Deposit Guarantees and Distributional Effects of Monetary Policy on Bank Lending*

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Abstract

This paper presents evidence of a bank-lending channel in the Polish banking system that is distinguished by differentially applied explicit deposit insurance guarantees. Banks with an explicit partial guarantee have a stronger loan response to monetary policy (forming a lending channel) than banks with explicit full guarantees. Furthermore, evidence shows that the weak response of fully guaranteed banks may be attributed to their ability to raise low-reserve/uninsured time deposits relative to partially-covered banks. These results have implications for credit control, the distributional effects of monetary policy, loan quality, and the efficient development of banking in emerging financial markets.

JEL classification: E52, G21, G28

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1. Introduction

Financial liberalization in emerging market economies has led to increases in domestic savings and foreign capital inflows, contributing to rapid economic growth in these countries. The increased flow of funds, however, has frequently led to surges in bank credit accompanied by rapidly decreasing loan quality and inflation. This has posed a challenge for emerging markets since it is often argued that the credit booms and the accompanying misallocation of loans that follow financial liberalization can contribute to banking and currency crises, possibly resulting in high social costs.[1] Although bank supervision and regulation could play a major role in reducing this resultant credit misallocation, regulatory policy is usually weak and resistant to reform in emerging markets. Consequently, using monetary policy to restrain credit growth may not only be a way of controlling inflation, but also an expedient way to indirectly mitigate the problems of poor loan quality associated with credit booms. Monetary policy has frequently been used for this purpose, but has also often failed to control loan expansions.[2]

Although there may be several reasons why monetary policy has difficulty controlling credit growth in emerging markets, this paper offers the argument that full deposit guarantees granted to banks allow them to continue funding loans during contractionary policy, mitigating policy's effect on loans. Additionally, if deposit insurance favors some banks, contractionary policy can produce allocative effects where funds are redirected towards banks with the largest guarantees. In particular, when the differential application of deposit guarantees favors inefficient banks (e.g., state-owned banks), contractionary policy will result in a misallocation of funds toward inefficient banks, discouraging efficient intermediation, producing poor quality loans and hampering banking system development.

To illustrate our point, we follow the bank-lending channel literature, which argues for distributional effects of policy. Lending channel studies contend that banks with strong balance sheets have a low marginal cost of funds that they can access during contractionary policy, allowing them to continue growing their loans. Banks with weak balance sheets, on the other hand, respond to policy and form the lending channel. Thus, policy produces distributional effects distinguished

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[1] See e.g., Kaminsky and Reinhart (1999), and Schneider and Tornell (2000) on the relationship between lending booms and crises.

[2] See e.g., Durjasz and Kokszczynski (1997) for such a policy in Poland, and Spiegel (1995) for Korea.

by the strength of a bank's balance sheet. Instead of balance sheet strength, we assume that regulatory subsidies in the way of deposit insurance guarantees provide fully guaranteed banks with a low cost source of funds that allows them to continue growing loans, thereby mitigating their loan response to contractionary policy. The banks with partial guarantees, on the other hand, contract their loans in response to policy and form the bank-lending channel. Thus, we propose the testable hypotheses that contractionary policy affects the private sector loan growth of fully guaranteed banks less than that of partially guaranteed banks, and that contractionary policy affects the time deposit growth of fully guaranteed banks more than that of partially guaranteed banks.

While our hypotheses could apply to any banking system, they are particularly relevant to emerging financial markets (EFMs) for two reasons. First, in the initial stages of transformation, large parts of EFM banking systems are often covered under full guarantees, implying from our argument that monetary policy should have weak overall effects on bank loans. Indeed, this weak responsiveness is often a problem, despite the fact that a common EFM attribute of weak bank balance sheets should produce a strong effect through the traditional bank-lending channel. Secondly, the differential application of explicit or implicit full guarantees to protect weak and inefficient banks is a regular feature of EFMs. Consequently, contractionary monetary policy could encourage a reallocation of funds from efficient banks with strong balance sheets to inefficient banks with weak balance sheets, weakening the overall banking system. These possible results imply that the extent and distribution of regulatory guarantees should be carefully considered when implementing monetary policy.[3]

A discerning empirical test of our hypotheses requires data on a banking system that had explicit guarantees and that implemented those guarantees differentially across banks. The Polish banking system from the beginning of 1995 until the end of 1999 meets these criteria. The government instituted a two-tiered system in which three large state-owned banks were granted full explicit deposit guarantees while the remaining banks had explicit partial coverage. Our empirical results for the Polish banking system show that the private sector loan growth of banks with full explicit guarantees is less responsive to monetary policy than that of banks with partial coverage, when controlling for other factors that account for loan growth. Additionally, the time deposit growth of the fully covered banks is more responsive to policy than that of the partially guaranteed

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[3] In general, our results should obtain if any regulatory policy that affects loan growth is implemented differentially (e.g., differentially applied capital ratios or outright subsidies to some banks). However, the application of large and differentially implemented deposit guarantees is a policy that is pervasive in emerging financial markets.

banks. Thus, the fully guaranteed banks appear to be funding their continued loan growth by substituting low reserve time deposits for high reserve demand deposits. In the sample period after the middle of 1999, when the full guarantee was rescinded, we find that the differential effect of policy on loans disappears. This evidence is consistent with our hypotheses that differential guarantees allowed the fully covered banks a low cost funding advantage over the partially guaranteed banks, and permitted the fully covered banks to continue loan growth during contractionary policy. Since the fully guaranteed banks are among the most inefficient banks in Poland, the distributional effects of contractionary monetary policy should have encouraged a reallocation of funds to the most inefficient banks.[4]

This paper is organized as follows: Section 2 reviews literature on the bank-lending channel and on differentially applied deposit guarantees. Section 3 presents a theoretical model that illustrates how differential deposit guarantees can form a bank-lending channel. Section 4 contains an overview of the Polish banking system focused on credit growth, deposit guarantees and monetary policy. This section also presents the empirical model used to test our loan growth and time deposit funding hypotheses in the Polish banking system. Section 5 contains an explanation of the data and the empirical results. The final section concludes the paper.

2. Review of the Literature

2.1 The Bank Lending Channel

The bank-lending channel (BLC) literature stresses the distributional effects of monetary policy on bank loans arising from differential balance sheet strength/weakness between banks. In the BLC, it is argued that contractionary monetary policy pulls away required reserves, forcing banks to reduce reservable demand deposit funding for their loans. Due to asymmetric information problems, some banks may not be able to continue funding loans by substituting into non-reservable (or low reserve), uninsured time deposits that expose depositors to default risk.[5] However, if some banks can mitigate these information problems by conveying to depositors that they have a lower probability of default than other banks, they can raise time deposits at a lower cost than other banks

[4] Opiela et al. (1999) provide evidence that the fully guaranteed banks are among the most inefficient of all banks operating in Poland. See references therein for similar findings in other emerging market banking systems.

[5] Operation of the bank-lending channel often presupposes a link between deposits and loans. This link is motivated by Kashyap, Rajan and Stein (K-R-S 2002), who argue that banks naturally hold both loans and deposits, which are linked due to the shared overhead costs associated with liquidity needed to meet deposit withdrawals and loan commitments. See also, Qi (1998). Jayaratne and Morgan (2000) provide evidence that loans are constrained by insured deposits because of the informational frictions in the market for uninsured deposits.

and maintain their loan growth. In BLC models, Kishan and Opiela (K-O 2000), and Kashyap and Stein (K-S 2000) argue that banks with high capital and liquidity, respectively, provide assurances to depositors that give these banks a marginal cost of large time deposits that rises less steeply than that of weaker banks.[6] As policy contracts, banks with strong balance sheets can substitute into large time deposits at low cost and continue funding loans, while banks with weak balance sheets contract loans because alternative funding becomes prohibitively expensive. The former group bypasses the lending channel and the latter group forms a lending channel. Thus, monetary policy has distributional effects, which mainly impact the loan supply of low capital and low liquidity banks, and their bank-dependent customers.[7]

Banks can also demonstrate their low default probability in other ways. Kashyap and Stein (K-S 1995), for example, argue that large banks may be able to continue funding loans during contractionary policy if bank size conveys strength to depositors by indicating a well-diversified portfolio, name recognition and/or a too-big-to-fail guarantee.[8] Empirically, the asset size characteristic appears to be especially relevant in distinguishing bank strength since K-S (1995, 2000), K-O (2000), and Jayaratne and Morgan (J-M 2000) show strong statistical evidence that asset size differentiates banks that are responsive to policy from those that are not. Although it is argued that implicit guarantees may be the major source of this distributional effect of asset size, none of these studies explicitly test the hypothesis that differentially applied deposit guarantees are responsible for this effect.

2.2 Differential Deposit Guarantees

The concept of differentially applied guarantees and the funding advantages implied for some bank groups is prevalent in the risk-pricing literature. Hannan and Hanweck (1988) show that large banks paid lower rates on large CDs than smaller banks in a 1985 sample of 300 U.S. banks,

[6] As one explanation for differing slopes of the marginal cost curves, one could argue that a rise in interest rates during contractionary policy increases adverse-selection problems increasing the probability of bank default. In general, this will increase the cost of uninsured bank funds. The rate of increase in the marginal cost of uninsured deposits should be smaller for strong banks than for weak banks, since the former group has a lower default probability than the latter. Stein (1998) provides a microeconomic adverse selection model that motivates the bank-lending channel.

[7] These loan supply shifts distinguish the BLC from the interest rate (or money) channel. There are two conditions for the presence of a bank-lending channel: policy must be able to shift loan supply and there must be bank-dependent customers (See e.g., Bernanke and Blinder (1992), and Bernanke and Gertler (1995)). Note that contractionary policy produces a distributional effect that results from differences in the cost of funding loans across banks. This argument further requires a differential reserve requirement between demand and time deposits. While a legally binding reserve requirement differential is not necessary (see e.g., Stein (1998)), an effective differential is. Implementing uniform reserve requirements would still give the strong banks a funding advantage, but the funding advantage would not increase with contractionary policy. This point is developed further in Sections 4 and 5.

[8] Alternatively, for Poland, Nikiel (2002) argues that cost-efficient banks, which tend to possess several characteristics

when controlling for bank-specific risk factors. Park and Peristiani (1998) show similar results for thrifts from 1987-1991. Both studies attribute this result, in part, to a too-big-to-fail policy. Flannery and Sorescu (1996) present evidence that large bank holding companies in the U.S. paid lower rates for subordinated notes and debentures in the mid-1980s, also arguing that they enjoyed higher implicit guarantees relative to smaller holding companies during this period. In comparing the effects of possible differential guarantees between periods, they find that from 1986 to 1991 this size advantage disappears, probably due to a change in policy by the FDIC to limit coverage to only banks and not their holding companies. In particular, they estimate that the spread on notes and debentures in 1991 was about 2.5 percentage points higher than in 1983, after controlling for firm-specific risk. This latter result indicates a funding advantage for holding companies in the mid-1980s, due to a too-big-to-fail guarantee, relative to holding companies in the latter time period when this policy was revoked.

A funding advantage following from differential guarantees between bank groups can be more precisely ascertained in emerging markets, where explicit guarantees to protect domestic banks and implicit guarantees associated with state ownership (common characteristics of emerging markets) more clearly define differential coverage. Opiela (2001) for Thailand, and Mondschean and Opiela (1999) for Poland, show that banks with full or large guarantees have funding advantages over banks with smaller coverage. In this literature, the advantage of the larger guarantee is measured as the deposit rate spread between fully and partially guaranteed banks (controlling for other factors that affect the spread), indicating a cross-subsidy from partially to fully guaranteed banks. In our paper, we argue that an additional differential funding advantage is activated (i.e., the cross-subsidy increases) when contractionary policy encourages banks to switch from demand deposits to time deposits.[9]

3. Model

In order to empirically distinguish a bank-lending channel, some banks must be responsive to monetary policy, while other banks must be able to bypass this channel.[10] It has been argued that

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of balance sheet strength, bypass contractionary policy whereas cost-inefficient banks form a bank-lending channel.

[9] This suggests an alternative test to our time deposit hypothesis (and complementary test to our loan hypothesis), in which we could explore the hypothesis that the time deposit rate spread between fully and partially guaranteed banks responds differentially to policy. Although we do not explore this approach in this paper, we note that preliminary results from this approach are consistent with our time deposit hypothesis.

[10] Studies using aggregate data are not able to show evidence of a BLC. Rather, they indicate a special role for credit, but they cannot ascertain what role credit plays in the transmission mechanism (See e.g., Bernanke and Blinder (1992)).

banks with explicit full guarantees may face a supply of time deposits that is more interest sensitive than that of other banks, allowing the fully guaranteed banks to continue funding loans during contractionary policy. To more precisely motivate this argument, we present a simple static model of a bank, emphasizing rising marginal costs of time deposits that differ between two types of banks. A representative bank is assumed to have three assets; required reserves (*RR*), securities (*SEC*), and loans (*LN*); and three liabilities, demand deposits (*DD*), time deposits (*TD*) and capital (*K*). The balance sheet constraint requires that,

$$RR + SEC + LN = DD + TD + K. \tag{1}$$

DD are inversely related to a market rate of interest (e.g., the interbank market rate (r_{IBM})) and positively related to income (*Y*). The interbank rate is assumed to be controlled by the monetary authority in the short run. A bank is assumed to have some market power in the market for *TD* and can therefore raise additional *TD* by raising its rate (r_{TD}) above the mean market rate ($\boldsymbol{r_{TD}}$).[11] Thus,

$$DD = a_0 - (a_1)r_{IBM} + (a_2)Y \tag{2}$$

$$TD = b_0 + (b_1)(r_{TD} - \boldsymbol{r_{TD}}). \tag{3}$$

A bank holds a fraction (α) of *DD* in required reserves (*RR*), but holds no excess reserves. Banks are not required to hold reserves on *TD*. There may be a required reserve ratio on *TD*, but as long as this ratio is less than α, it will not alter the implications of this model (i.e. contractionary policy will still force banks to move out of *DD* and encourage them to move into *TD*). To capture a buffer stock motive for holding securities, securities (*SEC*) are a fixed proportion of *DD*. The market for bank loans is assumed to be imperfectly competitive and a bank can therefore increase (decrease) loans by moving rates below (above) the mean market rate ($\boldsymbol{r_{LN}}$). Thus,

[11] Additionally, one can assume that *TD* is log linear in *Y*. This assumption may be reasonable in an emerging market economy where changes in *TD* rates have little effect on the savings of low-income depositors, but where increases in income increase the interest sensitivity of *TD*. For evidence of this relationship, see survey results in Jerschina (1995) and Rzeczpospolita (1999). Given our model, this additional assumption would produce an income elasticity that is larger for the fully guaranteed than for the partially guaranteed banks. As the economy grows, a proportionately large amount of savings will be channeled to the fully guaranteed banks, allowing them to grow loans faster than partially guaranteed banks. Additionally, it is easy to show that under this assumption, the effect of contractionary policy on loans would be weaker through the fully guaranteed banks than through the partially guaranteed banks.

$$RR = \alpha DD \quad (4)$$

$$SEC = c_0 + (c_1)DD - RR \quad (5)$$

$$LN = d_0 - (d_1)(r_{LN} - \mathbf{r_{LN}}). \quad (6)$$

The mean market rates (in bold type) are assumed to be directly related to r_{IBM}.[12]

Banks are assumed to maximize profits (π), given by,

$$\pi = (r_{LN})LN + r_{SEC}SEC - r_{DD}DD - r_{TD}TD. \quad (7)$$

Profits include the interest income on loans ($r_{LN}LN$) and the interest on securities ($r_{SEC}SEC$), minus the interest paid on demand deposits ($r_{DD}DD$) and on time deposits ($r_{TD}TD$). Equation (7) is maximized with respect to *TD*.[13] The first order necessary conditions are used to solve for *TD* after eliminating *RR, DD, LN, SEC,* r_{DD}, and r_{LN}. The same process is used to solve for *LN* and *SEC*. Testable hypotheses are derived in equations (8) through (13) by taking the derivatives of *LN* and *TD* with respect to the r_{IBM}, *SEC* and *K*:

$$dLN/dr_{IBM} = -[a_1 d_1(1- c_1)]/[b_1 + d_1] < 0 \quad (8)$$

$$dTD/dr_{IBM} = [a_1 b_1(1 - c_1)]/([b_1 + d_1] > 0, \text{ assuming } c_1 < 1. \quad (9)$$

As can be seen from equations (8) and (9), an increase in r_{IBM} decreases *LN* and increases *TD*, as hypothesized, and the extent of these responses depends on the interest sensitivity of *TD* (i.e. on b_1). Although, contractionary policy would move both groups of banks out of *DD* and into *TD*, as indicated by (9), the deposit insurance advantage of the fully guaranteed banks is argued to produce a larger b_1 for these banks than for the partially guaranteed banks. With a higher interest sensitivity of *TD*, a fully guaranteed bank can more easily replace *DD* with *TD* (by raising $\mathbf{r_{TD}}$) than can a partially guaranteed bank. Assume, then, that $b_1^{FG} > b_1^{PG}$ (i.e., the interest sensitivity of the *TD* of the fully guaranteed banks (FG) is greater than that of the partially guaranteed banks (PG)). From (8) and (9) it follows that,

$$|\ (dLN/dr_{IBM})_{FG}\ | < |\ (dLN/dr_{IBM})_{PG}\ | \quad (10)$$

[12] For example, they may be related with fixed spreads: $\mathbf{r_{TD}} = e_0 + \Phi r_{IBM},\ \mathbf{r_{SEC}} = f_0 + \Phi r_{IBM}$ and $\mathbf{r_{LN}} = g_0 + \Phi r_{IBM}$.
[13] A bank would actually control *TD* through r_{TD}.

$$(dTD/dr_{IBM})_{FG} > (dTD/dr_{IBM})_{PG} . \quad (11)$$

That is, the loans of the fully guaranteed banks will be less responsive to monetary policy and their time deposits will be more responsive than those of the partially guaranteed banks.[14]

Since the bank lending channel literature emphasizes that bank liquidity and bank capital could be used to fund loans, equations (12) and (13) show the effect of changes in these balance sheet constraints on loans.

$$dLN/dSEC = d_1(1- c_1)/[(b_1 + d_1)(c_1 - \alpha)] \lesseqgtr 0. \quad (12)$$

$$dLN/dK = d_1/[b_1 + d_1] > 0 \quad (13)$$

An increase in securities may or may not increase loans. The sign of (12) depends on the size of the sensitivity of *SEC* to changes in *DD* (i.e., on the size of c_1) relative to the required reserve ratio (α). According to equation (13), an increase in capital will increase loans.

4. Banking System Structure and Deposit Guarantees in Poland

4.1 Loan Growth

Private non-financial sector total real loan growth for all commercial banks in Poland from January 1995 to December 2000 is shown in Figure 1. The sub-sample period from 1995 to 1999 is an especially interesting period for the Polish banking system due to the unusually high growth rate of loans. Loan growth climbs rapidly through 1995 and 1996, peaks at 28% in 1997, and stays above 13% until the end of 1999. Loan growth over this sub-sample period averages 15% in real terms. This growth can be contrasted with that at the end of the sample (1999-2000), where it subsides to below 10%, and with the out-of-sample period from the end of 2000 to the beginning of 2002 (not shown) when loans only grow at a 5% average real rate.

During our sample period, the National Bank of Poland (NBP) tried various means of controlling this high credit growth. From the end of 1994 until the middle of 1999 the NBP decreased nominal interbank market rates from 26.8 to 13.7% while inflation dropped from a 28.4% annual rate to 9.8% (i.e., inflation dropped 18.6 percentage points while the nominal interbank

[14] The absolute value is presented since $dLN/dr_{IBM} < 0$. The more awkward inequality, $(dLN/dr_{IBM})_{FG} > (dLN/dr_{IBM})_{PG}$, would also imply that the fully guaranteed banks are less responsive to monetary policy than the partially guaranteed banks.

market rate (WIBOR-Warsaw Interbank Offer Rate) only dropped 13 percentage points).[15] Additionally during this period, reserve requirements on demand deposits rose from 17% to 20% and those on time deposits increased from 9% to 11%.[16] Due to its inability to control credit growth through these usual policy instruments, the NBP attempted to pull deposits from banks, from September to December 1997, by offering the public time deposits at rates that were competitive with those of commercial banks. The continued high growth in real loans, in the face of these contractionary policy efforts by the NBP, is consistent with our assertion that monetary policy had difficulty controlling loan growth from 1995 to the middle of 1999.

In the sub-sample period from the middle of 1999 to the middle of 2000, the WIBOR averaged 16% and the inflation rate averaged about 10%. In September 1999, reserve requirements on demand and time deposits were equalized at 5%. At the end of December 1999, all banks had the same explicit partial deposit guarantee. The fall in loan growth in this latter period is consistent with banks responding to contractionary policy after equalizing the reserve requirements on deposits and rescinding the differential guarantees.

4.2 Differential Application of Deposit Insurance Guarantees

The Polish banking system consists of private domestic, state-owned and foreign banks. Three of the four largest banks, PKO BP (the state savings bank), Pekao SA (the foreign currency bank) and BGZ (the state agricultural bank), were state owned and had an explicit full deposit insurance guarantee from the Ministry of Finance from March 1995 to the end of 1999.[17] All other banks, <u>which include all other state-owned banks</u>, had a partial *de jure* coverage up to a limit of 3000 euro from January 1995 to December 1997, 4000 euro from January 1998, 5000 euro from January 1999, 8000 euro from January 2000, 11000 euro as of January 2001 and 15000 euro as of January 2002.[18,19]

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[15] The nominal tomorrow/next WIBOR was used by the NBP as an indicator of monetary policy from 1994-1996 (see Osinski and Slawinski (1997)). Additionally, the 1-month WIBOR was announced as the Monetary Policy Council's (the body responsible for formulating monetary policy after 1997) target rate for monetary policy in 1998 (see Szpunar (1998)). Wrobel and Zeba (1998) find that these two rates are highly correlated and they conclude that they are comparable as measures of the stance of policy.

[16] Since reserve requirements in general were high and since the differential between those requirements on demand and time deposits was so large, it should be reasonable to assume that these reserve requirements were an effective constraint on demand deposits.

[17] Additionally, these banks were required to pay only about one-half the deposit insurance premium that was charged to other banks.

[18] There is 100% coverage for the first 1000 euro and 90% coverage on any amount over 1000 euro up to the specified limit. This partial guarantee was strictly enforced – i.e. when banks were closed, only the legally prescribed payoffs were made. This establishes that there was probably no additional implicit guarantee perceived for the partially guaranteed (private) banks. However, partially covered state-owned banks were probably perceived as having a larger

To emphasize the pervasiveness of full coverage, note that the fully guaranteed banks had 37.3% of banking system assets, 30.3% of loans 49.1% of total deposits and 25% of the capital of the banking system, on average over the sample period. The percentage of banking system assets covered by the full explicit guarantee decreased over time, but remained substantial throughout our sample. In 1995, the fully covered banks held 38.8% of banking system assets, while at the end of 1999 this had dropped to 36.0% and by the end of our sample in 2000Q2, this had only decreased to 35.8%.

4.3 Balance Sheet Structure of the Partially and Fully Guaranteed Banks

As previously mentioned, a bank's balance sheet structure could determine its loan response to policy. Since the bank-lending channel literature argues that balance sheet weakness affects loan growth and differentiates a lending channel, we show some financial indicators of the fully and the partially guaranteed banks in Table 1. This table includes the means and standard deviations (the latter in parentheses below the former) of real loan and time deposit growth, and of various ratios that may have affected a bank's ability to raise time deposits and fund loans. We divide these variables into the period before reserve requirements were equalized and full deposit guarantees were rescinded, and the period after these changes were made. Additionally, difference of means and standard deviations tests are performed to illustrate balance sheet similarities or differences between the two groups averaged over each sub-sample period that may have contributed to differences in loan and time deposit growth, and the response of banks to policy.

Rows 4 through 7 include the variables used in our regressions to account for balance sheet effects. In the first period, the capital leverage ratio is lower for the fully guaranteed banks and the non-performing loans-to-total loan ratio is higher than that of the partially guaranteed banks. In the latter period, only the leverage ratio is statistically lower. In general, these differences indicate that the fully guaranteed banks have weaker balance sheets than the partially guaranteed banks. This

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coverage than explicitly set (for evidence of this, see e.g., Mondschean and Opiela (1999)).

[19] From the adverse-selection model of Stein (1998) it may reasonably be assumed that the partially guaranteed banks already pay a "lemons premium" on demand deposits and therefore the switching costs from demand to time deposits for these banks may be small relative to those of the fully guaranteed banks. However, these switching costs depend on the extent to which demand deposits are covered at each bank. For banks with large accounts, the coverage is smaller and the premium should be larger than for banks with small demand deposit accounts that are almost completely covered. The Bank Guarantee fund estimates that approximately 92% of all demand deposits were covered under the partial guarantee in 2000. This would indicate that, in general, any default premium paid by partially guaranteed banks on their demand deposits is small. Additionally, whether the partially guaranteed banks are more or less responsive than the fully guaranteed banks ultimately is an empirical question. We do not explore this hypothesis on the responsiveness of banks divided by the extent of coverage on their demand deposits, but our results provide strong evidence that the loans of the fully guaranteed banks are less responsive to monetary policy than those of the partially guaranteed banks.

weakness should have increased the total loan responsiveness of the fully guaranteed banks to monetary policy, even though the fully guaranteed banks may have had a funding advantage, by virtue of their full guarantee. It is important to separate the effects of balance sheet weakness on loan and time deposit growth from the effects of guarantees in order to differentiate a bank-lending channel through partially guaranteed banks.

The variables in this table also allow us to take up the issue that the fully and partially guaranteed banks could differ in their response to policy due to differences in the types of customers to which they cater. Any differences may account for loan demand, rather than loan supply shifts necessary for the existence of a bank-lending channel. The significant differences in non-performing loans between the two groups, just mentioned, could be such an indicator of differences in loan customers and therefore differences in loan demand. However, as with most state-owned banks in transition economies, most of the fully guaranteed banks non-performing loans were accumulated during the early stages of transition (before 1995) and may not indicate the quality of new loans to customers over our sample period (although non-performing loans still may affect loan supply). Making the differences even larger, several *de novo* banks enter the sample in 1995 and 1996. Non-performing loans at these banks take time to develop (particularly lost loans) even if customer quality is poor. Therefore, these start-up banks may significantly decrease the non-performing loan-to-total loan ratio of the partially guaranteed banks. Since our sample period is not long, a better comparison of recent loan quality may be the substandard loans-to-total-loan ratio or even the doubtful loan-to-total-loan ratio. Therefore we divide non-performing loans into lost, doubtful and sub-standard and report the means and tests of equality of means in Table 1 below non-performing loans. Lost loans are the only category in which the mean between the two groups in the first period are significantly different. These results are consistent with our argument that the loan quality of loans made during the sample period is similar between the two bank groups.

As another category of possible customer differences, we look at data on loans and deposits divided into business and household customers, although these are available only for the first period.[20] The last two rows of Table 1 show the mean values and standard deviations of the ratios of business loans to assets and business deposits to assets. The means of these ratios are not significantly different between the fully and partially guaranteed banks. Thus, there do not appear to be differences in the customer types that would account for differences in loan responses between

[20] Although data on other customer characteristics are not available to us, the fully guaranteed banks have a mix of

the two groups of banks. We take up further issues associated with controlling for loan demand in the empirical section.

The last three rows of Table 1 show the concentration of demand deposits, time deposits and loans at the two groups of banks. The fully guaranteed banks rely more heavily on demand deposit funding than the other banks. The two-period adverse selection/buffer stock model by Stein (1998) would imply that the loans of those banks with a large amount of demand deposits might be more responsive to policy than other banks.[21] J-M (2000) provide evidence that those banks with the greatest proportion of insured deposits (demand deposits) have an advantage in growing loans.

5. Data, Empirical Model and Results

5.1 Data

The quarterly data consist of an unbalanced cross-sectional/time series panel for the period 1995Q1-2000Q2 and includes 66 banks (about 60 banks on average per quarter), or about 75% of the total number of banks. The sample contains on average 87.2% of all banking system assets, 87.9% of loans and 91.4% of banking system deposits. Bank balance sheet data on assets (loans and liquidity), liabilities (demand and time deposits), and capital are for residents only and were obtained from the NBP. Some banks enter, others drop out, some merge, and a few are privatized during the sample period. Merged banks are treated as new banks. Data for the first two quarters of *de novo* bank operation and the last two quarters of closed bank operation are dropped. Since this paper is attempting to measure the effect of policy on loan growth, distortions due to entry and exit behavior should be discarded. Capital consists of tier 1 capital. Data on the measure of monetary policy stance - the average quarterly value of the daily T/N WIBOR (Tomorrow/Next Warsaw Interbank Offer Rate) - and ownership were obtained from the NBP.[22] CPI data for the computation of real variables were obtained from the Main Statistical Office (GUS).

5.2 Empirical Model of a Bank-Lending Channel

The hypotheses on loans motivated by equations (8), (10), (12) and (13) are tested in our first regression for the partially and fully guaranteed banks. The hypotheses on time deposits motivated by equations (9) and (11) are tested for these same bank groups in a second regression. These regressions are also estimated for two periods: 1995Q1-1999Q2, when differential guarantees

C&I, trade and agricultural loans, as do the partially guaranteed banks.

[21] In contrast to this adverse selection model, we assume depositors know which banks are fully and partially guaranteed and they understand the differences in the probability of default associated with these guarantees.

and required reserve ratios were in place, and 1999Q3-2000Q2, when there was an explicit partial guarantee for all banks and when reserve requirements between time and demand deposits were equated.

Dependent Variable:

Regression 1

The growth rate in real loans (LNGR). Total nominal loans to the private non-financial sector are deflated by the CPI to obtain real loans. Real loan growth is computed quarterly.

Regression 2

The growth rate in real time deposits (TDGR). Nominal time deposits of the non-financial sector are deflated by the CPI to obtain real time deposits. Real time deposit growth is computed quarterly.

Independent variables:

Regressions 1 and 2

Change in the Tomorrow/Next WIBOR (ΔWIBOR). This is the rate charged for funds between banks and should represent a bank's marginal cost of funds. The daily T/N WIBOR was averaged over each quarter. As a proxy for the stance of monetary policy it should be negatively related to loan growth. Since loans are contracts and often involve a long-term bank/customer relationship, loans may adjust slowly to changes in the cost of funds. Therefore, contemporaneous, as well as four lagged values of the WIBOR are included. Increases in the WIBOR should cause reserves to fall and therefore cause demand deposits to fall. However, if banks try and are able to maintain funding for loans, time deposit growth should increase and therefore we expect a positive sign on the WIBOR in regression 2. When reserve requirements are equalized in the second period, banks will not have an advantage in switching from demand to time deposits. Therefore the sign on the coefficient attached to changes in the WIBOR should be indeterminate.

Regression 1 [23]

Liquidity/Assets (LIQAS). Liquidity is defined as assets minus loans. Securities, excess reserves and interbank funds may allow banks a means of continuing loan growth during contractionary policy. The liquidity-to-asset ratio is used. A higher liquidity-to-asset ratio in the previous period allows a higher rate of loan growth in the current period.

Capital/Assets (KAS). Capital is a constraint on asset size and composition and therefore on loan

[22] The T/N WIBOR is the rate charged to borrowers for two-day loans in the interbank market.

[23] It is not clear how time deposits should react to changes in the balance sheet constraints, especially after the equalization of reserve requirements across time and demand deposits. Therefore, the expected signs on the coefficients

growth. Capital provides both a regulatory and wealth constraint. A higher capital-asset ratio in the previous period allows banks to increase loan growth in the current period.

Logarithm of Assets (LOGAS). As argued in the bank-lending channel literature, asset size is a proxy for name recognition and for the ability of a bank to diversify loans. It may also include an implicit "too big to fail" policy. Thus, large banks may be able to more easily raise time deposits and continue growing loans than small banks during contractionary policy. Since the largest banks also have the most extensive branch network, asset size may be a proxy for the ability of banks to grow loans by growing deposits through their branch network. Thus, for all of these arguments, loan growth should respond positively to asset size. On the other hand, the largest banks dominate the deposit and loan markets in several regions, leaving little room for them to increase growth substantially relative to smaller banks. This argument would imply that larger banks might grow deposits and loans at lower rates than other banks. Taking all of the above arguments into account, the expected relationship between asset size and loan growth is indeterminate.

Non-performing Loans/Total Loans (NPL). Non-performing loans are a burden on a bank's loan portfolio that constrains a bank from issuing new loans. An increase in non-performing loans-to-total loans in the last period should decrease loan growth in the current period.

Using the above variables, the following model is estimated, first for a regression with real loan growth and second for a regression with real time deposit growth,

$$\begin{aligned} LNGR_{it} \text{ (or } TDGR_{it}) = {} & \Sigma_{j=0\text{-}4}\ \beta_j(\Delta WIBOR_{t-j}) + \Sigma_{j=0\text{-}4}\ \beta_{5+j}(\Delta WIBOR_{t-j})(DUM_{FG}) \\ & + \Sigma_{j=0\text{-}3}\ \beta_{10+j}(\Delta WIBOR_{t-j})(DUM_{TIME}) + \Sigma_{j=0\text{-}3}\ \beta_{14+j}(\Delta WIBOR_{t-j})(DUM_{FG})(DUM_{TIME}) \\ & + \gamma_1 LIQ_{it-1} + \gamma_2 KAS_{it-1} + \gamma_3 LOGAS_{it-1} + \gamma_4 NPL_{it-1} \\ & + \Sigma_{j=1\text{-}4}\ \delta_j(\Delta GDPGR_{t-j}) + \Sigma_{m=1\text{-}3}\ \tau_m(DUM_{seas}) + \lambda_i(DUM_i) \end{aligned} \tag{17}$$

where "i" indicates a particular bank and "t" indicates time. Since the main hypotheses tested concern the differential responses of loan and deposit growth of the two bank groups to current and lagged policy and lagged balance sheet constraints, a dummy variable (DUM_{FG}), which is 1 for the fully guaranteed banks and 0 otherwise, is attached to the policy variable.[24] Since these hypotheses

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associated with time deposits are not given.

[24] As an additional hypothesis, a regression was run with a dummy variable attached to the WIBOR for the partially guaranteed state-owned banks. This alternative regression takes into account the possibility that state ownership, in and

assume that a given bank structure at the end of the period determines loan and deposit growth in the subsequent period, all bank balance sheet variables are lagged one period. A time dummy variable (DUM_{TIME}), which is 1 for the period 1999Q3 to 2000Q2 and zero otherwise, was interacted with the policy variable for each of the two bank groups. This dummy is included to test the hypotheses that loan and time deposit responses between the two time periods are the same, and that loan growth of the two bank groups were not significantly different from each other in the latter period when reserve requirements were equalized and differential coverage was rescinded.[25] Lagged values of real GDP growth (*GDPGR*) were added to control for loan demand shocks and other macroeconomic shocks common to all banks, but varying over time.[26] DUM_i indicates the use of *firm-fixed effects*, where a constant term is estimated for each bank over the sample period. This specification also adds to controlling for possible demand shocks that are particular to a bank. DUM_{seas} accounts for seasonality in loan and time deposit growth. The model was estimated using fixed effects generalized least squares.[27]

5.3 Empirical Results

5.3.1 Loan Growth

Table 2 presents the coefficient estimates for the loan growth responses (regression 1) of the fully guaranteed and partially guaranteed banks. Columns 2-4 contain the results of the individual contemporaneous and lagged coefficients associated with policy, along with their cumulative effect (summed over the five periods), for each of the two bank groups for the period 1995Q1 through 1999Q2. We concentrate on the cumulative effects. The partially guaranteed banks have a negative and significant cumulative response (-0.775) to changes in the policy-influenced interest rate, as one would expect. The fully guaranteed banks have a positive and significant differential cumulative response (0.815) to changes in the WIBOR. Thus, the loans of the fully guaranteed banks are less responsive to policy than those of the partially guaranteed banks. The combined effect (the sum of the cumulative effects) of the fully guaranteed banks is 0.040 (given in parentheses below the

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of itself, conferred a full implicit guarantee that would allow not only the banks with an explicit full guarantee, but all state banks to raise time deposits more easily than private banks. This hypothesis was rejected. The coefficient estimates of this regression are not included (results available upon request).

25 Differences in behavior between the two groups in the first period that disappear in the latter period would provide additional support for our BLC hypothesis for the first period.

26 This method of controlling for loan demand is common in the literature (e.g., see K-S (1995, 2000), K-O (2000) and Peek and Rosengren (1995)). However, Peek, Rosengren and Tootle (2001) offer a more definitive method for separating loan supply and demand shifts. Unfortunately, the confidential regulatory data needed for their approach were unavailable to us for banks in Poland.

27 With large robust standard errors and evidence of a time-varying variance, fixed effects GLS may be an appropriate

differential cumulative effects). A Wald test of the hypothesis that the sum of the cumulative effect of the partially guaranteed banks and the cumulative differential effect of the fully guaranteed banks equals zero cannot be rejected (i.e. the test that the combined effect for the fully guaranteed banks equals zero cannot be rejected). This indicates that the hypothesis that the fully guaranteed banks are not at all responsive to monetary policy cannot be rejected.[28] The coefficients on the balance sheet constraints all have the expected signs, and all are significant. This indicates that balance sheet strength/weakness is significantly important in explaining variations in loan growth, which is consistent with other bank-lending channel studies.

At the beginning of September 1999, the NBP changed reserve requirements by setting the reserve ratios for both demand deposits and time deposits at 5%.[29] At the end of 1999, the full guarantee was rescinded, so that all banks had the same explicit partial guarantee. Consequently, the differential constraints that should have allowed fully guaranteed banks a funding advantage over partially guaranteed banks disappeared after this date. We therefore use a time dummy variable to examine the hypothesis that policy affected loan growth differently in the period from 1999Q3 to 2000Q2, relative to the first period tested. Columns 5-7 in Table 2 contain the differential results for this latter period. Since the panel is unbalanced and since only four quarters of data are available for this latter period, we use the contemporaneous and only three lagged values of the monetary policy variable. The cumulative differential effect of policy for the partially guaranteed banks (-3.518) is negative. When this effect is added to that of the previous period, the combined effect is -4.293, indicating that the partially guaranteed banks are more responsive to policy in the second period than in the first period. This result is consistent with the inability of these banks to raise time deposit funding as a result of the reserve requirement change (the complementary test on time deposits is shown in subsection 5.3.2 below.). The differential effect for the fully guaranteed banks (we will continue to refer to these banks as fully guaranteed) in the latter period is positive (0.0873). However, the combined effect for the fully guaranteed banks in the latter period (which is the sum of the partially guaranteed effect in the first period and the two differential effects of the fully guaranteed banks) equals –3.391. This indicates that the fully guaranteed banks decrease loan

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estimation technique (see e.g., Woolridge (2000), Ch. 10).

[28] The rejection of this hypothesis is not necessary for support of our bank-lending channel argument. The fully guaranteed banks need only have a differential positive response, or a cumulative negative response that is significantly smaller than that of the partially guaranteed banks. The rejection of this hypothesis, however, indicates that the fully guaranteed banks were non-responsive to policy, which strongly supports our bank-lending channel argument.

[29] This equalization of reserve requirements would take away any advantage of moving from demand to time deposits during contractionary monetary policy.

growth in response to policy in the latter period. A test of the hypothesis that this combined response of the fully guaranteed banks in the latter period equals the combined effect of the partially guaranteed banks in the same period cannot be rejected, implying that the loan growth of the fully guaranteed and partially guaranteed banks respond similarly to policy in the latter period. Although this period is short, this result gives an indication of the stronger effect of policy on the loan growth of both bank groups after the differential reserve requirements and the full guarantee are rescinded, compared to their responses in the first period. This reversal in the response of the fully guaranteed banks in the latter period further strengthens our argument that monetary policy's effects are mitigated when explicit full guarantees are present.

5.3.2 Time Deposit Growth

In order to explore how the fully guaranteed banks were able to circumvent policy in the first period, we analyze the effect of guarantees on banks' time deposit funding response to monetary policy. Regression 2 is estimated for the growth rate of real time deposits. The results are presented in Table 3. For the partially guaranteed banks in the first period, the cumulative effect of policy on time deposit growth (0.377) is positive and significant, as hypothesized in equation (9). But as stated in the hypothesis in equation (11), the time deposits of the fully guaranteed banks should have a larger positive response than that of the partially guaranteed banks. As Table 3 shows, the cumulative differential effect for the fully guaranteed banks (0.763) is positive and significant. Thus, the hypothesis that the time deposit growth of the fully guaranteed banks reacts the same in response to policy as that of the partially guaranteed banks is rejected at the 1% level. This result is consistent with our argument that the fully guaranteed banks' muted loan response is due to their ability to more easily raise time deposit funds than the other banks.

We also examine the time deposit growth behavior of each of the two bank groups in the latter period when reserve requirements were equalized for all types of deposits and the explicit full guarantee was removed. Like the loan results in the second period, one might expect time deposit behavior in the latter period to be similar between the two bank groups after required reserve have been equalized on all deposits and the full guarantee has been rescinded. However, since there is no difference between reserve requirements for time deposits and demand deposits, a bank may choose to reduce demand deposits, time deposits or both in response to contractionary monetary policy. Thus, in the latter period we might not expect the results to reveal information that either supports or rejects our hypothesis. Still we report these results in the last three columns of Table 3. For the partially guaranteed banks, the cumulative differential effect of policy on time deposit growth over that of the first period (-1.651) is negative and significant. This result is consistent with the loan growth result in Table 2 showing that the partially guaranteed banks are more responsive to policy in the second period than in the first. It is also consistent with the argument that this is due to their inability to raise time deposit funding after the equalization of reserve requirements for all deposits. The combined effect of -1.274 (shown in parentheses below the differential effect) indicates that these banks reduced their time deposits in response to policy. For the banks that previously had a full guarantee, the differential response (-4.278) and the combined response (-4.789) are also negative. This is consistent with the desirability of these banks to switch from demand to time deposits during contractionary policy when differential reserve requirements and guarantees were removed. A test of the hypothesis that the combined response of time deposits of the fully guaranteed banks in the latter period equals that of the partially guaranteed banks in the same period is rejected at the 5% level. The two bank groups are both reducing their time deposits in response to policy, but not equally.

In summary, in the first period of differential reserve requirements and differential deposit guarantees, the loan growth of the partially guaranteed banks responds to monetary policy, whereas that of the fully guaranteed banks does not. Evidence of the source of this loan behavior can be seen in the response of time deposit growth, which is larger for the fully guaranteed banks than for the partially guaranteed banks. These results are consistent with evidence of a bank-lending channel that is distinguished by differentially applied explicit deposit guarantees. The results of a strong policy influence on loans for both groups of banks in the latter period, when reserve requirements and the explicit full guarantee were eliminated, further strengthen our bank-lending channel argument.

5.3.3 Robustness Checks

The above results of differential loan response to policy by the two banks groups may be due to our specification of monetary policy stance or to our restriction that banks share a common loan and time deposit response to their balance sheet constraints or due to uncontrolled for differences in loan demand. Therefore we explored other specifications for our model to test the robustness of our results.

Since changes in the WIBOR may not perfectly capture any effect of policy stance that may be conveyed through relatively high or low interest rates, we ran regression equations 1 and 2 using levels of the nominal WIBOR. Our results using this alternative measure (not reported) were mostly qualitatively similar to the results in Tables 2 and 3.[30]

Our results of differential responses of loan and time deposit growth to monetary policy between the two types of banks with differential coverage may be partially due to restricting these banks to share common coefficients on their balance sheet variables. However, the two groups of banks may reasonably differ in their loan and time deposit responses to changes in their balance sheet constraints. These differences could be due to the differential application of regulatory policy (possibly favoring the fully guaranteed banks) or differences in management responsiveness to these constraints (e.g., the fully guaranteed banks may not be as responsive to changes in market signals and constraints as the partially guaranteed banks). Therefore we interacted the fully guaranteed bank dummy variable with each of the balance sheet variables in regression equations 1 and 2. Only the coefficient for non-performing loans-to-total loans in regression 1 was significantly different for the fully guaranteed banks (results not reported). When this marginal response was added to that of the partially guaranteed banks, it indicated that the loans of the fully guaranteed banks were not significantly responsive to changes in their non-performing loans.[31] Additionally, the results of all the above-mentioned hypothesis tests were qualitatively similar to those in Tables 2 and 3.

We have already attempted to control for differences in loan demand by showing similar loan quality and mix of business customers, by using firm-fixed effects and by including real growth of GDP. To address the possibility that the fully guaranteed banks loan demand varies with GDP, but is different from that of the partially guaranteed banks, we interacted a dummy variable for the fully guaranteed banks with GDP growth. None of the individual coefficients attached to the interacted variables were significant. Additionally, the hypothesis that the coefficients were jointly equal to zero could not be rejected.

Thus, our results appear to be robust to differences in balance sheet responses between the two bank groups, another measure of monetary policy and various specifications that capture differences in loan demand between the two groups.

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[30] With levels of the WIBOR the loan growth of the fully guaranteed banks are more responsive in the second period.

[31] There may be several explanations for this result. For example, managers may think that NPL will be covered by the government or managers may not respond prudently to this constraint due to lack of incentives.

6. Conclusion

Emerging financial markets (EFMs) often encounter surges in credit growth, accompanied by deteriorating credit quality and increasing inflation. In the presence of weak regulatory policy, monetary policy is sometimes used in an attempt to control credit growth in order to mitigate problems of loan quality. However, the use of contractionary monetary policy often fails to control these credit expansions, even though it is argued that the dominance of banks combined with weak bank fundamentals in EFMs should create a strong bank-lending channel. This paper offers an explanation for this anomaly that follows from the presence of full deposit insurance guarantees. Additionally, we argue that if these guarantees are differentially applied, contractionary policy may also encourage a misallocation of bank credit, promoting inefficiency in the banking sector.

In general, we argue that full deposit guarantees granted to banks, give them a low cost source of time deposits that allow them to continue funding loans during contractionary policy, mitigating policy's effect on loans. In particular, if deposit insurance favors inefficient banks (e.g., state-owned banks), as is commonly the case in EFMs, contractionary policy will allow these banks to continue funding loans, while efficient banks will reduce their credit growth. This allocative effect redirects funds towards inefficient banks, discouraging efficient intermediation, producing poor quality loans and hampering banking system development.

We test our hypothesis on the Polish banking system, where explicit guarantees were implemented differentially to favor a few large state-owned banks from 1995 to 1999. Our empirical results show that the loan growth of banks with full explicit guarantees is less responsive to monetary policy than that of banks with partial coverage, when controlling for other factors that account for loan growth. Also, the time deposit growth of the fully covered banks is more responsive to policy than that of the partially guaranteed banks. Thus, the fully guaranteed banks are able to bypass contractionary policy and they appear to be funding their continued loan growth by substituting low-reserve time deposits for high-reserve demand deposits. Additionally, since the fully guaranteed banks are among the most inefficient banks in Poland, our results would indicate that contractionary policy encourages a reallocation of funds to the most inefficient banks.

Our results have implications for other EFM banking systems as well. The differential application of explicit or implicit full guarantees to protect weak and inefficient banks is a regular feature of EFMs. Consequently, the application of contractionary monetary policy to control credit growth could encourage a reallocation of funds from efficient banks with strong balance sheets to inefficient banks with weak balance sheets, thus weakening the overall banking system and slowing its efficient development.

The evidence on the effect of guarantees presented here and its implications for credit control, however, must be carefully placed in the context of other influences on loan growth. The fully guaranteed banks (usually state-owned) are often those with the weakest balance sheets. This weakness is a constraint that should render their loans more responsive to monetary policy than those of the partially guaranteed banks (usually private), which often have strong balance sheets. We are arguing that the balance sheet weaknesses that commonly accompany fully guaranteed banks are at least partially offset by their ability to fund loan growth by virtue of their full guarantee. The presence of full guarantees may or may not be large enough for these banks to overcome their balance sheet weaknesses. Therefore, our results do not rule out the possibility that the balance sheet effect is larger than the guarantee effect and that contractionary monetary policy's combined effect could still decrease the loan growth of the fully guaranteed banks by more than that of the partially guaranteed banks. However, the presence of these offsetting effects does not lessen the importance of the effect of differential guarantees, which may continue to encourage the diversion of more funds to fully guaranteed banks than would otherwise be the case.

This paper also contributes to the literature on the bank-lending channel by distinguishing a separate lending channel through differentially applied guarantees. Our results support those of Kashyap and Stein (1995, 2000) and Kishan and Opiela (2000), who argue that bank size confers implicit deposit coverage that may allow banks with these large guarantees to bypass monetary policy. Unlike these studies, we are able to show evidence of the explicit effect of guarantees on monetary policy's ability to affect loans, separate from what bank size may entail. We present strong evidence of the existence of a lending channel distinguished through banks that have an explicit partial deposit insurance coverage, while banks with explicit full guarantees are able to bypass this channel.

Our results imply that the interaction of monetary and regulatory policies may not only produce distributional effects that adversely affect some banks, but an inefficient intermediation of funds that affects the efficiency of the entire banking system and the real economy. Monetary and regulatory policies in emerging markets should be carefully coordinated to minimize these adverse effects. For example, bank regulators probably realize that differentially applied guarantees provide subsidies to fully guaranteed banks that encourage a misallocation of funds, but they might not realize that this policy can interact with contractionary monetary policy to increase this subsidy, further redistributing funds towards inefficient banks and weakening the banking system. An awareness of this effect could aid regulators in more intensely monitoring banks during periods of contractionary policy. Likewise, if a central bank concentrates on aggregate credit growth to gauge the effects of a restrictive monetary policy, partially guaranteed banks will bear the burden of this contraction, particularly if the fully guaranteed banks dominate total credit. If the fully guaranteed banks are the most inefficient banks, monetary policy will weaken the banking system through its effect of diverting funds from efficient to inefficient banks. Monetary policy makers might not be aware that contractionary policy can increase this redistribution of funds, rendering policy less potent and weakening the bank-lending channel. An awareness of this limitation may temper the use of contractionary policy in the presence of differential guarantees.

References

Bernanke, Ben S., and Alan S. Blinder, “The Federal Funds Rate and the Channels of Monetary Transmission,” *American Economic Review*, Vol.82, No.4, pp. 901-922, September 1992.

Bernanke, Ben S., and Mark Gertler, “Inside the Black Box: The Credit Channel of Monetary Policy Transmission,” *Journal of Economic Perspectives*, Vol. 9, pp. 27-48, fall 1995.

Durjasz, Pawel and Ryszard Kokoszczynski, "Financial Inflows into Poland," presented at the International Institute of Applied Systems Analysis Conference, Vienna, May 1997.

Flannery, Mark J. and Sorin M. Sorescu, "Evidence of Bank Market Discipline in Subordinated Debenture Yields: 1983-1991," *The Journal of Finance*, Vol. 51, No. 4, September 1996, pp.1347-1377.

Hannan, Timothy H. and Gerald A. Hanweck, “Bank Insolvency Risk and the Market for Large Certificates of Deposit,” *Journal of Money, Credit and Banking*, May 1988, pp. 203-212.

Jerschina, Jan, “The Banking Services Market in Poland: Consolidation and Privatization of Polish Banks,” in *Competitive Banking in Central and Eastern Europe*, Ewa Miklaszewska ed., (Krakow, Poland: Jagiellonian University Press), 1995.

Jayaratne, Jith, and Donald P. Morgan, “Capital Market Frictions and Deposit Constraints at Banks,” *Journal of MoneyCredit, and Banking*, February 2000, pp.74-92.

Kaminsky, Graciela L., and Carmen M. Reinhart, “The Twin Crises: The Causes of Banking and Balance-of-Payments Problems,” *American Economic Review*, Vol. 89 (3), 1999, pp. 473-500.

Kashyap, Anil K., Raghuram Rajan and Jeremy C. Stein, “Banks as Liquidity Providers: An Explanation for the Coexistences of Lending and Deposit Taking,” Journal of Finance, Vol. 57 No.1, February 2002.

Kashyap, Anil K. and Jeremy C. Stein, "The Impact of Monetary Policy on Bank Balance Sheets," *Carnegie-Rochester Conference Series on Public Policy*, No.42, pp.151-195, 1995.

Kashyap, Anil K. and Jeremy C. Stein, "What Do a Million Banks Have to Say About the Transmission of Monetary Policy?," *American Economic Review*, September 2000.

Kishan, Ruby P. and Timothy P. Opiela, "Bank Size, Bank Capital and the Bank Lending Channel," *Journal of Money, Credit, and Banking*, February 2000, pp.121-141.

Mondschean, Thomas S. and Timothy P. Opiela, "Bank Time Deposit Rates and Market Discipline in Poland: The Impact of State Ownership and Deposit Insurance Reform," *Journal of Financial Services Research*, 15:3, 1999, pp. 179-196.

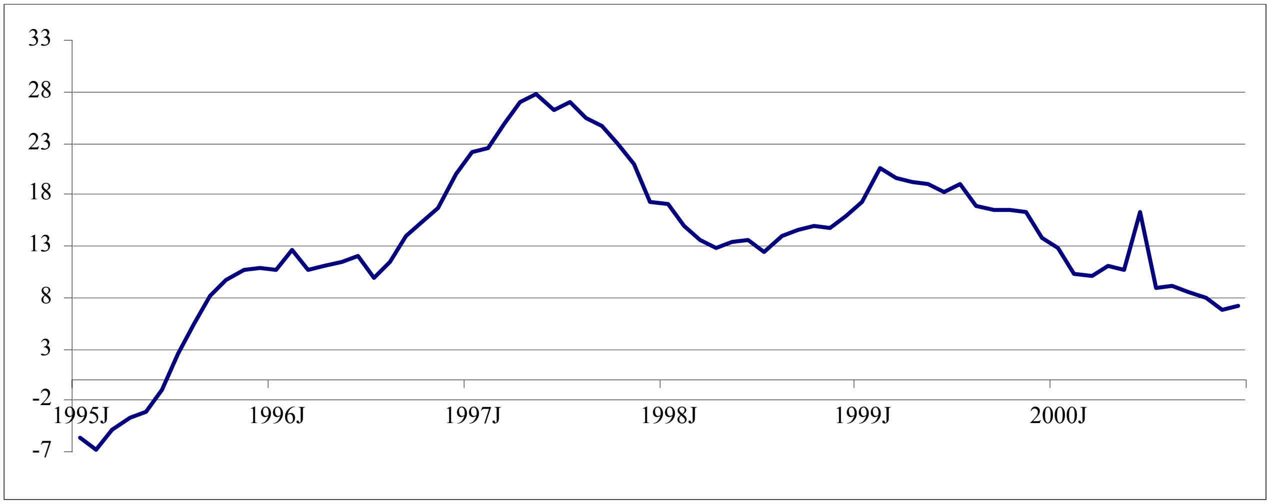
National Bank of Poland, *NBP Monthly Bulletin*, various issues.

Nikiel, Ewa M., “Wplyw Efektywnosci Kosztowej i Dochodowej Bankow Na Dzialanie Kanalu Kredytow Bankowych w Polsce“ (The Influence of Cost and Profit Efficiency on the Bank-Lending Channel), Ph.D. dissertation, Warsaw School of Economics, June 2002.

Opiela, Timothy P., “Risk Pricing at Financial Institutions in Pre-Crisis Thailand: Implications for modeling the Thai

Crisis," in Proceedings of the Conference on Bank Structure and Competition, Federal Reserve Bank if Chicago, May 2001, pp. 472-488.
Opiela, Timothy P., Marta Golajewska, Monika Jozefowska, Ewa M. Nikiel, "Efektywnosc I Ryzyko Sektora Bankowego w Polsce," *Materialy i Studia*, No. 96, National Bank of Poland, December 1999.
Osinski, Jacek and Andrziej Slawinski, "National Bank of Poland Open Market Operations and the Money Market in 1995-1996," Working Paper No.14, National Bank of Poland, March 1997.
Park, Sangkyun, and Stavros Peristiani, "Market Discipline by Thrifts," *Journal of Money, Credit and Banking*, August 1998, Part 1, pp. 347-364.
Peek, Joe and Eric Rosengren, "Bank Lending and the Transmission of Monetary Policy," *New England Economic Review*, Federal Reserve Bank of Boston, pp. 1-29, 1995.
Peek, Joe, Eric Rosengren and Geofrey Tootle, "Identifying the Macroeconomic Effects of Loan Supply Shocks," *Working Paper 00-2*, Federal Reserve Bank of Boston, 2000.
Qi, Jianping, "Deposit Liquidity and Bank Monitoring," *Journal of Financial Intermediation*, vol. 7, pp. 198-218, 1998.
Rzeczpospolita, "Co drugi Polak nie oszczedza," Ekonomia i Rynek, (on-line version), March 26, 1999.
Schneider, Martin, and Aaron Tornell, "Balance Sheet Effects, Bailout Guarantees and Financial Crises," NBER Working Paper 8060, December 2000.
Spiegel, Mark M., "Sterilization of Capital Inflows Through the Banking Sector: Evidence from Asia," Pacific Basin Working Paper Series 95-06, Federal Reserve Bank of San Francisco, 1995.
Szpunar, Piotr, "Cele posrednie a skutecznosci polityki pienieznej,"*Bank i Kredyt*, No.1-2, 1998, p.28.
Stein, Jeremy C., "An Adverse-Selection Model of Bank Asset and Liability Management with Implications for the Transmission of Monetary Policy," *Rand Journal of Economics*, Vol. 29 No.3, autumn 1998, pp. 466-486.
Woolridge, Jeffrey M., *Econometric Analysis of Cross Section and Panel Data*, Southwestern Publishing, 2000.
Wrobel, Ewa, and Jolanta Zeba, National Bank of Poland working paper, 1998.

Figure 1
Real Total Loan Growth of the Private Non-Financial Sector (%) [a]



[a] Nominal total loans are deflated by the CPI for all items. Loan growth is computed as an annualized monthly moving average. Computed from data from various issues of the *NBP Bulletin.* Only total loan growth is shown. Segregating loans by full and partial guarantees would be misleading, since loan growth may be affected by many types of balance sheet characteristics. In particular, the fully guaranteed banks have the weakest balance sheets, which would dampen loan growth.

Table 1

Means and Standard Deviations of Financial Characteristics of the Fully and Partially Guaranteed Banks [a, b]

	1995Q1-1999Q2		*1999Q3-2000Q2*	
	Fully Guaranteed Banks	**Partially Guaranteed Banks**	**Fully Guaranteed Banks [e]**	**Partially Guaranteed Banks [f]**
Banks in Sample	3	64	3	54
Real Loan Growth (%)	3.96 (6.63)	10.41 (9.52)	3.04 **(2.77)*****	5.42 **(8.92)**
Real Time Deposit Growth (%)	3.13 **(0.95)*****	9.79 **(11.67)**	1.85 **(1.53)*****	5.76 **(12.13)**
Capital/Total Assets (%)	**1.54**** **(4.10)****	**13.74** **(8.40)**	**3.95**** **(1.81)*****	**11.20** **(4.81)**
Liquidity/Total Assets (%)	66.92 (13.99)	55.00 (16.97)	58.23 **(6.21)*****	47.57 (17.90)
Total Assets (Thousands of PLN) [c]	**29566471***** **(14955065)***	**2018201** **(3036073)**	**48616920***** **(26613361)***	**3651304** **(5415377)**
NPL/Total Loans (%)	**16.08***** (10.05)	**5.99** (4.99)	9.48 (6.56)	6.02 (5.93)
Lost/Total Loans (%)	**14.12***** **(9.96)**	**4.69** **(4.88)**	7.62 (5.14)	3.57 (5.06)
Doubtful/Total Loans (%)	2.80 **(0.45)*****	1.29 **(1.53)**	2.30 **(2.36)****	3.50 **(4.88)**
Sub-standard/Total Loans (%)	2.79 **(1.05)*****	3.27 **(3.22)**	3.54 (2.28)	3.52 (3.52)
Time Deposits/Total Assets (%)	47.12 **(2.92)*****	31.81 **(18.67)**	50.82 **(3.43)*****	35.22 **(21.01)**
Business Loans/Total Assets	24.18 (16.58)	36.36 (12.87)	-- [d]	-- [d]
Business Deposits /Total Assets	10.41 **(4.72)****	16.70 **(11.21)****	-- [d]	-- [d]
Demand Deposits/ Total Assets (%)	**18.85**** (8.86)	**10.14** (6.40)	**18.91***** (8.98)	**9.18** (5.40)
Total Loans/Assets (%)	33.08 (13.99)	45.00 (16.97)	41.77 **(6.21*****)	52.43 **(18.00)**

[a] Means are listed first in each cell, followed by the standard deviations below the mean in parentheses. The upper half of the table includes variables employed in regression equations 1 and 2. The lower half includes demand and time deposit ratios.

[b] Asterisks indicate significant differences between the mean/standard deviation values of the two groups of banks at the 10% (*), 5% (**) and 1% (***) level. Significance is indicated with bold-faced type. Computed from data from the National Bank of Poland.

[c] PLN (New Polish Zloty).

[d] Data on business customers were not available to us for the latter period.

[e] These are the banks that were fully guaranteed in the first period.

[f] These are the banks that were partially guaranteed in the first period.

Table 2
Dependent Variable: Real Total Loan Growth
1995Q1-2000Q2 (Fixed Effects GLS) [a]

	1995Q1-1999Q2			***1999Q3-2000Q2***		
	Policy Variable	*Coefficient*	*P-Value*	*Policy Variable*	*Coefficient*	*P-Value*
Partially Guaranteed Banks	$\sum_{0}^{4}\Delta$WIBOR	**-0.775*** **	0.000	$\sum_{0}^{3}\Delta$WIBOR*DUMT	**-3.518**** **(-4.293)**	0.028
	ΔWIBOR	-0.0569	0.713	ΔWIBOR*DUMT	**-5.366*** **	0.0000
	ΔWIBOR(-1)	**0.600*** **	0.0001	ΔWIBOR(-1)*DUMT	**1.762*** **	0.0058
	ΔWIBOR(-2)	-0.244	0.139	ΔWIBOR(-2)*DUMT	**2.417*** **	0.000
	ΔWIBOR(-3)	**-1.035*** **	0.0000	ΔWIBOR(-3)*DUMT	**-2.332*** **	0.0005
	ΔWIBOR(-4)	-0.040	0.821			
Fully Guaranteed Banks	$\sum_{0}^{4}\Delta$WIBOR *DUMFG	**0.815**** (0.040) [b]	0.0308	$\sum_{0}^{3}\Delta$WIBOR DUMFG*DUMT	**0.0873*** ** **(-3.391)**	0.000
	ΔWIBOR *DUMFG	0.294	0.157	ΔWIBOR *DUMFG*DUMT	1.474	0.1313
	ΔWIBOR(-1) *DUMFG	**-1.001*** **	0.0000	ΔWIBOR(-1) *DUMFG*DUMT	**1.613****	0.0164
	ΔWIBOR(-2) *DUMFG	**0.353****	0.0687	ΔWIBOR(-2) *DUMFG*DUMT	**-1.765*** **	0.0051
	ΔWIBOR(-3) *DUMFG	**0.576*** **	0.0056	ΔWIBOR(-3) *DUMFG*DUMT	-1.234	0.157
	ΔWIBOR(-4) *DUMFG	**0.594*** **	0.0002			
	LIQAS(-1)	**42.832*** **	0.000			
	KAS(-1)	**17.295****	0.0501			
	LOGAS(-1)	**-5.084*** **	0.0000			
	NPLLN(-1)	**-20.202*** **	0.0033			
	Adjusted R^2 = 0.275		D-W = 1.760		60.36 Banks Avg./Qtr. x 22 Quarters	

[a] The bank specific and seasonal dummies, and the GDP growth coefficients are not reported. Significance at the 1%, 5% and 10% level is indicated by (***), (**) and (*) respectively. Significance is indicated with bold-faced type.
[b] The combined effects are reported in parentheses below the cumulative differential effects.

Table 3
Dependent Variable: Real Time Deposit Growth
1995Q1-2000Q2 (Fixed Effects GLS) [a]

	1995Q1-1999Q2			***1999Q3-2000Q2***		
	Policy Variable	*Coefficient*	*P-Value*	*Policy Variable*	*Coefficient*	*P-Value*
Partially Guaranteed Banks	$\sum_{0}^{4}\Delta$WIBOR	**0.377****	0.0494	$\sum_{0}^{3}\Delta$WIBOR*DUMT	**-1.651*** (-1.274)**	0.0000
	ΔWIBOR	**-0.663*****	0.0000	ΔWIBOR*DUMT	-0.736	0.482
	ΔWIBOR(-1)	**0.356****	0.0151	ΔWIBOR(-1)*DUMT	-0.417	0.703
	ΔWIBOR(-2)	**1.128*****	0.0000	ΔWIBOR(-2)*DUMT	-0.523	0.1861
	ΔWIBOR(-3)	0.152	0.376	ΔWIBOR(-3)*DUMT	0.0248	0.985
	ΔWIBOR(-4)	0.116	0.419			
Fully Guaranteed Banks	$\sum_{0}^{4}\Delta$WIBOR *DUMFG	**0.763*** (1.140)** [b]	0.0000	$\sum_{0}^{3}\Delta$WIBOR DUMFG*DUMT	**-4.278*** (-4.789)**	0.0000
	ΔWIBOR *DUMFG	**0.750*****	0.000	ΔWIBOR *DUMFG*DUMT	**-6.803*****	0.0002
	ΔWIBOR(-1) *DUMFG	**0.365****	0.0162	ΔWIBOR(-1) *DUMFG*DUMT	**8.428*****	0.0000
	ΔWIBOR(-2) *DUMFG	-0.0750	0.598	ΔWIBOR(-2) *DUMFG*DUMT	0.405	0.437
	ΔWIBOR(-3) *DUMFG	**-0.800*****	0.0000	ΔWIBOR(-3) *DUMFG*DUMT	**-6.309****	0.016
	ΔWIBOR(-4) *DUMFG	**0.524*****	0.0000			
	LIQAS(-1)	**-7.258*****	0.0053			
	KAS(-1)	**31.113****	0.0000			
	LOGAS(-1)	**-2.506*****	0.0009			
	NPLLN(-1)	5.383	0.293			
	Adjusted R^2 = 0.135		D-W = 2.027		60.36 Banks Avg./Qtr. x 22 Quarters	

[a] The bank specific and seasonal dummies, and the GDP growth coefficients are not reported. Significance at the 1%, 5% and 10% level is indicated by (***), (**) and (*) respectively. Significance is indicated with bold-faced type.
[b] The combined effects are reported in parentheses below the cumulative differential effects.