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Bank Time Deposit Rates and Market Discipline in Poland: The Impact of State Ownership and Deposit Insurance Reform*

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Abstract

This paper examines the impact of ownership structure and changes in the deposit insurance system on the market for bank time deposits in Poland. In an environment of less restrictive bank supervision and a deposit insurance policy that favored state banks, we find that depositors exacted a price for risk taking. After a new law increasing coverage for private banks went into effect, however, bank specific variables became less important in explaining differences in deposit interest rates. We report that the three fully guaranteed state banks pay significantly lower rates than private banks. However, other state-owned banks, with the same *de jure* guarantee as private banks, pay significantly lower rates than private banks, so it appears that depositors treat these state-owned banks as if they have a larger *de facto* guarantee.

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**Bank Time Deposit Rates and Market Discipline in Poland:
The Impact of State Ownership and Deposit Insurance Reform**

During the past several years, Poland has been promoting financial market development and stability through market-based microeconomic banking reforms.¹ The National Bank of Poland (NBP) has evolved into a modern central bank that oversees the payments system and uses open market operations to conduct monetary policy. At the same time, it has enhanced bank safety and soundness by establishing prudential regulations based on the Basel Capital Standards and improving the quality of bank supervision.² The Ministry of Finance has also fostered banking reform through commercializing and privatizing several previously state-owned banks. As a result, the banking system has changed from having a handful of state-owned banks controlling almost all deposits at the beginning of the decade to an environment where state-owned, partially state-owned, privately owned, and foreign banks coexist and compete to provide financial services to Polish firms and households.

This paper examines an aspect of this “mixed” banking system by focusing on the behavior of banks and their customers in the market for time deposits from 1992 to 1996. We believe this subject is worth studying for three reasons. First, all Polish banks are free to set interest rates on the time deposit products they offer, and depositors are free to choose the banks in which they deposit their funds. By examining the deposit rates that individual banks pay, we can observe whether the market is exerting discipline on banks in the sense that weaker banks are being forced to pay a risk premium for funds. As Flannery (1998) concluded in a recent survey article about US financial institutions, “[e]ven in the presence of conjectural federal guarantees, large CD rates sensibly reflect

bank risks. Bank debenture rates came to reflect bank condition once conjectural guarantees were lifted from these instruments. Even small, retail depositors have been shown to behave rationally when some intermediaries exhibit solvency problems.” If we can show similar empirical results for Poland, a nation with a less sophisticated financial system than the United States, we not only illustrate the robustness of Flannery’s conclusions but we also demonstrate that private monitoring of banks can complement public monitoring by bank regulators even in developing countries.³

The second motivation for this study is to examine how changes in deposit insurance coverage affect deposit interest rates. During the period chosen for this study, Poland implemented a new deposit insurance law that made explicit the extent of previous mostly implicit deposit guarantees. Although deposit insurance, properly structured and implemented, can assist in stabilizing banking systems, particularly in transition economies when potentially destabilizing economic restructuring is being undertaken, the guarantees created can increase the potential for moral hazard, especially if banks are undercapitalized. Examining the Polish deposit market during this period of institutional change may help us better understand how private depositors respond to changes in deposit insurance regimes.

The third motivation for this study is to examine the impact of state ownership of banks on deposit rates. Poland adopted explicit differences in deposit insurance coverage between state and private banks. The deposits of three of the largest banks, all state-owned, are fully covered, while the remaining banks have partial insurance; moreover, these three banks pay a lower premium than other banks despite receiving greater

coverage. This policy of differential pricing provides both direct (they pay lower premiums for broader coverage) and indirect (they can offer lower deposit rates than other banks) subsidies to these three banks. By studying this market, we can document the existence of this “cross-subsidization” between fully and partially covered banks. Furthermore, some smaller state-owned banks currently possess the same partial explicit coverage as the private banks, but, given their ownership structure, may actually possess a larger implicit guarantee. Therefore, we also examine whether their ownership status gives them a competitive advantage over private banks in gathering deposits.

We find that before explicit deposit insurance was in effect, the interest rates paid by Polish banks on their time deposits were significantly related to individual bank characteristics, especially for banks with low capital. After the passage of a formal explicit deposit insurance scheme in late 1994, the relationship between these factors and time deposit rates diminishes. Controlling for bank-specific factors, we also show that the three fully guaranteed state banks paid lower deposit rates than the partially guaranteed banks. Thus, we conclude these banks benefited from the larger guarantee. We also find that, again controlling for bank-specific effects, the partially guaranteed state banks paid lower rates than partially guaranteed private banks. It may be that these state-owned banks are perceived as possessing a larger *de facto* guarantee than fully private banks.

This paper is organized as follows. Section two presents an overview of the Polish banking system, describes trends in deposit growth since 1992, and examines the evolution of deposit insurance policy in Poland. Section three discusses the data and methodology used in the empirical analysis, including the hypotheses we test. Section four reports the

empirical results. Section five concludes.

2. The Market Environment for Commercial Bank Deposits in Poland

In terms of the ownership structure of the banking system, Poland has been in transition toward greater privatization since the beginning of the decade. Nevertheless, as of the end of 1997, over half of commercial banking assets were still under full or partial state control. Table 1 lists the major banks in Poland, their total deposits, and the degree of state ownership at the end of 1997. The three largest banks, PKO-BP, Pekao SA, and BGZ, are all fully state-owned and held 46.4 percent of the country's deposits at yearend 1997. PKO-BP is a savings bank that has branches and outlets throughout the country. Its original mission was to accept household deposits and finance residential construction projects. Pekao SA offers, among other services, foreign and domestic currency deposit accounts to its customers and serves as a vehicle for overseas Poles to remit funds to relatives in Poland. In 1997, Pekao was merged with major state-owned banks in three Polish cities, to form Group Pekao, the largest bank holding company in Poland. BGZ serves primarily the agricultural and food processing sectors of the economy. It is jointly owned by the national government and by over 1,200 cooperative banks that offer deposit accounts and loans to private farmers and self-employed craftspeople. Despite having received several capital infusions from the state during the 1990s, it has remained insolvent for several years. Other major Polish banks are listed in Table 1. These include large regional banks as well as those banks primarily engaged in providing international trade and wholesale banking services.⁴ Several of these have been privatized.

Deposit Market Development

Approximately one third of Polish households have never used financial services,

according to a survey reported in Gorniak (1995). He also reports that safety is a major concern of household depositors. These results were confirmed in a 1997 survey by Jerschina (1998), who found that 36.7 percent of Poles surveyed had never used a bank, and only 1.2 percent held a certificate of deposit in the last twelve months. Poland, for the most part, continues to operate as a cash economy. These statistics support the opinion of many researchers and bankers that Poland is underbanked and that the potential to provide additional banking services to the Polish public is one reason foreign banks are attracted to Poland. Depositors in Poland have several options. They can hold demand, savings and time deposits. Deposit accounts are available in zloty as well as in foreign currencies (US dollar or Deutschmark).

For the purpose of analyzing aggregate deposit trends, we divide our period of study into two subperiods based on yearend figures: 1991 to 1994, and 1994 to 1997. Table 2 reports on how several categories of deposits, adjusted for inflation, have grown over the period. One can observe that the demand for foreign currency deposits was growing much more rapidly than zloty-denominated deposits from 1991 to 1994. During this period, inflation was extremely volatile, and exchange rate policy was uncertain, with the Polish government devaluing the zloty twice in addition to maintaining a crawling peg depreciation rate of 1.8 percent per month.⁵

After 1994, however, foreign currency deposits fell sharply, declining 16 percent by yearend 1997. There are several potential explanations. First, the zloty was redenominated at the beginning of 1995 with one new zloty equal to 10,000 old zloty. This may have enhanced public confidence in the domestic currency. Second, the dollar fell

sharply against most currencies in the first half of 1995, so the real exchange rate value of the zloty was appreciating. This may have induced Poles to switch to zloty-denominated deposits given the interest rate on zloty deposits was much higher than on dollar deposits. Third, formal deposit insurance was passed in late 1994 and took effect in March 1995, which may have enhanced public confidence in local currency deposits.

Examining the growth of zloty-denominated deposits, the acceleration of overall deposit growth from 1991 to 1997 is clear: total deposits grew 19.5 percent after inflation from 1991 to 1994 and 59.7 percent from 1994 to 1997. Household demand deposits soared, accelerating in the latter period to a 147.8 percent gain after inflation. This may have been due to an increased willingness of banks to make personal loans beginning in early 1995, since this would permit banks to increase checkable deposits.

Personal time deposits grew 22.9 percent after inflation over the 1991-1994 period and more than doubled from 1994 to 1997. The introduction of deposit insurance, an improving economy, increasing confidence in the zloty and declining inflation are all possible explanations for the rapid growth. Table 3 classifies zloty time deposits of households by term to maturity. These data show that the vast majority of time deposits have a term to maturity less than one year. Given the volatility of inflation and the rates offered on longer-term deposits by Polish banks, depositors were evidently reluctant to hold longer-term time deposits. The share of total time deposits with maturity over one year fell from 13.1 percent at the end of 1991 to about 4 percent by the end of 1997.

Figures 1A and 1B illustrate the short-term interest rate environment facing Polish banks during the 1992-1997 period. The general decline in interest rates during this

period was driven primarily by falling inflation. Examining Figure 1B, one can observe that the spread between the three month T-bill and deposit rate was much higher in 1992-1993 (except for a brief period in March and April of 1993 where the Ministry of Finance tried to hold down Treasury rates) than in the 1994-1997 period. Moreover, if one adjusts the deposit rate for reserve requirements (9-10 percent over the sample period), the spread between the T-bill rate and adjusted deposit rate became negative in the second half of 1994 and early 1995, turned up sharply in 1995, and declined to almost zero in late 1996. Since that time, NBP has raised short-term Treasury rates substantially to stem loan growth and reduce inflationary pressure. The resulting narrowing of interest rate spreads between loans and Treasuries has made government securities relatively more attractive for banks to hold.

The Development of the Deposit Insurance System

Deposit insurance is an important component of prudential regulation. Deposit insurance promotes a stable flow of funds to the banking system by instilling public confidence in the safety of their funds. Government deposit guarantees, however, also reduce the incentive for depositors to monitor banks or for banks to monitor each other. In the absence of adequate government supervision, this lack of monitoring can lead to excessive moral hazard behavior by poorly capitalized banks. Thus, the structure and implementation of the insurance scheme determines the incentive structure for all those involved. It also determines the degree and distribution of risk in the system, both of which affect banking system soundness.

It has been argued that extensive or full government deposit insurance schemes are

not well suited to transition economies.⁶ Transition economies often do not have adequate prudential regulations, accounting standards are not high enough to provide accurate measures of bank net worth, and regulatory agencies often lack the expertise to contain moral hazard. The governments of these economies also cannot afford extensive payoffs to depositors. On the other hand, it can be argued that without deposit insurance, the inherent risk in an unstable transition economy and its banking system will reduce overall saving, adversely affecting both financial and real sector development.

The Polish deposit insurance scheme is an example of a system that went through three distinct structural changes, each establishing its own set of monitoring incentives for depositors and affecting the level and distribution of risk in the banking system. Deposit insurance started as a bifurcated system with full guarantees for state banks and no guarantees for private banks (1989-1992). It then moved to a possible implicit partial guarantee for private banks and a full guarantee for state banks (1992-94), and finally resulted in explicit full coverage for three large state banks and partial coverage for all other banks (1995-present). In conjunction with the incentives created by these changes, depositors appear to have had access to both audited and unaudited information on individual banks. The combination of shifting incentives and bank-specific information may have allowed depositors to discipline the deposit rates paid by banks.

Before 1989, Polish law contained no provisions for deposit protection. The 1989 Banking Law (Article 49) made the Ministry of Finance liable for the deposit claims of the NBP, three state banks (PKO-BP, Pekao SA, and BGZ), 11 joint-stock banks, 3 other state-owned banks and 1664 cooperative banks. This law provided full deposit coverage

only for the state-owned banks. Private banks were not covered, even partially, by the state.⁷

In the early years of banking system development, government monitoring was in an infant stage. Although the 1989 NBP Act gave the central bank sole supervisory responsibility over banks, the fragility of the banking system and the magnitude of economic change brought about by the “shock therapy” stabilization program of 1990 made it extremely difficult to enforce prudential regulations even if bank supervisory skills had been adequate. In addition, a liberal chartering policy designed to promote greater competition was adopted in 1989, so during this high-risk period, the number of banks increased from the above mentioned 14 state-owned banks to 75 private and state-owned banks from 1989 to 1990. By the end of 1993, private banks numbered about 80 and held about 21% of the total assets and 18% of the total deposits of the commercial banking system. The bifurcated deposit insurance system (full guarantee for state-owned banks and no guarantee for private banks) created incentives for depositor monitoring.

The combination of poorly capitalized banks, inadequate bank supervision, imperfect private monitoring, corruption, and an unstable economy pushed several private banks into insolvency within the first few years of the transition. Bank Handlowo Kredytowy of Katowice was the first commercial bank put into receivership and was liquidated by August 1992. Soon after, several weak banks were either strongly encouraged to merge with other banks, or forced into bankruptcy. From August 1992 to the end of 1995, action was taken by the NBP (i.e., decrees were issued) on 14 private commercial banks. Twenty other weak banks were merged with stronger banks with the

aid of NBP, but without official action.

After several cooperative bank failures, the NBP formulated its own deposit insurance policy in the middle of 1992. All deposit accounts were to be fully covered up to 1000 ECU (\$1,300 US) and 90% for the next 2000 ECU. This regulation, however, was not officially announced to the banks or the public. Rather, NBP intended to slowly reveal its policy to the public as banks failed. Since NBP did not have the authority to charge banks a deposit insurance premium, a policy of not clearly revealing the existence and conditions of coverage may have mitigated moral hazard behavior by banks by encouraging depositor monitoring. At the same time, this policy may have averted a panic by giving some assurance that NBP would provide funds in the event of a systemic failure. At the end of 1993 the Parliament passed a resolution, which was then included in NBP's annual guidelines, compelling NBP to provide their previously implicit coverage for 1994. Publicity for this resolution, however, was not extensive. Many newspaper articles continued to write about the full guarantee for state banks and the lack of insurance for private banks.

An implicit guarantee may not have existed in the minds of the public. The cost of these bank failures to the NBP was relatively small. For example, the NBP made payments to depositors in only two out of 14 closures: one to a cooperative bank in June 1992 (for which NBP was reimbursed from the government budget) and the second to Bank Posnania in August 1995 (for a failure by the bank in January 1995 – one month before the formal deposit insurance took effect). The NBP did, however, arrange the merger or buyout of several weak banks. These actions may have improved the solvency of the

banking system while retaining a role for private depositor monitoring.

During this volatile period, depositors had some ability to monitor bank risk. Although disclosure laws only required publicly traded banks to provide information on their performance, depositors had other information sources. Popular newspapers (e.g., *Rzeczpospolita* and *Nowa Europa*), bank specialty newspapers (e.g., *Gazeta Bankowa*), and specialty magazines (e.g., *Bank*) reported measures of bank performance and bank risk (including various balance sheet and income statement items). Since it may have been to a bank's short-term advantage to disseminate information that enhanced depositor confidence even when the information may not be accurate, many publications only printed survey data certified by legitimate international auditors. Although this information may not have always been relevant in assessing solvency risk, depositors had some means of monitoring bank risk.

After years of debate in the Parliament, a bill establishing formal deposit insurance was passed in December 1994 and became law at the end of February 1995. This law established the Bank Guarantee Fund (Bank Fundusz Gwarancyjny, BFG). The BFG was to assist in bank supervision (after a bank's failure), and to administer two funds: (1) the Deposit Protection Fund which reimburses depositors of failed banks; and (2) the Bank Assistance Fund which provides financial assistance in the assumption of troubled banks by healthy ones.

The Deposit Protection Fund provides for full coverage of all deposit accounts at PKO-BP, Pekao SA, and BGZ.⁸ In 1996, these banks paid premiums of 0.20% (0.12% for 1997) of total deposits. Full coverage is scheduled to terminate at the end of 1999.

Premiums for all other banks were 0.40% in 1996 (0.18% for 1997) of total deposits.

Deposit premium rates are adjusted annually based on the estimated needs of the fund for the coming year. Annual premiums are not paid to the Deposit Protection Fund, but are held by banks in a special deposit account collateralized by Treasury bills. Banks are assessed *ex post* for the cost of compensating depositors of failed banks. The Deposit Protection Fund initially provided coverage up to 3000 ECU (100% of the first 1000 ECU and 90% of next 2000 ECU) for state-owned, private Polish, and foreign banks (other than the fully guaranteed banks).⁹

From 1995 to early 1997, the Deposit Protection Fund spent \$51.4 million covering the deposits (only to the limits specified in the deposit insurance law) of 124 failed cooperative banks and 4 commercial banks. On average, depositors lost 8% of their deposits and waited 125.2 days for the final payment of their funds.¹⁰

The Bank Assistance Fund, however, is financed by *ex ante* assessments of commercial banks. The premiums are 0.20 percent of total risk weighted assets (computed as set forth by the Basle Accord) for the three largest banks and 0.40 percent for other banks. The choice of basing premiums on risk-weighted assets instead of deposits was designed to reduce the problem of mispricing deposit insurance by using fixed-rate deposit premiums. However, it does not eliminate the problem since undercapitalized banks with large Treasury security portfolios might pay less for deposit insurance than a well-capitalized bank with a healthy loan portfolio. Unlike the premiums paid for the Deposit Protection Fund, these premiums are paid directly to the Bank Assistance Fund.

The Bank Assistance Fund collected \$150.7 million in the 1995-1996 period and made loans of \$45.5 million for nine restructuring projects. These loans were for acquisitions of 5 commercial banks and 1 cooperative bank, and for the self-recovery of 1 commercial bank and 2 cooperatives. They are ten year loans during which only the interest is paid for the first 5 years.

The establishment of formal deposit insurance lowers the incentive for monitoring by depositors and potentially increases moral hazard incentives for bank risk-taking. Given the high risk associated with the economic transition and the lack of strong government supervision to contain this moral hazard problem, these incentives could lead to adverse consequences for the banking system, the state budget, and the overall economy. Since the explicit level of full coverage was only 1000 ECU per depositor before 1997, the risk exposure to the BFG is relatively modest. In addition, the 10 percent of deposits that were not covered for deposit balances above 1000 ECU and below 3000 ECU (prior to July 1997) meant that these depositors had an incentive to monitor. The time delay in paying off depositors also provided a monitoring incentive. Since coverage is per depositor per bank, depositors are encouraged to spread their deposits over several banks for maximum coverage. For firms, though, spreading balances across banks to increase coverage can be particularly costly. Insurance, however, did not cover multi-factory firms that may find it cost effective to bank at branches of a single institution.¹¹ This means that the deposits of firms at partially insured banks are at greater risk than deposits of households. Thus, firms have a greater incentive to monitor bank risk-taking. Alternatively, they will have a greater incentive to bank at one of the three large state

banks possessing a full guarantee.

The more serious moral hazard problem is the differential treatment of the three large state-owned banks *vis-a-vis* the other banks. These three banks receive a full state guarantee yet their premium is approximately one-half the rate other banks pay.

Depositors have no incentive to monitor the behavior of the three fully covered banks, giving them a competitive advantage over other banks in the deposit market.

3. Data and Methodology

Since we are interested in examining the implications of the change in the deposit insurance system, our quarterly sample ranges from 1992:1-1996:4. This includes 11 quarters before the passage of formal deposit insurance and 9 quarters after. The starting point of the first period was chosen due to the unavailability of data in previous periods. Since the Polish Parliament passed formal deposit insurance legislation in December 1994, the third quarter of 1994 was chosen as the break point between sample periods even though the law did not take effect until February 1995. Since several mergers and privatizations took place in 1997, the sample period was ended in 1996:4. The number of banks in the sample changes due to bank entry and exit, but averages 58 banks per quarter over the sample period. The sample consists of 18 state-owned banks (3 of which had the full deposit guarantee for the entire period), 7 foreign banks, and 55 private Polish banks.¹³ This includes complete data on 80 out of approximately 110 commercial banks that did or still exist, representing a mean value of about 90 percent of total assets.

The dependent variable (the spread) is calculated as the difference between the six month deposit rate and the six month Treasury bill rate. Since reserve requirements are a

cost of raising deposits that are built into deposit rates, these rates are adjusted for reserve requirements changes. The six month deposit rates for each bank were obtained from various issues of *Gazeta Bankowa*. The six month yield on T-bills and the reserve ratio on time deposits were taken from various issues of the *NBP Information Bulletin*. Data for all bank-specific explanatory variables were obtained from the NBP and from various issues of *Biuletyn Statystyczny* (Statistical Bulletin) from GUS (The Main Statistical Office).

We model deposit market discipline by assuming a perfectly competitive market for a homogeneous time deposit, as in Hannan and Hanweck (1988). Any differences in deposit rates between banks will reflect the quality of the deposit as determined by the probability of depositor payback. Differences in rates across banks are then due to differences in bank-specific solvency risk. We directly estimate the relationship between the deposit rate/T-bill rate spread and measures of bank-specific solvency risk. We include the following bank-specific explanatory variables in our analysis:

- **Capital-Asset Ratio.** We use the ratio of Tier 1 plus Tier 2 capital to total assets. The risk premium should be inversely related to this ratio.
- **Asset Growth.** It has been argued that the rapid growth of Polish bank deposits has been partly due to rapid loan expansion. The deposit rate offered by banks should be positively related to the growth of assets. For poorly capitalized banks, asset growth may reflect an attempt by banks to exploit the moral hazard incentive for greater risk-taking. Banks should be willing to pay higher rates to gamble for resurrection because they would keep the gains if they are successful and creditors (including the

government) would absorb the losses if the bank fails. For well-capitalized banks wishing to expand rapidly, they may have had to pay higher rates to secure funds to support their expansion, especially if the demand for deposits at an individual bank is interest inelastic. Thus, the deposit rates of aggressive, well-capitalized banks may be positively related to the capital-asset ratio as well as to asset growth.

- **Loan-Asset Ratio.** In trying to understand the determinants of bank failure, credit risk plays an important role. Credit risk can be measured using the loan-asset ratio. Assuming that the credit risk associated with a zloty of loans is constant across all banks, the greater fraction of loans to assets the greater the credit risk at any bank. Thus, a positive relationship should exist between the deposit rate spread and the loan-asset ratio.
- **Regional Risk.** The loan-to-asset ratio assumes that a zloty of loans at one bank is as risky as a zloty at any other bank. The Polish loan market has been a credit risk roulette wheel for banks, due to the overall restructuring of the economy. This credit risk has had a differential effect on individual banks because of differing economic performance among various industries and regions. The potential for regional variation in bank risk is especially relevant in the Polish banking system where individual banks have assets concentrated heavily in particular industries or regions. As a proxy for this regional risk we use the unemployment rate in the county where the bank is based. Higher unemployment rates imply greater risk and thus should be positively correlated with deposit rates.
- **Size.** Other things equal, larger banks may be better able to diversify their asset

portfolios than smaller banks, potentially leading to lower risk. Larger banks may have greater name recognition with potential depositors, making it relatively easier to attract new funds. Polish regulatory policy also favors larger banks. The initial full guarantee to all state banks and the later full guarantee to three of the largest gave the largest banks an advantage in raising funds. In addition, some regional Polish banks may be considered too large to fail. All of these arguments would suggest a negative relationship between bank size and deposit rates.

- **Business Deposits.** The relationship between deposit rates and other bank-specific variables may also be affected by the degree of monitoring by partially insured depositors. Providing a ceiling on deposit insurance coverage means that small accounts are fully insured while large accounts are not. Partially covered depositors have stronger incentives to engage in monitoring. The ratio of the value of partially insured deposits to total deposits could proxy for the degree of monitoring. Since it is more likely that the deposits of businesses would exceed the insurance limit than deposits of households, we use the ratio of business deposits to total deposits as a proxy for the degree of private sector monitoring. As the degree of monitoring increases, we expect deposit rates to be more strongly related to bank-specific measures of risk. Monitoring can take two forms: depositors could demand higher rates from weaker banks in compensation for greater risk bearing or depositors could move their funds to safer banks (e.g. if rates are a minor consideration). If the latter were true, we would observe a negative relationship between the business deposit ratio and the deposit spread. This relationship would be stronger if this ratio also acts as an

indicator of bank safety for household depositors.

The relationships between the deposit rate/T-bill rate spread and the bank-specific explanatory variables mentioned above can be expressed in the following equation,

$$(1) \quad SPREAD_{it} = \alpha_0(DUMT_t) + \alpha_1(DUM_k) + \alpha_2(SIZE_{it}) + \alpha_3(KAS_{it}) + \alpha_4(GROWTH_{it}) + \alpha_5(LNAS_{it}) + \alpha_6(UNEM_{it}) + \alpha_7(BUSDEP_{it}) + \epsilon_{it}$$

where the *SPREAD* is the difference between the deposit rate for the i^{th} bank and the T-bill rate of comparable maturity adjusted by the reserve requirement ratio. *SIZE* is measured by the logarithm of total assets; *KAS* is the ratio of tier 1 plus tier 2 capital to total assets; *GROWTH* is the percentage change in total assets between quarters; *LNAS* is the ratio of loans to assets; *UNEM* is the regional unemployment rate; and *BUSDEP* is the ratio of business to total deposits. Balance sheet variables are measured end of period. Table 4 contains sample means of balance sheet ratios of three groups of banks examined in the study. We hypothesize that α_1 , α_2 and α_3 should be less than zero while α_4 , α_5 and α_6 should be greater than zero.¹³

Time dummies were included in each period to control for the effects of macroeconomic and other variables that do not vary cross-sectionally. What remains are the cross-sectional differences between banks and bank groups. DUM_k is a dummy variable for the k^{th} bank group, $k =$ “2 fully guaranteed banks,” “14 other state-owned banks,” “7 foreign banks,” “2 state-owned negatively capitalized banks,” and all other banks.” The it subscript refers to the i^{th} bank for the t^{th} quarter.

This regression model is used to examine four questions. First, did market discipline exist, that is, did the above bank-specific factors significantly explain bank deposit rates? Second, did the degree of market discipline change significantly between the pre-insurance and post-insurance periods, that is, does the magnitude and significance of the bank-specific factors decrease in the post-insurance period? Third, while controlling

for bank-specific and time effects, did the three state-owned banks with a full guarantee pay significantly lower deposit rates than private banks? Fourth, controlling for bank-specific and time effects, did the other state-owned banks pay significantly lower rates than the private banks in the pre-insurance period and in the post-insurance period when they had the same *de jure* coverage as private banks?

4. Estimation and Results

The model is estimated from a pooled cross-sectional time series for two time periods: 1992:1-1994:3 and 1994:4-1996:4. Equation (1) was estimated by generalized least squares for the two periods coinciding with the two deposit insurance regimes (full coverage for state-owned banks and no coverage for private banks in the first period and partial coverage for both groups with full coverage for the three largest state-owned banks in the latter period). Because depositors are more likely to scrutinize the economic behavior of banks with low capital than well-capitalized banks, we decided to divide the sample into two groups based on the mean capital-asset ratio. A capital-asset ratio of 12 percent was used as the dividing point for two reasons. First, Polish banking regulations stipulate that *de novo* banks must maintain a 12 percent capital-asset ratio for the first year of operations. Second, this threshold separated the sample almost in half. We would expect bank-specific variables to be more significantly related to deposit rates for the low capital group. A Chow test was performed to test the joint hypothesis that coefficient estimates between the low and high capital bank groups were equal. The hypothesis was rejected at the one percent level in both periods, thereby providing statistical support for dividing the sample in this way.

The coefficient estimates for the two capital-asset groups during both periods

appear in Table 5 using the six-month rate spread as the dependent variable. This variable was chosen because the majority of Polish time deposits appear to have a term to maturity close to six months. The coefficient estimates for the fully guaranteed bank dummy variable show that in both periods, controlling for bank-specific effects, the fully guaranteed banks paid significantly lower deposit rates than either private banks or other state-owned banks. The coefficient becomes less negative in the post-insurance period, when private banks had partial coverage, but the coefficient is still significant at the one percent level. The coefficients on the other state-owned bank dummy are significantly less negative than those of the three large state banks in the first period, even though both groups had a full *de jure* guarantee. In the second period when the other state-owned and private banks had the same *de jure* guarantee, the coefficient estimate for other state-owned banks with low capital was still significantly negative. This highlights the possibility that a more comprehensive *de facto* guarantee may have existed, and may still exist, for these banks. A foreign bank dummy was added to allow better separation of state-owned and private banks. Though foreign banks are private, they may have an advantage because they may be perceived as providing better service or greater safety relative to Polish banks. They may therefore be able to pay lower rates. The coefficient on this dummy variable is negative, as expected, and significant in both periods, though it becomes less negative in the second period. This may indicate that the advantage enjoyed by foreign banks is diminishing.

The results for the other explanatory variables, by and large, are consistent with our hypotheses. The coefficient on asset size is negative and significant in both periods. The coefficient on the capital-asset ratio is negative and significant in the first period, but

becomes small and insignificant in the second period, which is consistent with less monitoring after formal deposit insurance was enacted. Asset growth has the expected positive sign and is significant in both periods. The loan-asset ratio is positive and significant in the early period, but is insignificant in the post-insurance period. Regional unemployment is surprisingly negative and significant for well-capitalized banks in the latter period. This may reflect more aggressive deposit gathering behavior by banks in counties with low unemployment rates as they try to meet growing loan demand. The coefficient on business deposits is negative and significant in both periods but declines in magnitude in the second period. This is consistent with the view that banks with larger amounts of business deposits are more closely monitored by businesses and are safer, and that monitoring diminishes when more comprehensive deposit guarantees exists.

Table 5 also reports the results for the well-capitalized banks. Not surprisingly, the results are mixed. The capital-asset ratio, the loan-asset ratio, and the unemployment rate are insignificant in the pre-insurance period. In the latter period, the capital-asset ratio is significant at the 10 percent level, but asset growth, the loan-asset ratio, and unemployment are insignificant. Asset size and the business-deposit ratio both have the expected signs and are significant in both periods.

In general, the coefficients on bank-specific variables are of the correct sign and significant in the pre-insurance period, but are of smaller magnitude and/or insignificant in the post-insurance period. The joint hypothesis that coefficient estimates for the low capital group were equal in both periods was rejected at the one percent level, and the same is true of the high capital group. The adjusted R^2 indicates that the explanatory power of the variables in the pre-insurance period is greater than in the second period. The

decreasing explanatory power and decreasing significance of most variables in the second period may be explained by the introduction of deposit insurance, but it may also be due to other factors such as increasing competition or improved economic performance.

5. Conclusions

This paper examines the behavior of Polish depositors and banks from 1992 to 1996. Given an absence of strong bank regulation and supervision and in the presence of a bifurcated deposit insurance regime, this paper examines the degree of the market discipline that depositors impose on banks. We conclude that in the period before explicit deposit insurance was the law of the land, depositors exacted a price for risk. However, in the post-insurance period, risk factors are either insignificant and/or decrease in absolute value for the less capitalized banks. A second finding is that the fully guaranteed banks paid significantly lower deposit rates than private or other state-owned banks, even when controlling for other bank-specific factors. These three large state-owned banks continue to dominate the banking system, controlling almost half of total deposits as of the end of 1997, and they are among the least capitalized Polish banks. Current deposit insurance regulations give them more generous coverage at a lower cost than other banks, resulting in cross-subsidization. Thus, regulatory policy has removed the use of market discipline as a check on these banks' behavior. They have little market incentive to improve efficiency and capital adequacy due to the full guarantee. Although this differential treatment is scheduled to end in 1999, until that time, well-capitalized private and state-owned banks will remain at a competitive disadvantage, raising their cost of funds and reducing their profitability.¹⁴ Third, the deposit rates of well-capitalized banks are not as

responsive to changes in risk factors. Fourth, the business-deposit ratio appears to serve relatively well as a proxy for greater monitoring. The estimated coefficients on this variable tend to be large and significant in the pre- and post-insurance periods, indicating that relatively small deposit insurance coverage for businesses gives them greater incentive to monitor. This result is important given that the deposit insurance coverage has recently increased for multi-plant firms. Fifth, even though other state-owned banks have the same *de jure* partial guarantee as the private banks in the post-insurance period, those in the low capital group pay significantly lower deposit rates after controlling for bank-specific factors. Hence, they may be viewed as having more comprehensive *de facto* coverage. This has important implications for state owned banking systems (or systems to be nationalized) that limit *de jure* coverage in an attempt to promote market discipline and prevent moral hazard.

Because certain state-owned banks receive a broader insurance guarantee relative to other banks, our results illustrate how this differential treatment can affect a bank's cost of funds. If banks receiving a full guarantee can attract funds at lower rates, they will have a competitive advantage over other banks. Given that these banks are also often the ones that need the most restructuring, the current system in Poland may be reducing economic incentives to modernize these banks' operations in preparation for the opening of Polish banking to foreign competition in 1999.

We believe that our empirical results demonstrate that private monitoring of banks can complement monitoring by bank regulators even in a country with a less sophisticated financial system; thus, opportunities for private monitoring should be included when designing deposit insurance systems. In fact, given that the supervisory capabilities of

bank regulators may be lower in developing countries due to a lack of resources and skilled personnel, the benefits of private monitoring may be even greater than in a developed economy.

1. See Mondschean and Opiela (1997) for a survey of banking system reform in Poland.
2. For a detailed discussion of the reform of the NBP, see Ugolini (1996).
3. Deposit rates have been used by many researchers to measure the degree of market discipline imposed on banks. Examples include Baer and Brewer (1986), Hannan and Hanweck (1988), Ellis and Flannery (1992), and for Chile, Davies and Robitaille (1997).
4. In 1989, the commercial lending arm of the National Bank of Poland was separated from the central bank. It was then divided into nine regional banks located in major Polish cities. For more information, see Mondschean and Opiela (1997). Bank Handlowy, founded in 1870, is the nation's leading corporate bank. BRE is primarily engaged in financing international transactions. PBR acts as a wholesale bank, lending money to other banks from its own resources as well as from foreign credit lines. Kredyt Bank PBI was not part of the original nine carved out of NBP in 1989, but has grown rapidly due to several acquisitions.
5. A discussion of Poland's exchange rate policy during the first few years of transition can be found in Otker (1994).
6. See World Bank (1996).
7. Private banks might have formed a co-insurance system (similar to U.S. state-chartered banks in the late 1800s and early 1900s), but the adverse selection problem associated with lax entry requirements, underdeveloped laws on collateral, lack of audited information on banks, and the risky environment associated with the transition created a climate too risky for co-monitoring. For more historical information on co-insurance schemes for deposit insurance in the United States, see Calomiris (1990).
8. The other three banks in the Group Pekao holding company are not explicitly included

in the full guarantee given to Pekao SA. Since the merger did not take place before the end of our sample period, these banks are classified as “other state-owned banks.”

9. This coverage increased from 3,000 ECU to 4,000 ECU on July 1, 1997, and to 5,000 ECU as of January 1, 1998. It is scheduled to increase to 7,000 ECU in January 1999 and the goal is for coverage to eventually increase to 25,000 ECU to meet EU standards.

Currently, cooperative banks are also covered by the Depositor Protection Fund. When the cooperatives are reorganized, they will have a separate fund financed by the cooperatives alone.

10. Each zloty amount was converted using the average daily exchange rate during December 1995 and 1996.

11. This facet of the law has been altered. As of July 1, 1997 each branch of multi-plant firms and non-profit organizations will enjoy the same coverage as individual accounts. We develop the implications of this change in coverage in Sections 3 and 4.

12. Many foreign banks are excluded since deposit rate data were not available. Some of the private banks are partially owned by local governmental bodies, state-owned enterprises, or cooperatives.

13. As argued above, β_2 may be > 0 for highly capitalized banks that are growth oriented.

14. Opiela (1998) provides evidence that this full guarantee gives these three banks an advantage in raising time deposits. This allows them to continue expanding loans during periods of contractionary monetary policy.

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Table 1
Structure and Ownership of the Polish Banking Industry

Bank	Total Deposits (mln. PLN)	Percent of Total Banking System	Percent of State Ownership
Fully Guaranteed Banks			
Powszechna Kasa Oszczednosci - Bank Panstwowy (PKO-BP)	37,445.0	25.7	100.0
Bank Gospodarki Zywnosciowej (BGZ)	8,200.6	5.6	100.0
Polska Kasa Opieki SA (Pekao-SA)	21,822.9	15.0	100.0
Total for Fully Guaranteed Banks	67,468.5	46.4	100.0
Other Group Pekao Banks			
Powszechny Bank Gospodarczy (PBG)	2,887.0	2.0	100.0
Bank Depozytowo-Kredytowy (BDK)	3,146.6	2.2	100.0
Pomorski Bank Kredytowy (PBK-S)	3,095.6	2.1	100.0
Other Large Polish Banks			
Bank Slaski (BS)	6,081.3	4.2	5.0
Bank Przemyslowo-Handlowy (BPH)	5,591.7	3.8	46.7
Powszechny Bank Kredytowy (PBK)	5,756.9	4.0	53.3*
Bank Handlowy (BH)	4,960.7	3.4	7.9
Kredyt Bank PBI	4,710.3	3.2	10.6*
Wielkopolski Bank Kredytowy (WBK)	4,487.0	3.1	5.1
Bank Zachodni (BZ)	4,051.3	2.8	100.0
BIG Bank Gdanski (BG)	3,960.7	2.7	6.0*
Bank Rozwoju Eksportu (BRE)	3,249.9	2.2	0
BIG Bank	1,186.7	0.8	6.0*
Polski Bank Rozwoju (PBR)	266.4	0.2	29.5
Other Banks	24,618.1	16.9	
Total System Deposits	145,518.7	100.0	

*Includes shares held by state-owned insurance companies.

All data are as of December 31, 1997

Source: National Bank of Poland.

Table 2**Real Deposit Growth at Polish Commercial Banks--1991-1997
(Percent)**

Category	1991-1994	1994-1997
Total Deposits	28.21	34.00
Zloty Denominated Deposits		
Total	19.50	59.65
Demand Deposits	12.59	24.07
Corporate	6.76	-11.78
Personal	38.74	147.75
Time Deposits	24.31	82.10
Corporate	27.71	23.38
Personal	22.90	107.62
Foreign Currency Deposits		
Total	49.44	-15.99
Demand Deposits	52.00	-15.25
Corporate	-8.58	195.09
Personal	59.33	-29.85
Time Deposits	48.15	-16.37
Corporate	134.24	144.13
Personal	45.62	-23.96

Source: National Bank of Poland Information Bulletins (1992-1997).
All data are measured at the end of each year.

Table 3

**Zloty Time Deposits of Households by Maturity
(Percent of Total at End of Each Year)**

Maturity	1992	1993	1994	1995	1996	1997
< 1month	0.34	0.59	0.12	2.70	4.21	5.94
1-6 months	65.94	56.38	55.42	57.74	57.95	57.17
6-12 months	23.98	33.72	35.99	33.6	32.82	32.99
1-2 years	2.90	2.83	2.82	2.39	1.97	1.18
Over 2 years	6.84	6.47	5.65	3.57	3.05	2.72

Source: National Bank of Poland.

Table 4**Balance Sheet Ratios by Bank Group**

	Fully Guaranteed State-Owned	Other State-Owned	Private
Number of Banks in Sample	3	15	62
Percent of Total System Assets	37.8	43.5	7.3
% of Sample Assets	42.7	49.1	8.3
Securities/Total Assets (%)	28.4	22.4	18.5
Loans/Total Assets (%)	32.1	35.5	47.1
Total Deposits/Total Assets (%)	64.0	41.5	44.0
Demand Deposits/Total Assets (%)	20.3	14.6	9.7
Time Deposits/Total Assets (%)	43.7	27.2	34.5
Zloty Deposits/Total Assets (%)	40.3	30.2	36.6
Zloty Dem. Deposits/Total Assets (%)	12.3	11.1	8.8
Zloty Time Deposits/Total Assets (%)	27.9	19.2	28.0
FC Deposits/Total Assets (%)**	23.7	11.5	8.1
FC Demand Deposits/Total Assets (%)	8.0	3.5	1.1
FC Time Deposits/Total Assets (%)	15.7	8.0	7.0
Business Deposits/Total Assets (%)	9.0	17.2	23.5
Capital/Total Assets (%)	1.9	7.1	11.1

* Mean values within each group

** Foreign Currency (FC)

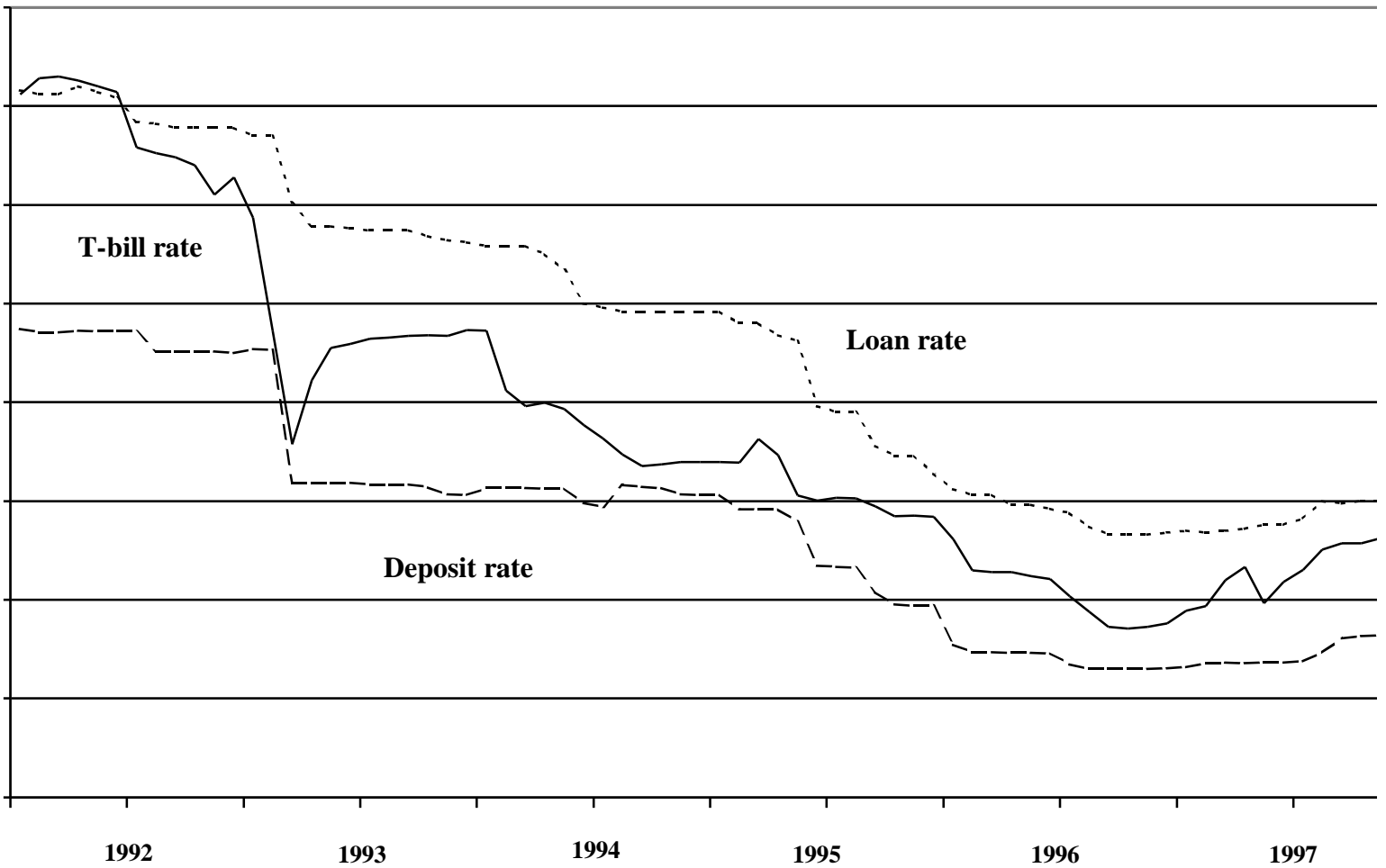
Source: Computed from data from the National Bank of Poland.

Table 5
The Effect of Bank-Specific Factors on Deposit Rate Spreads
Dependent Variable: Spread between 6 month deposit and T-bill rates

Variable	Capital/Assets ≤ 0.12		Capital/Assets > 0.12	
	1992:1-1994:3	1994:4-1996:4	1992:1-1994:3	1994:4-1996:4
Fully Guaranteed Dummy	-7.55 (-16.81)***	-2.27 (-6.11)***	-	-
Other State-Owned Dummy	-0.74 (-3.28)***	-0.45 (-2.66)***	-4.43 (10.02)***	-1.83 (-3.82)***
Foreign Dummy	-5.73 (-11.88)***	-1.81 (-3.10)***	-	-0.84 (-3.27)***
Negative Capital Dummy	0.64 (1.72)*	0.53 (2.41)**	-	-
Log(Assets)	-0.32 (-8.88)***	-0.25 (-4.27)***	-0.27 (-3.89)***	-0.47 (-4.70)***
Capital/Assets	-2.22 (-1.99)**	-0.30 (-0.74)	0.67 (0.99)	-1.04 (-1.85)*
Asset Growth	0.17 (0.56)	1.387 (2.91)***	-0.42 (-1.73)*	-0.065 (-0.23)
Loans/Assets	1.70 (3.94)***	0.27 (0.73)	-0.87 (-1.67)*	0.61 (1.43)
Regional Unemployment	-0.45 (-0.20)	-2.65 (-1.83)*	-12.09 (-4.05)***	-1.89 (-0.96)
Business Deposits/ Total Deposits	-2.49 (-7.86)***	-1.63 (-6.43)***	-1.87 (-5.08)***	-1.07 (-2.23)**
Adjusted R ²	0.918	0.757	0.900	0.787
Number of Observations	389	318	224	219

Note: Coefficients on the time fixed effects are omitted, but are available upon request. The t-statistics in parentheses are starred to emphasize that the coefficients are significantly different from zero at the 10(*), 5(**), and 1(***) percent levels. Missing values for dummy variables in the third and fourth columns are

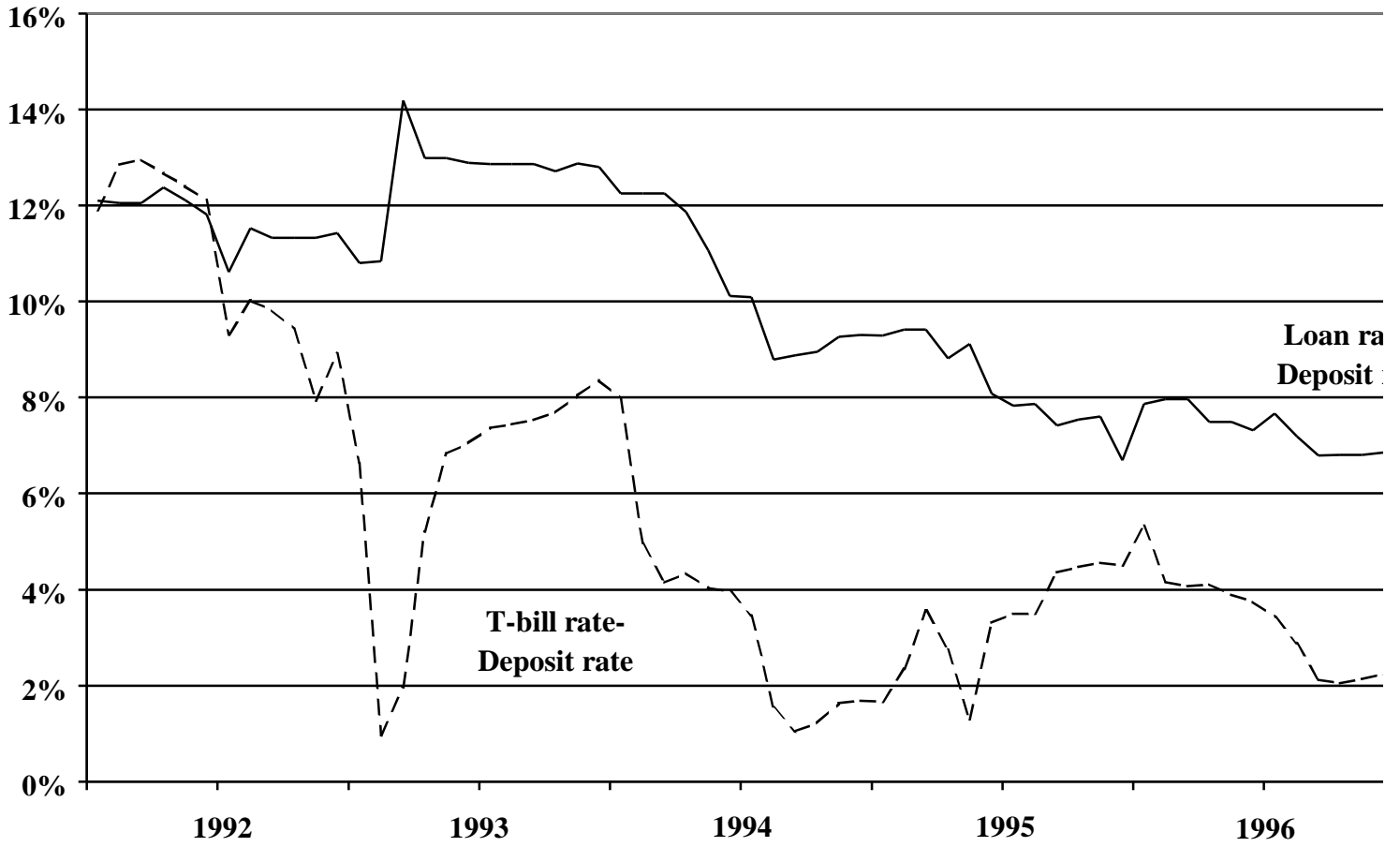
Figure 1A
Selected Three-Month Interest Rates



because no banks falling into those categories had capital ratios above 12 percent during the sample period.

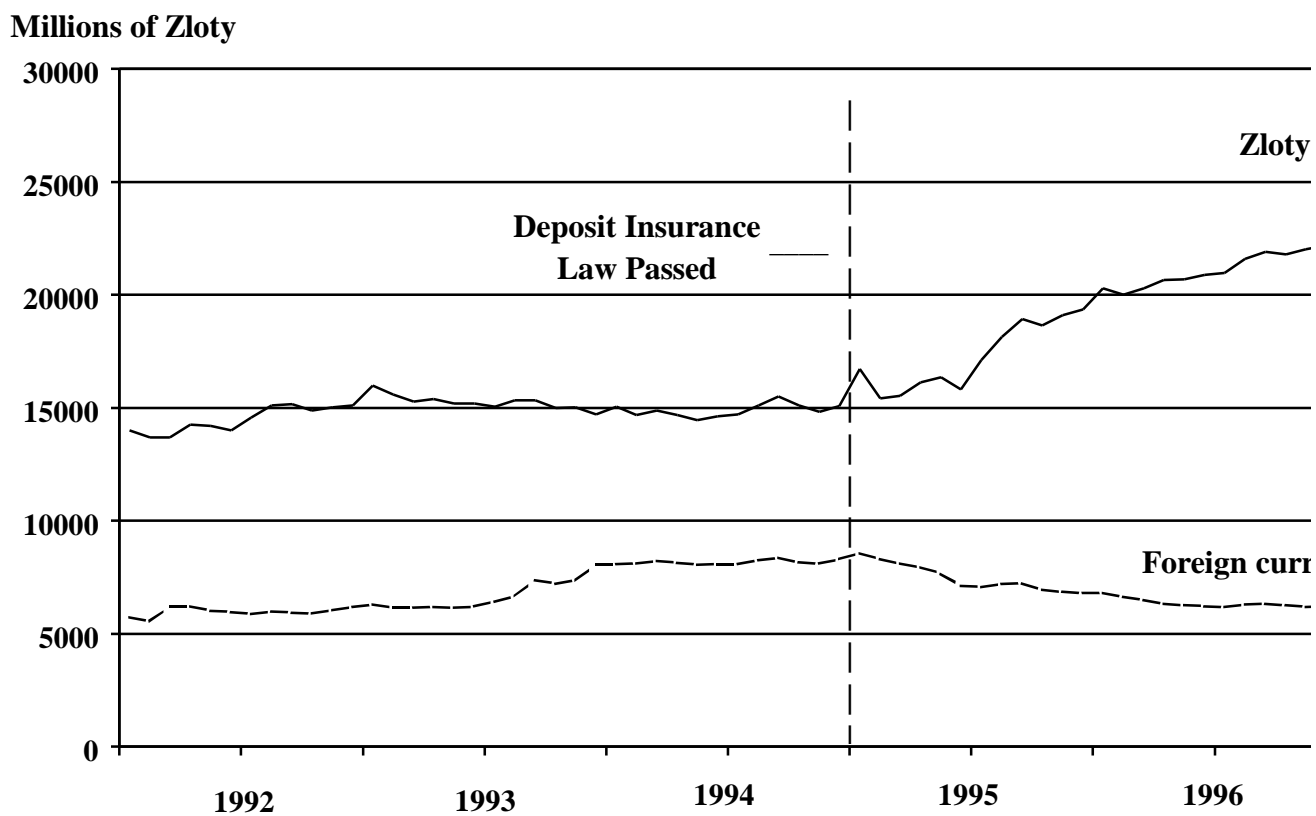
Source: National Bank of Poland, *Information Bulletins*, various issues.

Figure 1B
Selected Three-Month Interest Rate Spreads



Source: National Bank of Poland, *Information Bulletins*, various issues.

Figure 2
Zloty vs. Foreign Currency Deposits
(Adjusted for Inflation)



Note: The deposit levels were deflated by the CPI (Dec. 1991=1.0).

Source: National Bank of Poland, *Information Bulletins*, various issues.

