Finance*, Vol. 26, pp. 2155-2189.
- Degryse, H. and Ongena, S. (2005): "Distance, Lending Relationships, and Competition", *Journal of Finance*, Vol. 60, No. 1, pp. 231-266.
- Demirgüç-Kunt, A., Laeven, I., and Levine R. (2003): "The impact of bank regulations, concentration and institutions on bank margins", Working Paper World Bank, Washington .
- Dick, A.A. (2007): "Market Size, Service Quality, and Competition in Banking", *Journal of Money, Credit and Banking*, Vol. 39, No. 1, pp. 49-81.
- Evans, W.N., Froeb, L.M. and Werden, G.J. (1993): "Endogeneity in the concentration-price relationship: Causes consequences, and cures" , *Journal of Industrial Economics* 38, No. 4, S. 431-438.
- Gatev, E. and Strahan, P. (2005): "Banks' advantage in hedging liquidity risk: theory and evidence form the commercial paper market", *Journal of Finance*, Vol. 60, pp.
- Fischer, K.-H. (2000): "Acquisition of information in loan markets and bank market power – An empirical investigation", mimeo, University of Frankfurt.
- Fischer, K.-H. (2002): *Banken und unvollkommener Wettbewerb – Empirische Beiträge zu einer Industrieökonomik der Finanzmärkte*, unpublished doctoral dissertation, Goethe-University, Frankfurt, Germany.
- Fischer, K.-H. and Hempell, H.S. (2006): "Regional Markets, Oligopoly, and Market Power in Banking", Deutsche Bundesbank, Research Center, discussion paper forthcoming.

- Fischer, K.-H. and Pfeil, C. (2004): "Regulation and Competition in German Banking: An Assessment", in: Krahen, J.P. and Schmidt, R.H. (eds.), *The German Financial System*, Oxford University Press, pp. 293-340.
- Giovannini, A. and Mayer, C. (1991) (eds.), *European Financial Integration*, Oxford University Press.
- Hannan, T. (1991): "Bank commercial loan markets and the role of market structure: evidence from surveys of commercial lending", *Journal of Banking and Finance*, Vol. 15, pp. 133-149.
- Hempell, H.S. (2002): "Testing for competition among German banks", Deutsche Bundesbank, Frankfurt a. M., Working Paper, No. 4/02.
- Kashyap, A.K., Rajan, R., and Stein, J. (2002): "Banks as liquidity providers: an explanation of the coexistence of lending and deposit taking", *Journal of Finance*, Vol. 57, pp. 33-73.
- Khan, C., Pennacchi, G., and Sopranzetti, B. (2006): "Bank consolidation and the dynamics of consumer loan interest rates", *Journal of Business*, Vol.
- Lach, S. (2002): "Existence and persistence of price dispersion. An empirical analysis", *Review of Economics and Statistics*, August 2002.
- Lown, C., and Peristiani, S. (1996): "The behavior of consumer loan rates during the 1990 credit slow down", *Journal of Banking and Finance*, Vo. 20, pp. 1673-1694.
- Maudos, J., Fernandez de Guevara, J. (2004): "Factors explaining the interest margin in the banking sectors of the European Union", *Journal of Banking and Finance*, Vol. 28, pp. 2259-2281.
- Pan, X., Ratchford, B.T., and Shankar, V. (2003): "Price dispersion on the Internet: A review and directions for future research", Working Paper Indiana University.
- Petersen, M.A. (2004): "Information: hard and soft", working paper North Western University.
- Petersen, M.A. and Rajan, R.G. (1994): "The benefits of lending relationships: Evidence from small business data", *Journal of Finance*, Vol. 49, pp. 3-37.
- Petersen, M.A. and Rajan, R.G. (1995): "The effect of credit market competition on lending relationships", *Quarterly Journal of Economics*, Vol. 110, pp. 407-433.
- Petersen, M.A. and Rajan, R.G. (2002): "Does distance still matter? – The informational revolution in small business lending", *Journal of Finance*, Vol. 57, pp. 2533-2570.

Sapienza, P. (2004): "The Effects of Government Ownership on Bank Lending", *Journal of Financial Economics*, Vol. 72, pp. 357-384.

Valverde, S.C., Fernandez, F.R. (2007): "The determinants of bank margins in european banking", *Journal of Banking and Finance*, forthcoming.

Weth, M.A. (2002): "The pass-through from market interest rates to bank lending rates in Germany", Deutsche Bundesbank, Economic Research Centre, Discussion paper No. 11/02.

# Appendix

## Definitions of main variables in detail:

**LERNER** = local Lerner indices: calculated averages of estimated Lerner indices of local banks based on an empirical cost approach taking account of bank individual effects (calculated from cooperative banks and savings banks only).

**HERF** = local Herfindahl-Hirshman index calculated on the basis of branch data

**PCINCOME** = lagged local disposable income per capita

**DUNEMPL** = lagged local unemployment per capita

**INSOLV** = local number of insolvencies relative to number of manufacturing firms

**CITY** = dummy variable indicating urban regions

**FRAGM** = count variable for the number of regional centers indicating market fragmentation

**TASSET** = total assets

**LOANDEP** = ratio of customer loans to customer deposits

**COMMIT** = loan commitments to customer loans

**LIQUSTR** = sight deposits and short-term time deposits relative to interbank deposits

**LOANSTR** = short term customer loans to overall customer loans

**LOANLOSS** = depreciation and write-down on receivables and certain securities and additions to provisions for the loan business relative to customer loans

**NORTH** = dummy variable indicating northern states

**EAST** = dummy variable indicating new eastern German states and Berlin

**Table 1: Sample descriptives of gross interest rate spreads for regional sub sample of MIR statistics (2003-2006)\***

	<b>mean</b>	<b>sd</b>	<b>#obs</b>
<b>short-term time deposits by private households</b>	0.230	0.297	377
<b>short-term time deposits by enterprises</b>	0.219	0.162	353
<b>medium-term consumer loans</b>	3.563	1.440	347
<b>long-term consumer loans</b>	2.877	1.451	339
<b>private housing loans (5 to 10 years)</b>	0.951	0.243	374
<b>corporate overdraft credits</b>	5.654	1.466	382
<b>short-term corporate loans (<math>\leq</math> 1 mill. Euro)</b>	2.338	0.804	353
<b>short-term corporate loans (<math>&gt;</math> 1 mill. Euro)</b>	1.354	0.449	195

Source: MIR statistics of Deutsche Bundesbank, own calculations.

\*Including 97 regionally active banks reporting to the Bundesbank MIR statistic using yearly averages by bank; sample period 01/2003 to 09/2006.

**Table 2: Sample descriptives of gross interest rate spreads for previous bank interest rate statistics (1992-1995)\***

	<b>mean</b>	<b>sd</b>	<b>#obs</b>
<b>short-term time deposits by private households</b>	1.499	0.493	1216
<b>medium-term consumer loans</b>	7.280	1.280	972
<b>mortgage loans (10 years)</b>	1.227	0.222	491
<b>current account credit (<math>\leq</math> 500,000 Euro)</b>	5.537	1.369	1157
<b>current account credit (<math>&gt;</math> 500,000 and <math>\leq</math> 2.5 mill. Euro)</b>	3.640	1.151	572

Source: previous bank interest rate statistics of Deutsche Bundesbank, own calculations.

\*Including 304 bank branches which reported to the Bundesbank bank interest rate statistic using yearly averages by bank, sample period 1992 to 1995.

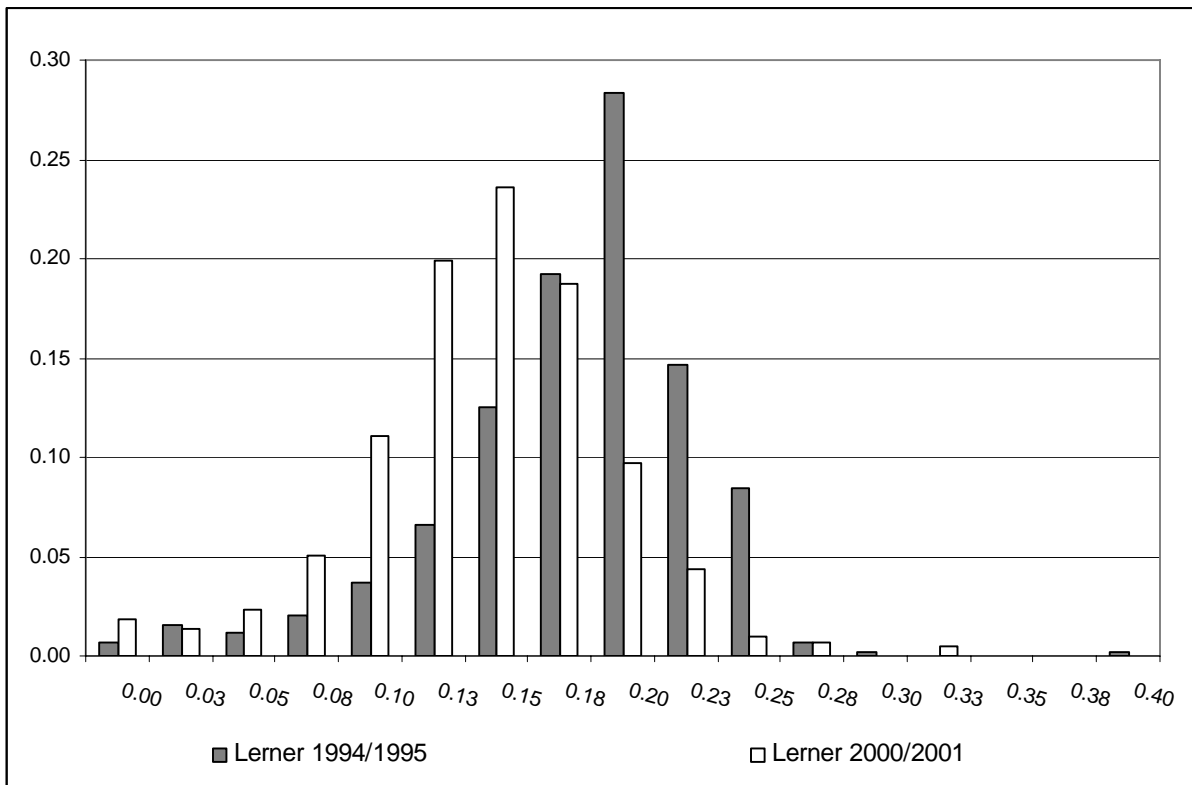
**Table 3: Local market structure variables**

	Lerner index ( <i>LERNER</i> ) <sup>1</sup>		Herfindal index ( <i>HERF</i> ) <sup>2</sup>	
	1994-1995	2000-2001	1996	2000
<b>mean</b>	0.168	0.131	0.219	0.237
<b>median</b>	0.178	0.134	0.210	0.222
<b>sd</b>	0.053	0.051	0.087	0.098

<sup>1</sup> See pp. 5 for a closer description of the calculation method.

<sup>2</sup> Source: bank branch statistics of the Deutsche Bundesbank; own calculations. Calculation based on the number of bank branches per local market.

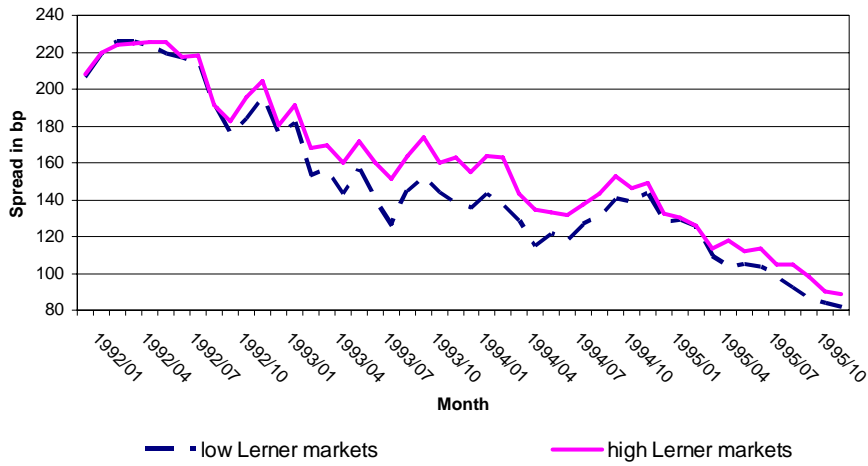
**Figure 1: Estimated Lerner indices for the 1994/1995 and 2000/2001 sub-periods**



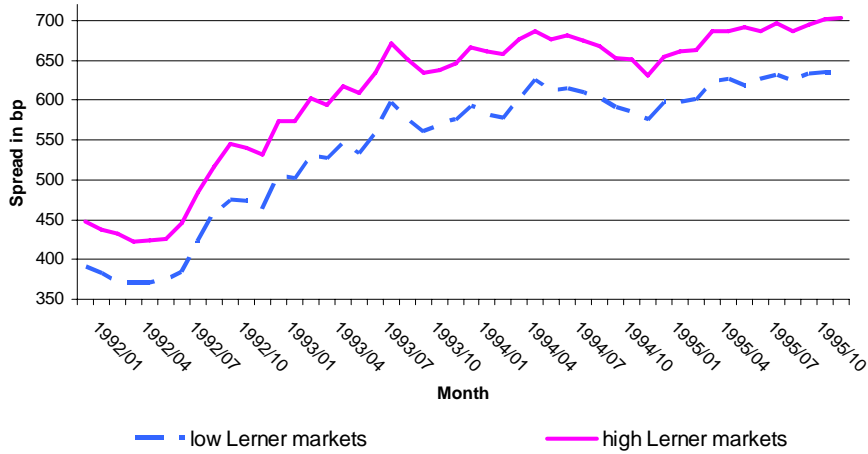
Source: Fischer/Hempell (2006)

### Figures 2 to 4:

**Gross Spreads for Time Deposits (1992 to 1995)**



**Current Account Credit - Small (1992 to 1995)**



**Current Account Credit - Large (1992 to 1995)**

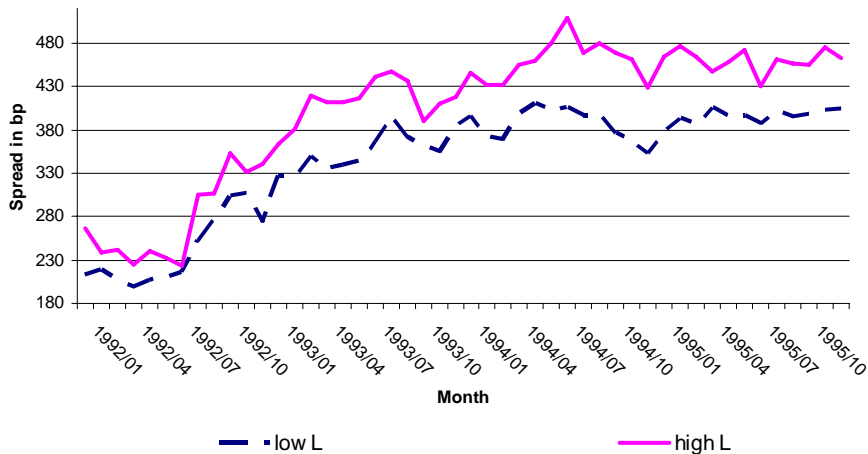


Table 4

	1992 – 1995 <sup>1</sup>		2003-2006 <sup>2</sup>							
	short-term time deposits (up to 50,000 Euros)		short-term time deposits							
			private households				enterprises			
<i>LERNER</i>	3.555** (2.19)		3.272** (2.04)		3.792** (2.35)		1.856* (1.68)		1.6777 (1.52)	
<i>HERF</i>		1.873** (2.12)		1.362** (2.35)		1.707*** (2.85)		.8002* (1.71)		.8067 (1.49)
<i>PCINCOME</i>	.000009 (1.01)	.000015 (1.52)	-.000001 (.04)	.000015 (1.14)	-.000007 (-.53)	.000006 (.44)	-.000002 (.15)	.000007 (.94)	.000000 (.09)	.000006 (.75)
<i>DUNEMPL</i>	.0100 (.80)	.0280* (1.75)	4.267 (1.35)	2.441 (.89)	3.999 (1.16)	.8984 (.31)	3.0560 (1.49)	2.0289 (1.16)	3.2264 (1.54)	1.7310 (.96)
<i>FRAGM</i>	-.0079 (-.72)	.0201 (1.48)	-.0126 (-1.05)	-.0089 (-.89)	-.0132 (-1.07)	-.0109 (-1.03)	-.0118 (-1.34)	-.0090 (-1.43)	-.0112 (1.37)	-.0099 (-1.55)
<i>CITY</i>	-.0313 (-.51)	.0621 (1.13)	.1325 (1.44)	.0719 (1.04)	.1320 (1.50)	.0711 (1.06)	.0570 (1.05)	.0249 (.77)	.0529 (1.03)	.0272 (.85)
<i>TASSETS</i>					.000000 (1.17)	.000000** (2.03)			-.000000 (-.70)	-.000000 (-1.13)
<i>COMMIT</i>					-.2670 (-.43)	-1.0209* (-1.89)			.1254 (.50)	-.1896 (-.96)
<b>constant</b>	.0865 (.17)	-.2017 (-.33)	-.1949 (-.58)		-.1324 (-.35)	-.0835 (-.21)	.0052 (.02)	-.0409 (-.20)	-.0286 (-.13)	.0047 (.02)
<b>dummies for states / regions</b>	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
<b>time dummies</b>	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
<b># observations</b>	1,216	1,216	377	377	377	377	353			
<b>F(18, 317)</b>	140.05	138.33								
<b>F(10, 96)</b>			10.73	11.22						
<b>F(12, 96)</b>					8.98	10.68				
<b>F(10, 93)</b>							13.31	13.14		
<b>F(12, 93)</b>									10.89	11.55

\* Dependent variable: yearly averages of monthly mean in gross spread of reported deposit rates; instrumental variable regressions (2SLS); instruments for competition / market structure variables: approximated number of banks in the market as of 1985 and regressors listed above; standard errors corrected for clustered sampling at individual bank / branch level; t-values in parentheses. \*, \*\*, \*\* denote significance at the 10%, 5%, and 1% level, respectively.

<sup>1</sup> Based on data from previous bank interest rate statistics from the Deutsche Bundesbank. – <sup>2</sup> Based on German data from the new MIR statistics of the Eurosystem.

Table 5

	1992-1995		2003-2006							
	consumer loans (24 to 48 months)		consumer loans							
			medium-term				longer-term			
<i>LERNER</i>	-8.018 (-1.27)		.0330 (.00)		-5.596 (-.50)		-4.756 (-.41)		-8.201 (-.72)	
<i>HERF</i>		-3.324 (-1.28)		.0137 (.00)		-2.425 (-.49)		-2.129 (-.41)		-3.763 (-.79)
<i>PCINCOME</i>	.000012 (.60)	.000015 (.75)	-.000057 (-.54)	-.000057 (-.82)	.000006 (.06)	-.000025 (-.38)	-.000033 (-.31)	-.000063 (-.82)	.000008 (.07)	-.000041 (-.55)
<i>DUNEMPL</i>	-.8271** (-2.14)	-.8703** (-2.31)	2.7380 (1.30)	2.740 (1.26)	3.201 (1.55)	2.862 (1.31)	4.324** (2.20)	3.843* (1.68)	4.879** (2.49)	4.106* (1.76)
<i>FRAGM</i>	-.0017 (-.04)	-.0404 (-1.50)	-.1970** (-2.33)	-.1969*** (-3.01)	-.1733** (-2.03)	-.1897*** (-2.77)	-.1830** (-2.26)	-.1970*** (-3.22)	-.1720** (-2.12)	-.1947*** (-3.07)
<i>CITY</i>	.3516** (2.47)	.1364 (.74)	.5229 (1.14)	.5222 (1.64)	.2726 (.63)	.3840 (1.18)	.2643 (.54)	.3850 (1.19)	.1056 (.22)	.2997 (.91)
<i>LOANDEP</i>					-1.3181** (-2.43)	-1.4100** (-2.27)			-0.8579 (-1.64)	-0.9773* (-1.69)
<i>LIQUSTR</i>					-.1177*** (-2.92)	-.1194*** (-2.69)			-.0825** (-2.16)	-.0846** (-2.14)
<b>constant</b>	8.831*** (7.13)	8.315*** (9.00)	4.076*** (3.32)	4.073*** (2.88)	5.195*** (4.31)	5.680*** (3.58)	3.628*** (2.87)	4.046** (2.43)	4.324*** (3.52)	5.126*** (2.84)
<b>dummies for states / regions</b>	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
<b>time dummies</b>	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
<b># observations</b>	972		347				339			
<b>F(18, 264)</b>	143.38	143.16								
<b>F(10, 90)</b>			9.61	9.61						
<b>F(12, 90)</b>					8.43	8.47				
<b>F(10, 90)</b>							4.48	4.49		
<b>F(12, 90)</b>									4.11	4.05

\* Dependent variable: yearly averages of monthly mean in gross spread of reported loan rates; instrumental variable regressions (2SLS); instruments for competition / market structure variables: approximated number of banks in the market as of 1985 and regressors listed above; standard errors corrected for clustered sampling at individual bank / branch level; t-values in parentheses. \*, \*\*, \*\*\* denote significance at the 10%, 5%, and 1% level, respectively.

<sup>1</sup> Based on data from previous bank interest rate statistics from the Deutsche Bundesbank. – <sup>2</sup> Based on German data from the new MIR statistics of the Eurosystem.

**Table 6**

	1992 - 1995		2003-2006			
	private mortgage loans (10 years)		private housing loans (5 to 10 years)			
<i>LERNER</i>	-1.163 (-.76)		-.0225 (-.02)		.0872 (.09)	
<i>HERF</i>		-.4926 (-.78)		-.0087 (-.02)		.0348 (.09)
<i>PCINCOME</i>	.000001 (.11)	.000001 (.23)	-.000033*** (-3.02)	-.000033*** (-3.55)	-.000035*** (-3.31)	-.000034*** (-3.60)
<i>DUNEMPL</i>	.0620 (.58)	.0631 (.60)	-.4965* (-1.87)	-.4980* (-1.89)	-.5219** (-2.00)	-.5167** (-2.00)
<i>FRAGM</i>	.0049 (.88)	.0002 (.04)	.0059 (.63)	.0058 (.74)	.0041 (.43)	.0044 (.55)
<i>CITY</i>	-.0419 (-1.26)	-.0726 (-1.38)	.0330 (.59)	.0334 (.79)	.0418 (.78)	.0340 (.97)
<i>LOANDEP</i>					.0755 (1.22)	.0775 (1.29)
<i>LIQUSTR</i>					-.0020 (-.16)	-.0017 (-.14)
<b>Constant</b>	1.277*** (3.79)	1.193*** (4.98)	1.287*** (7.52)	1.289*** (6.89)	1.244*** (6.23)	1.237*** (5.52)
<b>dummies for states / regions</b>	yes	yes	yes	yes	yes	yes
<b>time dummies</b>	yes	yes	yes	yes	yes	yes
<b># observations</b>	491		374			
<b>F(18, 160)</b>	10.49	10.41				
<b>F(10, 94)</b>			43.23	43.55		
<b>F(12, 94)</b>					40.57	39.09

\* Dependent variable: yearly averages of monthly mean in gross spread of reported loan rates; instrumental variable regressions (2SLS); instruments for competition / market structure variables: approximated number of banks in the market as of 1985 and regressors listed above; standard errors corrected for clustered sampling at individual bank / branch level; t-values in parentheses. \*, \*\*, \*\*\* denote significance at the 10%, 5%, and 1% level, respectively.

<sup>1</sup> Based on data from previous bank interest rate statistics from the Deutsche Bundesbank.

<sup>2</sup> Based on data from the new German MIR statistics of the Eurosystem.

**Table 7**

	1992 - 1995				2003 - 2006			
	current account credit				overdraft credit to enterprises			
	less than 500,000 Euro		500,000 to 2.5 mill. Euro					
<b>LERNER</b>	18.600*** (2.96)		29.101** (2.25)		22.239** (2.35)		20.378** (2.17)	
<b>HERF</b>		9.301*** (2.92)		18.185** (2.02)		12.927** (2.57)		12.032** (2.35)
<b>PCINCOME</b>	-.000031 (-1.11)	.000007 (-.20)	.000075 (1.17)	.000146 (1.64)	-.000131 (-1.29)	.000023 (.35)	-.0001257 (-1.20)	.000001 (.01)
<b>DUNEMPL</b>	-.0394 (-.96)	.0454 (.86)	.0404 (.56)	.2976** (2.15)				
<b>INSOLV</b>					.0160 (.11)	.2804*** (2.63)	.0166 (.11)	.2642** (2.19)
<b>FRAGM</b>	-.0192 (-.40)	.1259** (2.34)	-.1069 (-.88)	.2029 (1.08)	-.0457 (-.51)	.0717 (.93)	-.0505 (-.48)	.0598 (.68)
<b>CITY</b>	-.2350 (-1.12)	.2675 (1.29)	-.7350* (-1.79)	.5005 (1.16)	1.0859** (2.12)	.5077 (1.51)	1.0558** (2.00)	.5735 (1.64)
<b>LOANDEP</b>							-.1715 (-.24)	.1653 (.31)
<b>LOANLOSS</b>							-3.5740 (-1.16)	6.6151 (.32)
<b>LOANSTR</b>							-.82560 (-1.17)	.3692 (.09)
<b>constant</b>	2.245 (1.32)	2.521 (1.56)	-3.799 (-1.01)	-6.663 (-1.26)	4.209*** (2.64)	.7205 (0.44)	5.091***	1.538 (.77)
<b>dummies for states / regions</b>	yes	yes	yes	yes	yes	yes	yes	yes
<b>time dummies</b>	yes	yes	yes	yes	yes	yes	yes	yes
<b># observations</b>	1157		572		382		287	
<b>F(18, 303)</b>	145.11	132.87						
<b>F(18, 169)</b>			36.97	36.41				
<b>F(10, 96)</b>					8.92	9.67		
<b>F(12, 96)</b>							2.06	2.67

\* Dependent variable: yearly averages of monthly mean in gross spread of reported loan rates; instrumental variable regressions (2SLS); instruments for competition / market structure variables: approximated number of banks in the market as of 1985 and regressors listed above; standard errors corrected for clustered sampling at individual bank / branch level; t-values in parentheses. \*, \*\*, \*\*\* denote significance at the 10%, 5%, and 1% level, respectively.

<sup>1</sup> Based on data from previous bank interest rate statistics from the Deutsche Bundesbank. – <sup>2</sup> Based on German data from the new MIR statistics of the Eurosystem.

**Table 8**

	2003 - 2006							
	short-term loans to enterprises (up to one year)							
	Small ( $\leq$ 1 mill. Euro)				larger ( $>$ 1 mill. Euro)			
<i>LERNER</i>	6.881 (1.09)		8.460 (1.53)		-.6100 (-.25)		1.778 (.73)	
<i>HERF</i>		3.631 (1.17)		4.869* (1.71)		-.3663 (-.25)		1.174 (.68)
<i>PCINCOME</i>	.000003 (-.06)	.000039 (.74)	.000004 (.08)	.000049 (.94)	.000024 (.90)	.000019 (.90)	.000000 (.03)	.000016 (.65)
<i>INSOLV</i>	-.0491 (-.66)	.0278 (.47)	-.0345 (-.50)	.0641 (1.18)	-.0067 (-.25)	-.0150 (-.41)	-.0211 (-.69)	.0072 (.17)
<i>FRAGM</i>	-.0920** (-2.18)	-.0600** (-2.04)	-.0928* (-1.92)*	-.0459 (-1.42)	-.0612*** (-2.67)	-.0642*** (-2.22)	-.0810*** (-3.21)	-.0725*** (-4.02)
<i>CITY</i>	.4342** (2.07)	.3044** (1.99)	.4812** (2.09)	.3276* (1.71)	.0076 (.06)	.0235 (.23)	.1269 (.87)	.0801 (.74)
<i>LOANDEP</i>			-.9906*** (-3.25)	-.0536*** (-2.81)			-.0640 (-.39)	.01305 (.07)
<i>LOANLOSS</i>			35.507** (2.43)	32.101** (2.08)			11.206 (1.37)	11.294 (1.23)
<i>LOANSTR</i>			2.956 (1.57)	3.810** (2.07)			3.522* (1.88)	3.364* (1.81)
<b>constant</b>	1.667* (1.69)	.8745 (.64)	1.530 (1.62)	.2304 (.17)	1.149*** (2.91)	1.249** (2.25)	.8080** (2.04)	.3533 (.41)
<b>dummies for states / regions</b>	yes	yes	yes	yes	yes	yes	yes	yes
<b>time dummies</b>	yes	yes	yes	yes	yes	yes	yes	yes
<b># observations</b>	353		270		195		157	
<b>F(10, 95)</b>	6.74	7.74						
<b>F(12, 94)</b>			4.18	4.71				
<b>F(10, 66)</b>					2.62	2.66		
<b>F(12, 93)</b>							3.40	3.54

\* Dependent variable: yearly averages of monthly mean in gross spread of reported loan rates; instrumental variable regressions (2SLS); instruments for competition / market structure variables: approximated number of banks in the market as of 1985 and regressors listed above; standard errors corrected for clustered sampling at individual bank / branch level; t-values in parentheses. \*, \*\*, \*\*\* denote significance at the 10%, 5%, and 1% level, respectively.

<sup>1</sup> Based on data from previous bank interest rate statistics from the Deutsche Bundesbank. – <sup>2</sup> Based on German data from the new MIR statistics of the Eurosystem.