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Determinants of Bank Profitability in Ukraine

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Abstract

The Ukrainian banking system exhibits low profitability compared to other transitional countries in the region. This study examines the determinants of bank profitability in Ukraine. It relates bank specific, industry specific and macroeconomic indicators to the overall profitability of Ukrainian banks. The study uses a panel of individual banks' financial statements from 2005 to 2009. According to the empirical results, Ukrainian banks suffer from low quality of loans and do not manage to extract considerable profits from the growing volume of deposits. Despite low profits from the core banking activities Ukrainian banks manage benefit from exchange rate depreciation. This study finds evidence for the difference in profitability patterns of banks with foreign capital versus exclusively domestically owned banks. The results also indicate that there is room for consolidation of Ukrainian banks in order to benefit from economies of scale.

Keywords

bank, profitability, Ukraine

Cover Page Footnote

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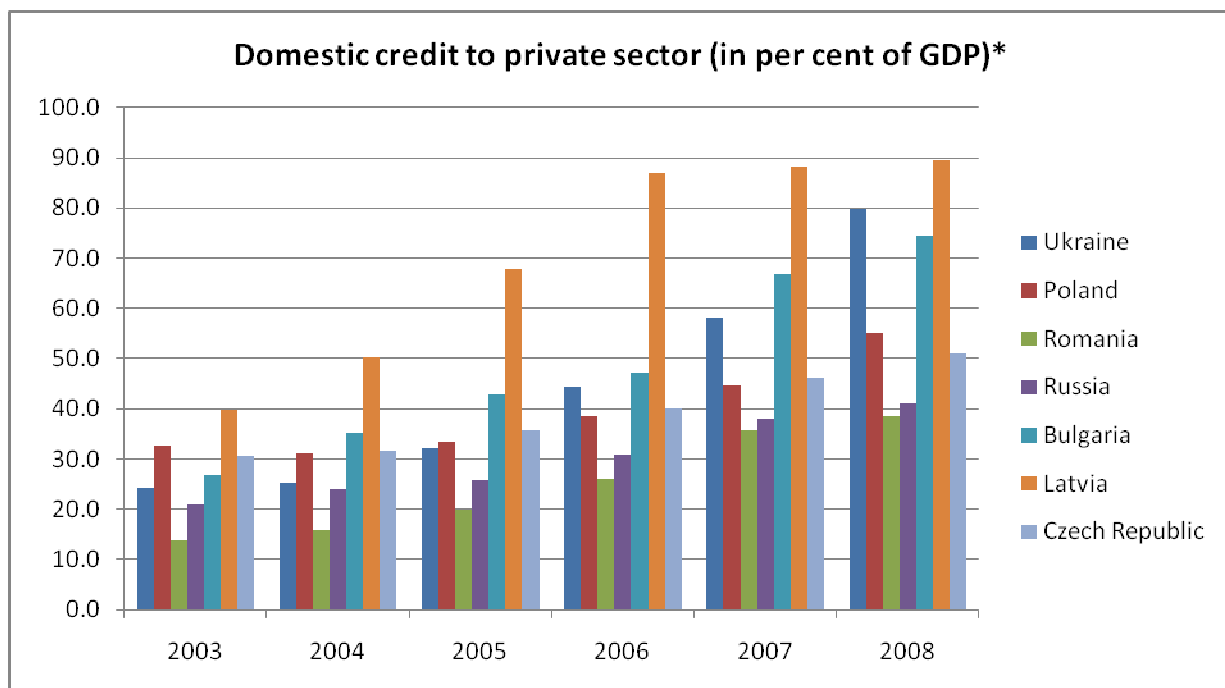
Abstract

The Ukrainian banking system exhibits low profitability compared to other transitional countries in the region. This study examines the determinants of bank profitability in Ukraine. It relates bank specific, industry specific and macroeconomic indicators to the overall profitability of Ukrainian banks. The study uses a panel of individual banks' financial statements from 2005 to 2009. According to the empirical results, Ukrainian banks suffer from low quality of loans and do not manage to extract considerable profits from the growing volume of deposits. Despite low profits from the core banking activities Ukrainian banks manage benefit from exchange rate depreciation. This study finds evidence for the difference in profitability patterns of banks with foreign capital versus exclusively domestically owned banks. The results also indicate that there is room for consolidation of Ukrainian banks in order to benefit from economies of scale.

Introduction

After almost ten years of growth at an average annual growth rate of 7%, late 2008 brought Ukraine to its deepest recession since the early 90s. With global demand shrinking, imports collapsed lowering the GDP by 20% in 2008. The banking sector contributed significantly to the previously observed growth through the increasing availability of credit as shown in Table 1. Banking was also one of the most affected industries in the turmoil. The global financial crisis evoked existing refinancing risks of large private sector debts accumulated in recent years as well as risks associated with the banking sector. Recognizing the need for an efficient banking system to stimulate economic recovery, we aim to analyze the main determinants of bank profitability in Ukraine.

Table 1

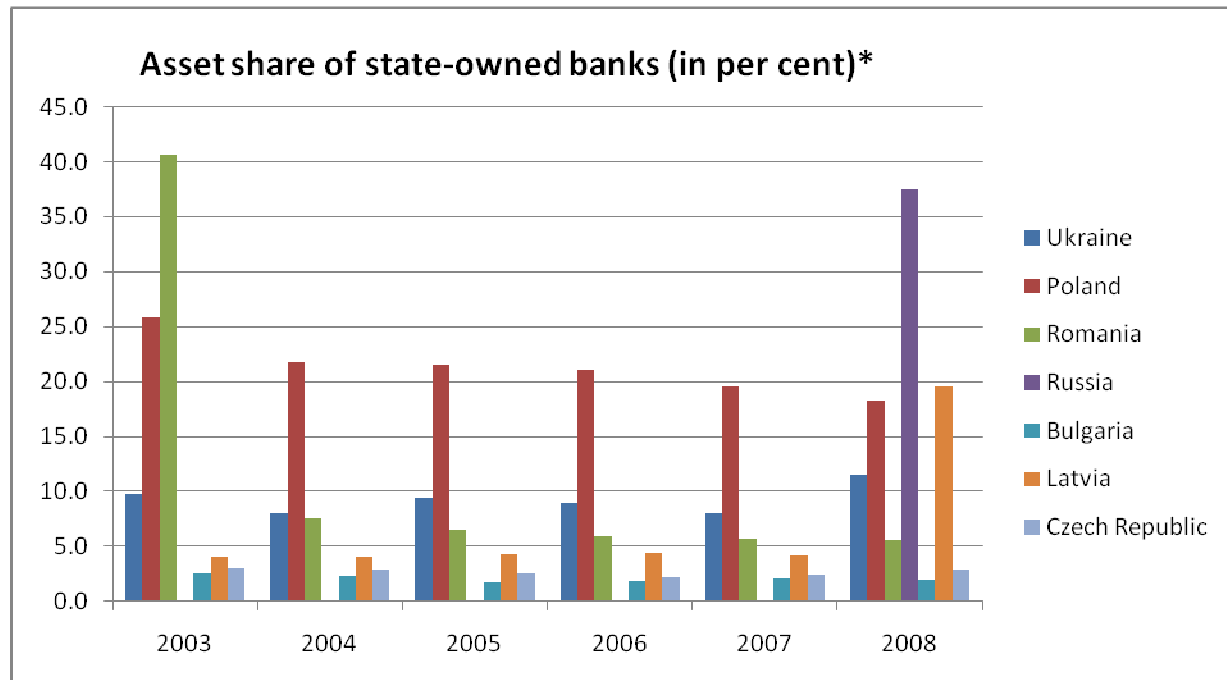


The Ukrainian Banking Sector

The Ukrainian banking sector has its roots in the inefficient Soviet banking system. Prior to 1991 the few existing state controlled banks de facto served as a channel to subsidize state owned enterprises rather than to issue loans.

In the early years of Ukraine's independence, the number of banks increased dramatically from 76 in 1991 to 230 in 1995. Such an increase was triggered by low barriers to entry, specifically the extremely low capital requirements. Many of these banks were liquidated in the subsequent years, yet many new banks were chartered. In the end of 2009 there were 179 licensed banks operating in Ukraine.

Compared to other countries in transition, the share of state owned banks in Ukraine is not significant. Until the time of the crisis, when three private banks were nationalized, there were only 2 state owned banks in the country. The following table compares Ukraine to other countries in the region in terms of the presence of state owned banks in the industry.

**Table 2**

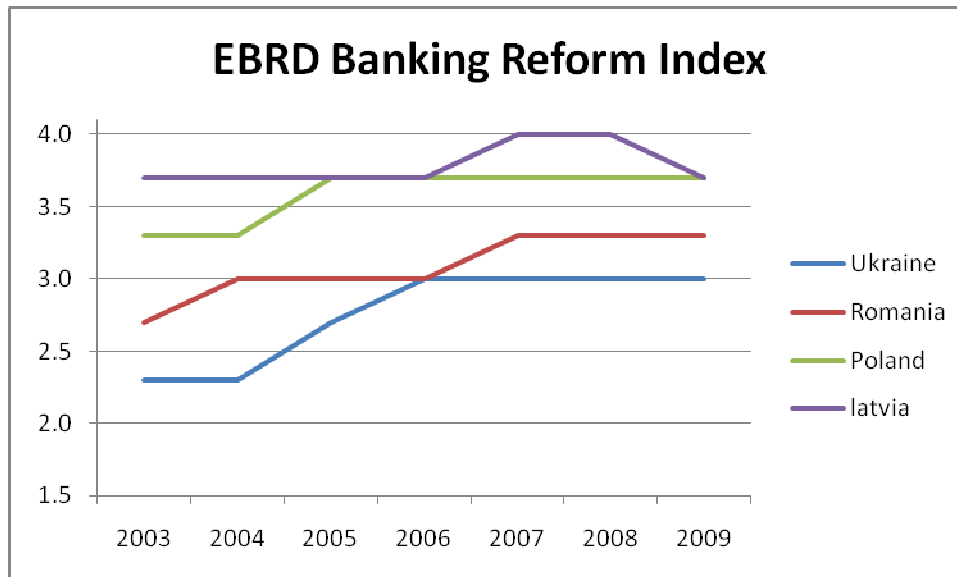
Ukrainian banking is, however, highly concentrated with approximately 50% of total assets controlled by the ten largest banks. There has not been any significant change in the competitive structure in recent years. This highly concentrated organization of the industry suggests strong competition between the market leaders. It also indicates that the rest 170 banks are small pocket banks serving the needs of individual firms.

Most of the banks in Ukraine are universal banks i.e.: providing all corporate and individual services under one roof. Banks' assets are invested overwhelmingly in real sector financing. The share of securities is less than 6 percent (Baum, Caglayan, Schäfer, & Talavera, 2008). There are almost no notable regional banks. Ukrainian banking is characterized by a high degree of liquidity risk. Due to the overall economic instability and lack of trust in the banking sector there is a considerable duration mismatch between the system's assets and its liabilities with most deposits being shorter than one year.

The high degree of currency risk is another characteristic of Ukrainian banking. In the recent years approximately half of the sector's total assets were in foreign currency while the majority of deposits are in domestic currency. Prior to the 2008 meltdown thanks to a booming import sector and a stable domestic currency, foreign currency exposure did not present an

eminent threat to the stability of the banking sector. However, in an environment of macroeconomic uncertainty, such foreign currency exposure could lead to customers defaulting on their foreign currency loans. This was the case during the financial crisis when a drastic depreciation of Hryvna as Table 3 shows caused multiple defaults.

The institutional maturity of the Ukrainian banking sector has developed slowly in the last several years. One measure of progress in the reform of the banking sector is the indicator of European Bank of Reconstruction and Development. Ukraine's index of the banking sector reform improved from 2.3 in 2003 to 3.0 out of maximum 4 in 2009. A score of 3 means that a country has achieved substantial progress in developing the capacity for effective prudential regulation and supervision, including procedures for the resolution of bank insolvencies, and in establishing hardened budget constraints on banks by eliminating preferential access to concessionary refinancing from the central bank (Fries & Taci, 2002). As a comparison neighboring Poland has a 3.7 index, Romania has a 3.3 score and Russia has a 2.7 score.

**Table 4¹**

Significant institutional improvements were implemented in 2004. The National Bank of Ukraine raised capital adequacy requirements, implemented new legislation on mortgages and mortgage-backed securities. Furthermore, a new law on Anti Money laundering helped remove Ukraine from the blacklist of the Financial Action Task Force on Money Laundering (FATF) in early 2004 (International Financial Corporation [IFC], 2008).

Such actions increase the attractiveness of Ukrainian banks to foreign investors. Already in 2005 the second largest bank was acquired by the Austrian Raiffeisen Bank. This was followed by a wave of foreign acquisitions from 2006 to 2008 when over 24 major transactions took place. Foreign investors acquired mostly large banks² with some instances of medium size banks acquisitions.³

Baum et al. (2008) suggests that banks that have political linkages attract foreign investors. The linkage between politics and banking is very strong in Ukraine as it is in other Community of Independent States. According to the International Financial Corporation Corporate Governance report, the Ukrainian banking system is characterized by an intricately

¹ Source: European Bank for Reconstruction and Development

² French bank BNP Paribas controlling stake in UkrSibbank, the #4 bank in Ukraine, UkrSotsBank bought by Banca Intesa (Italy), Commerzbank buys 60% of Ukraine's Bank Forum.

³ Eurobank EFG concluded its acquisition of Universal Bank

spun network of interests as well as economic and political relationships among major shareholder groups. Banks seek political support to gain advantage in dealing with the bureaucratic obstacles of obtaining a license to operate or a license to carry out transactions in foreign currency which are important sources of income for Ukrainian banks. Baum (2008) claims that there is evidence that politically connected banks have lower capitalization levels than their non-affiliated counterparts. Another problem of political patronage is that these banks have a different objective function from that of strict profit maximization, lending to related parties under sub-optimal conditions.

Related party lending is a recurrent problem in post-communist banking systems. It decreases the cost-efficiency of the banks and undermines the overall competitiveness of the banking system. Article 52 of *Agreements with Bank-Related Parties (National Bank of Ukraine, Law on Banks and Banking 2009)* stipulates that banks are prohibited from providing more favorable conditions to their related parties. If discovered, such agreements should be invalidated in court. By issuing its order, the NBU may impose restrictions on the amount under agreements with the related parties. However, there are no quantitative restrictions on lending exclusively to one client or specific penalties for banks engaging in related parties lending

Problems of political patronage and related party lending are related to poor transparency standards in Ukrainian banking. According to Standard & Poor's report on banks transparency in Ukraine, there have been considerable improvements in the recent years. From 2007 till 2008 there was an almost 4 p.p. improvement in the transparency index of Ukraine's 30 largest banks. It is currently 44.9%, which means that 44.9% of the maximum possible amount of information is disclosed. However, the index value remains significantly (almost two times) below global best practices (Standard & Poor and Financial Initiatives Agency, 2008). The weakest category in terms of transparency is disclosure of management's compensation, internal audit regulations, board meetings etc.

Inefficiency is another problem for the Ukrainian banking sector. The country is often cited as one of the least efficient and highest cost banking market among transition countries together with Bulgaria, the Czech Republic and Russia. (Fries & Taci, 2005; Grigorian & Manole, 2006). There is also evidence that more than half of scarce bank resources are being wasted during the production of financial services in Ukraine. (Kyj & Isik, 2008).

Literature review

Prior literature on bank profitability explains profitability through internal and external variables. Internal, or bank specific factors, are under the control of bank management. External variables trace the effect of the macroeconomic environment on banks' performance.

Short (1979) and Bourke (1989) provided the first studies on bank profitability. Some subsequent studies aimed at explaining bank profitability in a single country were done by Berger (1995), Angbazo (1997), Guru, Staunton & Balashanmugam (1999), Ben Naceur (2003), Mamatzakis & Remoundos (2003), Kosmidou (2006), Athanasoglou, Brissimis & Delis (2006).

Other studies aim at analyzing bank profitability in groups of countries: Molyneux & Thorton (1992), Demirguc-Kunt & Huizinga (1999), Abreu & Mendes (2001), Staikouras & Wood (2003), Hassan & Bashir (2003), Goddard, Molyneux & Wilson (2004). The results of the studies differ significantly due to the variation of the environment and data included in the analysis. However, there are common factors influencing profitability identified by several researchers. The discussion of these determinants follows.

Internal factors

Cost

Banks operating costs as percentage of its profits are expected to have a negative correlation with profitability. In the literature, the level of operating expenses is viewed as an indicator of the management's efficiency. For example, Abreu & Mendes (2001) in their study of several European countries conclude that operating costs have a negative effect on profit measures despite their positive effect on net interest margins. The inclusion of bank expenses into the profitability is also supported by Bourke (1989) and Molyneux & Thorton (1992) who find a link between bank profitability and expense management. Several studies on cost efficiency that included Ukraine (Fries & Taci (2005); Grigorian & Manole (2006)) identified Ukraine as the highest cost banking sector in its region.

Size

The impact of a bank's size on its profitability is not uniform. In a study of European banks for the period of 1992 to 1998, Goddard et al. (2004) identified only slight relationship between size and profitability. Some of earlier studies have different results. Smirlock (1985)

proves a significant and positive impact of a bank's size on its profitability. Short (1979) goes further by claiming that size has a positive influence on profitability through lowering the cost of raising capital for big banks. Later, studies by Bikker & Hu (2002) and Goddard et al. (2004) support the proposition that increasing a bank's size positively affects profitability through cost of capital. However, there is no consensus in the literature on whether an increase in size provides economies of scale to banks. For example, some researches including Berger, Hanweck & Humphrey (1987) claim that there is no significant relationship between profitability and size.

Capital

Various studies suggest that banks with higher levels of capital perform better than their undercapitalized peers. Staikouras & Wood (2003) claim that there exists a positive link between a greater equity and profitability among EU banks. Abreu & Mendes (2001) also trace a positive impact of equity level on profitability. Goddard et al. (2004) supports the prior finding of positive relationship between capital/asset ratio and bank's earnings.

Liquidity

Insufficient liquidity is one of the major reasons of bank failures. However, holding liquid assets has an opportunity cost of higher returns. Bourke (1989) finds a positive significant link between bank liquidity and profitability. However, in times of instability banks may chose to increase their cash holding to mitigate risk. Unlike Bourke (1989), Molyneux and Thorton (1992) come to a conclusion that there is a negative correlation between liquidity and profitability levels.

External Factors

Another group of variables impacting bank profitability are macroeconomic control variables. GDP is one of the most common measures of the total economic activity within a country. In the literature, the growth of GDP has significant positive effect on the profitability of the financial sector. Thus, we expect a GDP growth to have a positive impact on the profitability of individual banks in the study.

Inflation is often cited to be a significant determinant of bank profitability. First analyzed by Revel (1979), the effect of inflation on bank profitability depends on whether banks operating

expenses increase faster than the inflation rate. Therefore, the impact of inflation is contingent on the overall macroeconomic stability that allows the correct predicting of inflation. According to Perry (1992) the relationship between inflation and banks performance depends on whether the inflation is anticipated by a bank's management. By correctly predicting inflation and adjusting interest rates, managers can raise revenues faster than costs. Among studies that find a significant positive relationship between inflation and bank earnings are those conducted by Molyneux & Thorton (1992) and Bourke (1989).

Exchange rate

Abreu & Mendes (2001) identify no impact of effective exchange rate on bank profitability in their study of EU banks. This result may not be valid for Ukraine since, unlike their European counterparts, Ukrainian banks operate in an environment where income from foreign exchange transactions can be generated due to lack of transparency in the pricing of financial products.

Industry Characteristics

Concentration in the banking industry should lead to monopolistic profits for some banks according to Molyneux & Thorton (1992) and Bourke (1989). The effect of concentration is studied in the light of the structure-conduct performance (SCP) also known as Market Power (MP) hypothesis. SCP hypothesis suggests that increased market share leads to monopolistic profits. According to Short (1979), Gilbert (1984) and Molyneux et al. (1996), banks in highly concentrated markets tend to collude which leads to monopoly profits. However, various studies have found no evidence favor of the SCP hypothesis. For example, in their study of EU banks for the period of 1994–1998 Staikouras & Wood (2003) found no support for the SCP hypothesis.

In a study of Australian banks, Williams (2003) puts forward some interesting results claiming that concentration reduces profits of the foreign entrants serving as a barrier to entry. Similar finding were produced by Pasiouras & Kosmidou (2006) regarding European banks.

Foreign versus Domestic ownership

When reviewing the literature on the impact of foreign ownership on bank profitability a distinction between emerging and developed countries must be made. Studies conducted in the US, such as Hasan & Hunter's (1996), Mahaja, Rangan & Zardkoohi's (1996) and Chang, Hasan & Hunter's (1998) find foreign banks to be less cost efficient. Foreign banks are proved to be less profitable than domestic banks by Seth (1992), Nolle (1995) and Sathye (2001). The study of UK banks by Kosmidou et al. (2004) suggests that domestic banks outperform foreign ones. Also, Hasan & Lozano-Vivas (1998) find no substantial difference in profits of domestic and foreign banks.

In the emerging markets results usually differ leaning in favor of banks with foreign ownership. For example, in their study of 11 transition countries Bonin, Hasan and Wachtel (2005) showed foreign-owned banks to be more cost-efficient.

Ukrainian banks were included in the Fries & Taci (2005) study of transition banking, concluding that banks with a majority foreign capital are more cost efficient than domestic ones. Isik & Hassan (2003) and Isik (2007) suggest that foreign ownership is crucial in developing countries for disciplining local banks and boosting their efficiency. A study of the efficiency of Ukrainian banks by Kyj & Isik (2006) suggests that pure foreign ownership is more efficient in standalone basis. However, pure domestic ownership outperforms pure foreign ownership in technical efficiency. These unexpected results can be explained by the presence of various institutional voids in Ukraine. Such uncertain legal environment gives local banks an advantage suggesting that foreign banks should acquire local agents to maximize overall efficiency and profits provided that they maintain the control.

Determinants and variables

Dependent variable

Two ratios are commonly used to describe bank profitability: the return on equity (ROE) and the return on assets (ROA). ROA indicates how effectively a bank manages its assets to generate income. It indicates income earned on each unit of assets. The problem of ROA is that it excludes off-balance sheet items of the bank creating a positive bias in evaluating bank performance. ROE measures the return to shareholders on a unit of their capital. The drawback of ROE is that banks with lower level of capital will generate a higher ratio. These banks have a

high level of financial leverage which is undesirable and associated with high degree of risk. Moreover, ROE is not an optimal measure of profitability since degree of capitalization is often established by the regulatory authority. The view in favor of ROA versus ROE is also supported in the literature. Golin (2001) concludes that ROA is the key measure of profitability for banks.

Independent variables

Bank specific Determinants of bank profitability

The capital level of banks in this study is described by a ratio of total equity over total assets - *capta*. Well capitalized banks have lower perceived risk and according to the finance theory should produce lower returns. However, banks with a higher level of capital are viewed as having a safety net in case of liquidation. Being better insured from bankruptcy they also enjoy a lower cost of capital contributing to their profitability. A well-capitalized bank has more flexibility to both pursue unexpected opportunities and deal with unpredicted losses and is thus more profitable. Capital to assets ratio is an endogenous variable for determining profitability. The causality may run in both directions. As explained above, increasing level of capital may enhance profits. However, a portion of profits may be ploughed back into a banks increasing capital to assets ratio. Moreover, banks that have better performance can choose to communicate this information to the public through higher capital levels.

Credit risk is modeled by the ratio of provisions for loans losses over total loans - *provloan*. This ratio measures the ability of bank managers to screen the credit risk and therefore increase profitability. Provisions for loans could also be an endogenous variable due to a two-way causality. On the one hand, income decreases when loans are not collected. Meanwhile, in times of steady high profits banks may decrease provisions for loan losses since stable cash inflows allow them to better bear sudden defaults. However, we model provisions ratio as a predetermined variable because provisions ratio is set by the bank in view of its debt collection in the prior period. This makes this endogenous variables pre-determined and, therefore, not correlated with the error term in equation.

Size is described by the accounting value of banks total assets. Size is an important determinant of profitability. The effect of a bank's size on profitability is not settled in the literature. We

expect a positive effect on earnings to be derived from economies of scale and lower perceived probability of default of larger banks. However, increase in size can lead to decreasing profits for banks due to cumbersome bureaucracy. In attempt to track a possible non-linear relationship between banks' profits and size we include size squared into the model.

Cost management (admin) - we use a ratio of administrative expenses including personnel over total assets in order to estimate how efficiently banks manage their expenses relatively to their size. We chose this ratio over cost/net income due to inconsistencies that arise when profits are negative. In line with earlier studies, we expect this effect of expenses ratio on profits to be negative.

Liquidity – liquid – is measured by a ratio of cash and cash equivalents over total assets. We expect a positive coefficient. High liquidity may allow a bank to avoid costly borrowing of funds should the need for cash arise. However, there is also an opportunity cost that banks incur by not investing the cash available to generate returns. Therefore, the sign may appear to be positive.

Loans to total assets – loanta – is a variable measuring what percent of total assets is comprised by loans. We expect a positive coefficient as more loans would generate interest income for the bank.

Deposits to total assets – depos – is a variable measuring the amount of deposits held by a bank proportional to its size. Deposits are banks' primary sources of funds that they can invest to generate income. Therefore we expect a positive correlation between ROA and deposits ratio.

Industry specific determinants

The concentration variable in this study is defined as a ratio of the ten largest banks assets over the assets of the whole system. The Ukrainian banking sector is highly concentrated with ten largest banks controlling approximately 50% of the total sectors assets. Partially due to the short time span of the study, from 2005 to 2009, we do not observe considerable variations in the concentration ratio. If the Structure Conduct Performance hypothesis stands for Ukrainian banking, we expect a positive impact of the concentration variable on profitability.

Foreign ownership

Foreign ownership (for) is a dummy variable, taking a value of 1 if 30% or more of a bank's capital is foreign owned and 0 otherwise. Considering the prior reported inefficiency of domestic banks, we expect a positive correlation between foreign ownership and profitability.

Macroeconomic indicators

We use a logarithm of nominal GDP (lngdp) to account for the growth of the Ukraine's output. We expect GDP growth to have a significant positive effect on the profitability of banks. In line with the literature, we expect a strong positive correlation between the overall economic activity and the performance of the financial sector.

Inflation (infl)

We use the current inflation, increase of the Consumer Price Index over the previous quarter, to proxy for the expected inflation. In the highly inflationary environment of Ukraine we predict this variable to be a significant determinant of profitability. The effect of inflation on banks' earnings depends on whether it is correctly anticipated by the bank. By making accurate inflation forecasts managers can increase the rates on loans faster than the operating costs allowing earning higher profits.

Exchange rate (exchn)

In this study exchange rate is the quarterly depreciation of Ukrainian hryvna with respect to the US dollar. Ukraine's exchange rate regime is characterized as a crawling peg. However, recently the NBU has advanced towards more flexibility. Having approximately 50% of their total assets in foreign currency, Ukrainian banks face significant foreign currency risk. By lending to its customers in foreign currency, banks face a risk of not collecting their loans in case of domestic currency depreciation. Therefore, we expect a negative effect of depreciation on banks' earnings.

Crisis .Suspecting a decline in profits after the financial crisis of late 2008 we also experiment with various time dummy variables. For the sake of simplicity and considering the short time span of the study we chose a single crisis dummy which is equal to one for quarters following the crisis and zero for preceding quarters.

Data Description

This study uses the detailed quarterly balance sheet and income statement information for a universe of Ukrainian banks. This is an unbalanced panel for the period from the first quarter of 2005 to the fourth quarter of 2009. Banks that have fewer than eight quarters of available data are excluded from the sample. These banks are either newly-chartered or those that have been liquidated. We acknowledge the problem in analyzing profitability may arise because the worst performing banks were liquidated in this period and therefore excluded from our study. In this way the reason for attrition may be correlated to the idiosyncratic error and cause biased estimators. However, Wooldridge (2009) claims that fixed effects estimation can be still used if attrition is correlated with the unobserved effect (p.488). After all screenings, our sample size consists of about 3236 bank-quarter observations.

It is important to acknowledge that the quality of the accounting data may be questionable. The International Financial Reporting Standards that were adopted in 1998 required banks to use and to be audited based on these standards. However, several studies on banking in transition economies recognize the problems with data due to underdeveloped accounting practices of the respective countries, Ukraine being one of them. Some of these studies are Fries & Taci (2005), Grigorian & Manole (2006) and Bonin et al. (2005).

We expect to improve our estimations compared to previous studies on transition banking by working directly with balance sheets of the individual banks. Bonin et al. (2005) identifies the problem of using samples from the BankScope database since in the emerging markets they are skewed towards industry leaders. This database includes only banks audited by international auditing firms and uses different accounting standards. However, we hope to alleviate these problems by working with the primary source and not the Bank Scope database. The individual bank data is available on the official website of the NBU.

The information on foreign capital stake in banks is also taken from the NBU web site and websites of the individual banks. The macroeconomic indicators used in the study are taken from the International Financial Statistics and the State Statistics Committee of Ukraine. The summary statistics are provided below separately for all banks in the study, banks excluding the ten largest ones and foreign owned banks.

Summary Statistics

| | ten largest banks | | | all banks | | | foreing ownership | | |
|----------|-------------------|----------|----------|------------|--------|-------|-------------------|----------|----------|
| | mean | min | max | mean | min | max | mean | min | max |
| roa | 0.006581 | -0.08985 | 0.031295 | -0.0033032 | 5.267 | 0.23 | 0.0024457 | -0.45436 | 0.145833 |
| loanta | 0.705047 | 0.039204 | 0.997889 | 0.6505031 | 0 | 5.823 | 0.6737963 | 0 | 1.308574 |
| capta | 0.108869 | 0.019106 | 0.306712 | 0.2243797 | -4.415 | 1 | 0.1846617 | -0.13191 | 0.999167 |
| provloan | 0.078719 | 0.019697 | 1.068166 | 0.0654313 | 0 | 1 | 0.0748766 | 0.000339 | 4.548362 |
| conctr | 0.522819 | 0.490121 | 0.538415 | 0.5228187 | 0.49 | 0.538 | 0.5228187 | 0.490121 | 0.538415 |
| gdp | 173.5339 | 88.1 | 275.78 | 173.5339 | 88.1 | 275.8 | 173.5339 | 88.1 | 275.78 |
| infl | 3.471 | 0.36 | 8.34 | 3.471 | 0.36 | 8.34 | 3.471 | 0.36 | 8.34 |
| exchn | 5.7315 | 4.85 | 8.01 | 5.7315 | 4.85 | 8.01 | 5.7315 | 4.85 | 8.01 |

Econometric Methodology

We first specify a linear model of profitability:

$$\Pi_{it} = c + \sum_{j=1} \beta_j X_{it}^j + \sum_{l=1} \beta_l X_{it}^l + \sum_{m=1} \beta_m X_{it}^m + \varepsilon_{it}, \quad \varepsilon_{it} = v_i + u_{it}$$

Where the dependent variable Π_{it} is the ROE of a bank, c is constant term, $\sum_{l=1} \beta_l X_{it}^l$ is a vector of bank specific variables, $\sum_{j=1} \beta_j X_{it}^j$ is a vector of industry-specific variables and $\sum_{m=1} \beta_m X_{it}^m$ is a vector of macroeconomic variables.

Later, suspecting a dynamic structure of industry profits, we add a lagged dependant variable on the right hand side.

$$\Pi_{it} = c + \delta \Pi_{i,t-1} + \sum_{j=1} \beta_j X_{it}^j + \sum_{l=1} \beta_l X_{it}^l + \sum_{m=1} \beta_m X_{it}^m + \varepsilon_{it}$$

To evaluate the stationarity of the variables in the model we use unit root test applicable to unbalanced panels (Fisher-type tests based on Augmented Dickey Fuller). Stationarity implies that the mean, variance and autocorrelation of a variable do not change with time. The results indicate that all variables are stationary besides size and admin.⁴ We proceed with generating logarithms of size and admin expense which are stationary.

We also recognize the differences in performance between the largest banks in the industry and the small pocket banks redundant in the Ukrainian banking. We proceed by excluding the ten market leaders from the sample. We report separate estimations for all the banks, ten largest banks and the 168 remaining banks after the exclusion of the top ten.

We estimate the model using fixed (FE) and random (RE) effects. In all three cases, the FE specification is preferred to RE due to the presence of individual effects according to the F-test⁵. Hausman test for the systematic differences in coefficients cannot be computed for the model where logarithm of size is used instead of level. When estimating the model with levels of size and admin instead of logarithms, we can also report Hausman test results that support FE estimations.⁶ However, foreign ownership which we suspect to be an important determinant of profitability is a time invariant dummy that can only be estimated in the random effects framework. We provide results of FE and RE estimation for the three cases:

⁴ With a critical value (378), Inverse χ^2 roa= 628.1321, provloan= 495.7310, capta= 962.8644, liquid=1000.9915, admin= 258.3852, size= 286.7672. For the generated lsize Inverse χ^2 =2923.1675, Lnadmin=638.2254.

⁵ F(188, 2871) = 7.90, Prob > F = 0.0000

⁶ rejecting the null that difference in coefficients not systematic $\chi^2(7) = 1594.02$, Prob> $\chi^2 = 0.0000$

Fixed Effects Estimation

| all banks | | largest banks | | banks excluding 10 largest | |
|--------------------------|--------------------------|------------------------|---------------------------|----------------------------|--------------------------|
| roa | Coef. | roa | Coef. | roa | Coef. |
| capta | 0.1983186* 0.015464 | capta | 0.4407198* 0.0680432 | capta | 0.1983191* 0.0154639 |
| provloan | -0.5484608* 0.019307 | provloan | -0.5260717* 0.0803424 | provloan | -0.5484701* 0.0193065 |
| loanta | -0.0932841* 0.006781 | loanta | -0.0330863** 0.0162007 | loanta | -0.0932862* 0.0067814 |
| admin | -0.4418549* 0.061084 | admin | -0.1124065 0.2440954 | admin | -0.4418566* 0.0610843 |
| liquid | -0.001619 0.016305 | liquid | 0.3151804* 0.0644255 | liquid | -0.0016203 0.0163049 |
| depos | -0.1506659* 0.012320 | depos | -0.0475137 0.0466997 | depos | -0.1506591* 0.0123201 |
| lnsize | 0.0611774* 0.003401 | lnsize | -0.0341664* 0.0115293 | lnsize | 0.0611747* 0.0034009 |
| sizesq | -2.98E-17* 1.12E-17 | sizesq | 2.09E-18 2.76E-18 | sizesq | -2.97E-17* 1.12E-17 |
| for | (omitted) | for | (omitted) | for | (omitted) |
| concr | 0.2086086* 0.0781721 | concr | -0.2195133 0.4637933 | concr | 0.208593* 0.0781723 |
| lngdp | -0.0038517 0.0063109 | lngdp | 0.0604832** 0.0263773 | lngdp | -0.003849 0.0063109 |
| infl | -0.0055916* 0.0005262 | infl | -0.0019293 0.0017974 | infl | -0.0055915* 0.0005262 |
| exchn | 0.0019149 0.0017546 | exchn | 0.0033998 0.0073964 | exchn | 0.0019149 0.0017546 |
| crisis | -0.0359261* 0.0055265 | crisis | -0.0223621 0.0142783 | crisis | -0.0359266* 0.0055265 |
| _cons | -0.7055874* 0.0555024 | _cons | 0.3958847 0.3045791 | _cons | -0.7055615* 0.0555023 |
| F test F(167, 2510)=9.41 | | F test F(9, 155) =8.12 | | F test: F(167, 2510)=9.41 | |

Random Effects Estimation

| all banks | | top ten banks | | banks excluding the top ten | |
|-----------|----------------------------|---------------|----------------------------|-----------------------------|--------------------------|
| roa | Coef. | roa | Coef. | roa | Coef. |
| capta | 0.1307273* 0.0153035 | capta | 0.3479631* 0.0716819 | capta | 0.130725* 0.0153035 |
| provloan | -0.4959377* 0.0177516 | provloan | -0.5065944* 0.0804249 | provloan | -0.4959431* 0.0177516 |
| loanta | -0.0962202* 0.0066338 | loanta | -0.0244347*** 0.0146192 | loanta | -0.0962221* 0.0066338 |
| admin | -0.545617* 0.0573843 | admin | 0.3790974*** 0.2126005 | admin | -0.5456186* 0.0573845 |
| liquid | 0.0125959 0.0161153 | liquid | 0.1943067** 0.066118 | liquid | 0.0125942 0.0161154 |
| depos | -0.1469778* 0.0125745 | depos | -0.0899865*** 0.0500601 | depos | -0.1469741* 0.0125745 |
| lnsize | 0.0341894* 0.0105061*** | lnsize | 0.0105061*** | lnsize | 0.0341871* |

However, banks' profits may exhibit a considerable degree of persistence over time. Therefore, we suspect a dynamic structure of the model with lagged profits included to be more efficient in determining the current period's performance. Yet, including a lagged dependent variable in the model can cause autocorrelation. Therefore we use Arellano and Bond (1991) framework to account for dynamic effects in our model. This approach uses lagged values of the dependent variable together with the lagged values of exogenous regressors as instruments. Also, the Arellano and Bond estimator is suitable for panels with relatively small time dimension (20 quarters in our case) and large number of panels (178 banks studied here).

In order to use the Arellano and Bond structure we set all explanatory variables to be strictly exogenous besides *capta* and *provloan* as explained in the dependent variables section. Such treatment of these variables is consistent with the literature, i.e. Athanasoglou et al. (2006). Moreover, estimating the model by setting these variables as endogenous and predetermined is

supported by the Sargan test. A high p-value⁷ supports the null that model's over identifying restrictions are valid, i.e. all are instruments exogenous.

We use the two-step robust option of the Arellano Bond GMM estimation procedure ensuring robustness of the standard errors to panel-specific autocorrelation and heteroskedasticity. We evaluate the model by estimating the validity of the instruments used. This is checked with Sargan's test for over identifying restrictions where high p-values are desirable.⁸

In the dynamic framework used here we cannot estimate the model separately for the ten largest banks due to a small sample size. The number of instruments used in the estimation considerably exceeds the number of groups.⁹ Moreover, the results for the universe of Ukrainian banks are almost identical to results obtained when top banks are excluded. Therefore, we report only the results of a panel containing all Ukrainian banks.

Dynamic Model Estimation using Arellano Bond framework

all banks

| roa | Coef. |
|----------|-------------|
| roa | 0.3610461* |
| provloan | 0.0142264 |
| capta | -0.8226579* |
| loanta | 0.0031724 |
| admin | -0.6144041* |
| | 0.0063821 |

⁷ Prob > chi2 = 0.19980

⁸ Sargan test is performed for non-robust estimation.

⁹ Weak Sargan test for the dynamic model on 10 largest banks proves that model's misspecification

In order to analyze the behavior time invariant variables such a foreign ownership dummy we proceed by estimating the model using Arellano-Bover/Blundell-Bond linear dynamic panel-data estimation. We also create several interactive dummy variables to track whether there is a difference of in how foreign and domestic banks manage their individual bank features and

inflation. We create variables *loantafor*, *deposfor*, *liquidfor*, *inflationfor*. The results are reported in the table below.

| Dynamic Model Estimation | |
|---------------------------------|-------------------------|
| roa | Coefficients |
| roa L1. | 0.2525598 (0.00420) |
| provloan | -0.5789123 (0.00248) |
| capta | 0.1704175 (0.00193) |
| loanta | -0.2944481 (0.00181) |
| loantafor | 0.3955272 (0.00348) |
| depos | -0.2168488 (0.00183) |
| deposfor | 0.3347063 (0.00328) |
| liquid | -0.0283566 (0.00305) |
| admin | -0.4841469 (0.00616) |
| lnsize | 0.020003 (0.00051) |
| liquidfor | 0.0980975 (0.00367) |
| for | -0.5176645 (0.00369) |
| gdp | 0.0001663 (0.00001) |
| infl | -0.0015655 (0.00006) |
| inflfor | 0.0020534 (0.00011) |
| exchn | 0.00948 (0.00019) |
| crisis | -0.0180477 (0.00061) |
| sizecrisis | -2.67E-10 (0.00000) |
| _cons | 0.0248807 (0.00623) |

Wald Test p-value=0.000

Sargan test p-value=1.00

Two step robust standard errors reported

All significant at 1%.

Empirical Results Interpretation

Lagged profitability ($l.roa$) appears to be highly significant which confirms the dynamic character of bank profits. The obtained coefficient of lagged roa is .25 which indicates a moderate persistence of profits. The higher the value of the coefficient θ the greater is the departure from the perfect competitive markets. In the case of Ukraine the coefficient indicates a moderate deviation from competitive markets suggesting a considerable degree of competition.

Provisions for loans ($provloan$) are significant and have a strong negative effect on profitability with a -.83 coefficient. As expected, an increased exposure to risk lowers a bank's earnings. This result suggests that in the emerging market environment with booming credit prior to the financial crisis bank managers should improve the screening of credit risk in order to raise profits.

The evidence of insufficient credit risk monitoring is supported by the negative coefficient obtained for $loanta$ (-.146). The fact that loans as percent of total assets have a significant negative impact on profitability is alarming pointing to a very low quality of bank loans in Ukraine. In light of these findings, the National Bank of Ukraine should endorse credit risk screening measures within banks. For example, one measure could be setting a limit on the maximum credit risk exposure to a single party. The NBU could also provide instructions to banks on effective risk monitoring in line with worldwide best practices. However, when interacted with foreign ownership, loans have a positive coefficient indicating higher quality of loans of foreign banks

The coefficient of capital is positive and significant at a 1% confidence level which is in line with theory. Such result may indicate that Ukrainian banks that increase their equity have a lower cost of capital and thus are more profitable. A policy implication of such results may be for NBU to sanction higher capital requirements to improve the low profitability in the banking system.

Administrative expenses as percent of total assets have a negative impact on profits. The negative sign indicates the lack of competence in expenses management in a bank. When administrative costs are managed properly, an increase in expenses will increase the interest

margin of a bank and raise income. The negative coefficients could also indicate a bank's inability to pass its expenses to customers because of the competition.

Liquidity defined as cash as a percent of total assets has appeared insignificant for determining profitability in the first dynamic panel data model. We suspect that liquidity could be also partially captured by comparatively liquid deposits available in a bank. When System GMM is used, liquidity has a significant and negative impact on profitability in line with prior studies but contrary to the findings of Baum et al.'s (2008) for Ukrainian banks who have determined a positive correlation of the bank interest margin and liquidity. When interacted with foreign ownership dummy liquidity has a positive effect indicating the ability of foreign banks to better manage liquidity. This may possibly be due to the fact that foreign banks have more opportunities to invest in various short term liquid assets abroad while the underdeveloped domestic markets do not offer a variety of financial products.

Deposits measured relatively to banks size (depos) have a negative impact on bank performance. This is unexpected, since banks normally should strive to attract more deposits as a source of funds. However, Baum et al. (2008) also found a negative effect of deposits to interest margin in Ukrainian banking. Banks fail to extract profits from deposits possibly due to the prevalence of short-term deposits in the system. Negative correlation of deposits could be an indication of competition in the market with a single bank being unable to lower its rates on deposits to generate income. Interestingly, the FE estimation for the ten largest banks yields insignificant results for deposits suggesting that large banks have more market power and can raise their interest margins despite competition. Also foreign bank's profitability appears to be positively affected by an increase of deposits.

The impact of the size of a bank is significant only at 10% confidence level. The correlation between size and profitability is positive suggesting economies of scale and suggesting that higher profits can be derived from mergers in Ukrainian banking. In an environment of economic instability, the size of a bank is closely related to its reputation and perceived reliability. Therefore, by merging banks could attract more customers and earn higher profits. The negative quadratic effect of size indicates that there is point after which the increase in a bank's size provides diseconomies of scale due to bureaucracy and other difficulties in operating a large structure.

The concentration ratio is significant only at the 10% level. This result means that with increasing competition bank profitability increases¹⁰. However, considering the small change in concentration index during the time of the study we do not see these results as convincing enough to draw conclusions about the evidence for the SCP hypotheses in Ukraine.

GDP has an expected positive effect since the banking sector is sensitive to the overall development of the economy. With the real sector growing, banks can successfully collect their loans and extend new ones.

Holding other factors constant, inflation is not significant in a dynamic model. However, FE results are significant for all banks besides ten largest banks. Inflation is positively related to banks profitability, which could imply that during the period of our study the levels of inflation were anticipated by banks management. Correctly predicting inflation gave banks an opportunity to adjust the interest rates accordingly and consequently to earn higher profits. Yet, foreign banks appear to successfully anticipate inflation enhancing their profits with increasing inflation

The exchange rate depreciation has a positive significant effect on income which could be explained by the ability of banks managers to anticipate exchange rate fluctuations. This could result in gains on foreign exchange transactions. This outcome is in line with the available information on significant gains from foreign exchange transactions in the last five quarters.¹¹ It is important to mention that due to lack of public trust in the domestic currency the demand for foreign currency soars in times of uncertainty allowing banks to earn additional profits.

Foreign ownership dummy has a significant negative effect on the profitability of Ukrainian banks when considered on a standalone basis. This finding is surprisingly considering the higher perceived efficiency and expertise of foreign banks. Such a result may suggest that domestic banks enhance their profitability through factors other than pure technical efficiency.

¹⁰ The share of ten largest banks fluctuated from 49.5% to 51% between 2005 and 2009.

¹¹ Ukrainian banks were not required to disclose this information prior to the financial crisis.

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