
Determinants of the Level of Non-Performing Loans in Commercial Banks of Transition Countries

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Abstract:

Problem loans have generated considerable academic and policy attention in recent years, fueled in part by the aftermath of the 2008-2009 economic crisis and subsequent credit crunch.

Problem loans, referred to as non-performing loans (NPL), are loans which are not paid in the structured time period as set in the contract between the borrower and the bank. The goal of this study is to show the influence, in transition countries, of macroeconomic factors on the level of these loans.

Specifically, factors such as Gross Domestic Product (GDP growth), inflation, unemployment and export growth shall be considered, using a variety of econometric models and specifications to ensure robustness, including Fixed and Random Effects Models and Arellano-Bond Dynamic Panel estimation.

We use data from the World Bank and International Monetary Fund for a sample of transition countries over the period 2006 and 2016. Findings show that GDP growth and inflation are both negatively and significantly correlated with the level of NPLs, while unemployment is positively-related to NPLs.

These results have important implications for banking stability within transition countries, and the role of macroeconomic policies in this regard.

Keywords: Non- Performing Loans, GDP, Inflation, Unemployment, Exports.

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1. Introduction

The sharp rise in non-performing loans (NPLs) in the last decade has caught the attention of many scholars around the world to try to explain this phenomenon. Various authors such as Anjom and Karim (2015), Turan and Koskija (2014), Çeliku and Luçi (2003), Clichici and Colesnicova (2014), Kurumi and Bushpupa (2017), and Hanifan Fajar and Umanto (2017), have studied the impact of macroeconomic factors on the level of NPLs. They reveal a relationship between macroeconomic factors and specific bank factors on NPLs in transition countries and note that Gross Domestic Product (GDP), inflation and unemployment had a significant positive impact on decreasing NPLs. Furthermore, they note that the only factor in these transition countries found to be significant, but with an opposite effect on non-performing loans, was the level of exports, which is unsurprising given that it reflects a country's vulnerability to external economic shocks.

In this study, we test the relationship between macroeconomic factors and the level of NPLs in 10 transition countries from Central and Eastern Europe, specifically Albania, Armenia, Bosnia and Herzegovina, Bulgaria, Croatia, Hungary, Kosovo, Macedonia, and Romania, during the period 2006 to 2016. Our objective is to determine for this region, the extent to which macroeconomic factors impact on the level of NPLs. Transitional countries are ones where the country is changing from a centrally planned economy to a market economy. These countries undergo a structural transformations intended to develop market-based institutions. They remove trade barriers and leave prices to be set by market forces (Feige, 1991; 1994). There is also a push to strengthen the financial sector to facilitate the restructure and privatise previously state-owned organisations and resources and ensure macroeconomic stabilisation.

At the beginning of the transition period the main causes that lead to the increase of problem loans was mainly due to the inefficiency of the banking systems, which were emerging from state ownership. However, some authors feel that today there is a need for a wider search in order to uncover the reasons behind such growth. They are of the opinion that one should investigate macroeconomic factors related to the environment in which the banking system operates (Turan and Koskija, 2014). The liberalization of centralized economies and the meltdown of the Comecon markets led to major changes in relative prices of goods and services, as well as a significant reduction in foreign trade activity for most Central and South-Eastern European countries as well as former Soviet Union countries. In this current environment, state owned enterprises became less profitable. This financial difficulty in transition countries, together with the lack of determination to complete the state plan and strategies to reflect the needs of this new market economy, led to a drastic decline in production. Output contraction affected the production chain of state-owned enterprises.

Moreover, even those enterprises that were favoured by the change of relative prices, faced severe shortages of raw materials, and consequently, their ability to remain profitable became slim. Output in these transition economies fell sharply, with many state-owned enterprises becoming less solvent. These factors placed these firms in a state of inability to cover operating costs and pay up their loan instalments and/or cost of their loan interests (Çeliku and Luçi, 2003; Dittus, 1994).

Governments in transition countries are faced with difficult situations and need to find a solution for NPLs. As noted above a large number of NPLs were generated during the planning stage of the economy as well as during the government's period of inactivity on credit lines during the early transition phase. Therefore, the state banks cannot be held responsible for that portion of NPLs caused by state inefficiency in the previous period.

It would also be very difficult to privatise state banks due to the inherited NPLs, even if these were to inherit only that portion of NPLs caused by their own inefficiencies. State banks inherited large amounts of NPLs and insufficient funds to invest. Therefore, their potential impact on economic development weakened as the net-worth of banks became more fragile, aggravated by their obligation to pay interest to depositors while having non-interest receiving loans which cause them to suffer permanent losses.

Moreover, a large number of NPLs leaves banks with a higher probability of bankruptcy, because despite their origin, they carry constant costs to banks. If state banks are to carry these NPLs, then the banking sector may lose the confidence of depositors and this may escalate into a banking crisis (Çeliku and Luçi, 2003; Gorton and Winton, 1998).

2. Literature Review

If a bank does not receive a timely partial or full payment of a loan, it should classify this as a problem loan and the value of the loan on the bank's financial statements should be adjusted to reflect this. By recording them in this way stakeholders, management, regulators and other individuals will have a clearer picture of the true value and strength of the bank (Apostolik and Donohue, 2015). Therefore, problem loans are defined as financials agreements wherein the borrowing party did not pay the interest and/or installments according to a structured schedule. In other words, loans will be defined as NPLs when they do not generate income for the bank and thus cease to be in accordance with the loan agreement (Anjom and Karim, 2015).

Authors analysing the impact of economic factors focus both on external events such as general macroeconomic conditions, which could impact on the ability of borrowers to repay their loans, and the variability of NPLs through banks. Turan and Koskija (2014) examine the continuous increase of NPLs in Albania resulting from

problems caused by the economic crisis and the decrease of emigrant incomes. They use quarterly data for the period 2003 to 2013 and a multivariate co-integration test to reveal that NPLs and real GDP, unemployment, inflation, loan interest rate and remittances are co-integrated in the long run, but not in a strong way. Turan (2016) in a later study of macroeconomic indicators on NPLs in the Albanian banking sector during the period 2007 to 2014, finds that NPLs have a negative correlation with remittances and the unemployment rate.

Using multivariate linear regression analysis, Clichici and Colesnicova (2014) found that banking NPLs in the Republic of Moldova are affected by distinct banking sector structures, their policy choices and also by the macroeconomic environment. They note an increase in NPLs as GDP, exports and remittances decrease and when unemployment increases. However, they find no correlation between NPLs and private indebtedness.

Kurumi and Bushpupa (2017) similarly reveal significant linkages of interest rates, remittances and the unemployment rate with NPLs. Also, in another empirical analysis of Bangladesh's banking system NPLs, Anjom and Karim (2015) found that there is a negative relationship with inflation, public debt as a percentage of GDP, return on equity, return on assets, total loan to total asset ratio, total loan to total deposit ratio and a non-interest income ratio. Moreover, Hanifan Fajar and Umanto, (2017), in a study of 20 banks listed on the Indonesia Stock Exchange (IDX) between Q1 2005 and Q4 2014, using dynamic panel data GMM, reveal that the previous period of NPL, GDP growth and inflation rate, have a significantly negative impact on NPL and that the Operations Expenses to Operations Income ratio (BOPO) and the Return on Equity (ROE) have a significantly positive relationship with NPL.

Rossi *et al.* (2005), considered a sample of 278 banks in nine transition countries, between the period 1995 to 2002, employing the Granger-causality techniques to test the relationships among loan quality, cost efficiency, and bank capital. They found that increases in NPLs are usually followed by decreasing cost efficiency. This occurs since banks increase spending on monitoring, working out, and/or selling off these loans, becoming more diligent in administering the portion of their existing performing loan portfolio. On the other hand decreasing cost efficiencies are usually followed by increasing NPLs, because of bad management practices, such as excessive expenditure, subpar underwriting and monitoring practices. Moreover, they highlight that low bank capital ratios may encourage management to take on more portfolio risks, increasing NPLs. In addition, Keeton and Morris (1987) focus on the concept of moral hazard, finding that commercial banks with low level of capital to asset ratio are encouraged to undertake high risk in their loan portfolio. As a consequence of this, the level of non-performing loans have increased. This negative relationship between equity ratio and NPLs is also a finding of Berger and DeYoung (1997) and Salas and Saurina (2002).

Empirical studies regarding the factors that determine the level of NPL show that real increase in GDP usually translates into higher levels of income, improving the financial capacity of borrowers. However, on the other hand, when the economy is below normal conditions or in a recession, the level of NPL may increase due to the resulting increase in unemployment, with borrowers facing major difficulties to repay their debt (Salas and Suarina, 2002; Ranjan and Dhal, 2003; Fofack, 2005; Jimenez and Saurina, 2005; Thalassinos *et al.*, 2015). Exchange rates, interest rates and inflation are other macroeconomic factors that impact the quality of the bank's activities. Exchange rate fluctuations may have a negative impact on the quality of assets, especially in countries with a large amount of foreign currency loans. The same with interest rate increases, particularly in case of loans with flexible interest rate (Louzis *et al.*, 2012; Zaman and Meunier, 2017). However, on the one hand, higher inflation may ease debt compensation by affecting the real value of unpaid credit, while on the other hand it may also reduce the real income of unprotected borrowers. In countries where credit rates are flexible, higher inflation may lead to higher rates resulting from monetary policy actions to fight inflation (Nkusu, 2011).

Saba *et al.* (2012) in their study conducted between 1985 and 2010 on US banks, identify that inflation and general loans have an important impact on NPL. Zeng (2012) analyses NPL in Chinese cases between 1999 and 2000 by using a model based on optimal control theory. He concludes that the equilibrium value of NPL of Chinese banks depends on microeconomic factors (example, internal management) under macroeconomic conditions which include open economy towards external world and government policies.

Klein (2013) investigates determining factors and their impact on NPLs and also on the macroeconomic performance of Central, Eastern and South-Eastern European (CESEE) countries, for the period between 1998 and 2011, using time series analysis. He found that NPLs responded to macroeconomic conditions, such as unemployment, GDP growth and inflations and highlights that the high NPLs in these countries affect the economic recovery negatively.

Fofack (2005), similarly focuses on investigating the main causes of NPL during the economic and bank crises that struck the majority of countries in Sub-Saharan Africa in the 1990s. His econometric analyses show that in these countries there is a dramatic increase of NPLs and extremely high loan risk that is influenced mainly by macroeconomic volatility.

Jameel (2014) uses time series multiple regression analyses on data collected from the Pakistani banking sector, between the period 2000 and 2010, to explain and determine the factors effecting NPLs. He found a negative association between capital adequacy ratio, GDP growth rate, credit deposit ratio and maturity time period of loans and NPLs. On the other hand, there is a positive relationship between weighted average lending rate and NPLs (Allegret *et al.*, 2016).

Bank profitability and sustainability can only be provided through a proper flow of interest income generated through the lending function of banks. However, since banks are no longer able to generate enough interest income through classical safe credit and are required to maintain reserves in the form of provisions to cover for eventual loan losses, bank capital decreases together with their health, which is becoming fragile, increasing the trend of NPLs. Therefore, banks are required to take proactive action to deal with the phenomenon of bad choice of borrowers by identifying and understanding the macroeconomic factors that contribute to the rise of classified credit in banking system (Anjom and Karim, 2015)

3. Methodology

In this study, we analyse the macroeconomic factors influencing NPLs in transition economies using panel data for Albania, Armenia, Bosnia and Herzegovina, Bulgaria, Croatia, Hungary, Kosova, Macedonia, and Romania, during the period 2006 to 2016 (see Table 1 for a full list of variables and sources). Using STATA, we applied various econometric techniques developed specifically for panel data, including Pooled OLS, Fixed and Random Effects estimation, as well as more complex dynamic panel data methods to account for autoregressive lagged dependency in NPLs and endogeneity issues, based on the Arellano-Bond framework using Generalised Method of Moments (GMM) estimation.

Table 1. Description of model and data source

Variable	Description	Data source
NPL	Non-performing loans, is a dependent variable	World Bank
GDP	Gross Domestic Product Growth, expressed as percentage	World Bank and International Monetary Fund
INF	Inflation, expressed as percentage	World Bank and International Monetary Fund
UNEMP	Unemployment, expressed as percentage	World Bank and International Monetary Fund
EXP	Export, expressed as percentage	World Bank and International Monetary Fund

Source: Summary of data source used by authors, World Bank and the International Monetary Fund.

The specification of the basic econometric model used for testing determinants of the level of NPL in commercial banks of transition countries is as follows:

$$NPL_{it} = \mu_t + \beta_1 GDP_{it} + \beta_2 INF_{it} + \beta_3 UNEMP_{it} + \beta_4 EXP_{it} + \varphi_i + \varepsilon_{it}$$

In this econometric model we use level of NPLs as the dependant variable and GDP growth, inflation (INF), unemployment (UNEMP) and exports (EXP) as the

explanatory variables. The subscript 'i' denotes each country, whereas 't' denotes the year.

Gross Domestic Product Growth GDP_{it} can be defined as a the change total market value of goods or services produced by the economy of a certain country, as well as total income earned by people living in that country. High GDP growth implies that the economy is performing well, and incomes of its citizens are increasing. Growing revenues demonstrate that loans will be paid. Annual GDP growth will implicitly assure that bank lending would function effectively (Anjom and Karim, 2015).

Inflation INF_{it} is an indicator of price stability and has a negative relation to the level of problem loans. This is due to the fact that, during inflationary periods the real value of payments that borrower has to settle their obligations to credit institutions falls (Kurumi and Bushpepa, 2017).

The unemployment rate $UNEMP_{it}$ is closely-related with banks' performance. Bank performance suffers when unemployment increases because there will be fewer individuals seeking to cooperate with banks, fewer bank accounts and services, which leads to increased NPLs. A higher unemployment rate implies that more people will have difficulties to pay their debt, increasing NPLs. Thus, based on the above arguments there is a positive relationship between unemployment rate and problem loans (Kurumi and Bushpepa, 2017).

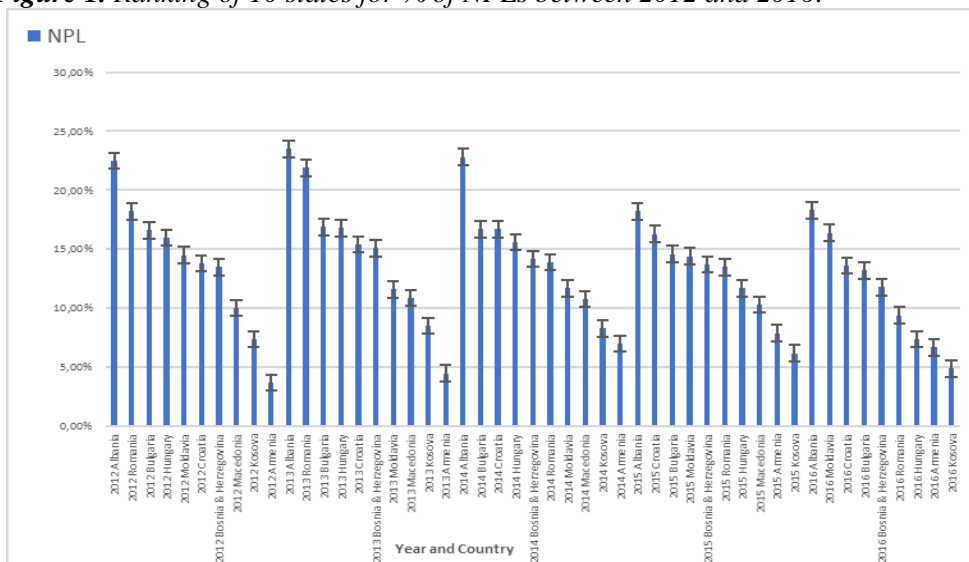
Rate of export increase EXP_{it} may provide additional information regarding the impact of economic conditions. A decline in exports should lead to a fall in company revenue and therefore companies face a lower ability to repay their credit. This contributes to a relatively higher NPL percentage to total loan (Clichici and Colesnicova, 2014).

The term φ_i captures country-specific fixed effects that enables us to control for time-invariant unobservable factors that may affect NPLs which otherwise may lead to biased coefficients. The term ε_{it} is the usual random error term.

For testing these variables, we have used (1) Pooled OLS, (2) the Fixed Effects model, (3) the Random Effects model, and (4) Arellano-Bond GMM estimation. We show all results from each specification in the interest of full disclosure, in order to assess the robustness of the findings, even though we attribute more weight to the results from the Arellano-Bond estimation, given that it was designed to control for endogeneity caused by persistence in the time series element of our dependent variable (Arellano and Bond, 1991).

Figure 1 below, shows that for the 5 years between 2012 and 2016, Albania has the highest rate of NPLs, while Kosovo and Armenia have the lowest rates, from the countries sampled for this study.

Figure 1. Ranking of 10 states for % of NPLs between 2012 and 2016.



Source: Summarized by the authors from data published by the World Bank.

4. Results

The results of regression analysis are reflected in Table 2 below. Robust standard errors, clustered at the country level to account for arbitrary heteroscedasticity across countries and serial correlation within each country panel, are used in each model.

Table 2. Empirical analysis of models in STATA

Dependent variable (NPL)	Pooled OLS (Model 1)	Fixed Effects (Model 2)	Random Effects (Model 3)	Arellano Bond (Model 4)
GDP Growth	-0.2816* (0.153)	-0.2227* (0.101)	-0.2389** (0.106)	-0.2597** (0.090)
Inflation	-0.8284** (0.174)	-0.7731** (0.119)	-0.7155** (0.155)	-0.0584 (0.072)
Unemployment	-0.1403** (0.046)	0.4087** (0.159)	0.0655 (0.103)	0.3085* (0.162)
Export	0.1405** (0.060)	0.097 (0.057)	0.1038 (0.067)	0.0378 (0.039)

Source: Calculation in Stata by the authors. **, Denotes that the coefficient is statistically significant at the 5% level; * Denotes that the coefficient is statistically-significant at the 10% level. Cluster-Robust standard errors are reported in parentheses.

From the results above, the only explanatory variable that yields statistically-significant coefficients across all specifications is GDP growth. In all cases, the relationship is negative, as obtained in prior studies, indicating that improved

macroeconomic conditions lead to lower NPLs due to higher incomes, lower default rates, etc. Unemployment yields significant coefficients in all but one case (the Random Effects model).

In most cases, the coefficient is positive, denoting that higher unemployment rates are associated with higher NPLs, reflecting worsening employment prospects and thus earnings, although the coefficient emerges as negative and significant in the Pooled OLS, which perhaps underlines the relative shortcomings involved in this simple specification. The coefficient on Inflation is also significant and negative across three models, implying that higher levels of inflation are associated with lower NPLs, possibly due to the resulting reduction in real debt repayments. Nonetheless, this interpretation must be treated with caution given the lack of statistical significance in the Arellano-Bond model, which belies the lack of robustness of this result. Export growth only yields significant coefficients in the Pooled OLS model (positive), thus suggesting that this variable is not a key determinant of commercial bank NPLs within our sample. Therefore, our findings confirm the importance of general macroeconomic conditions as key determinants of non-performing loans within our transition countries. The results also echo those of previous authors, given the positive coefficients obtained on unemployment, as well as the negative coefficients obtained for both GDP growth and inflation.

5. Conclusions

Undoubtedly, NPLs have ‘caught the eye’ of many authors who were intrigued by this phenomenon. This is perhaps attributable to the fact that it is an indicator of the health of the banking system within a country and hence the economic health of that country, both in the short term and in the long term due to its implications for investment.

Our analysis has sought to determine the impact of specific macroeconomic factors of transition countries on the level of NPLs. We show the relationship by using four different econometric models and found that GDP growth showed the strongest (inverse) relationship with NPLs, meaning that as GDP growth increases, people have more disposable income and can meet their loan payment obligations. Inflation also showed a significant negative relationship with NPLs, revealing that in times of low inflation, people can honour their loan obligations due to the reduced real burden of such repayments as general prices rise.

Unemployment showed a significant positive relationship with NPLs, in line with prior findings, further underscoring the importance of domestic economic conditions for NPLs. Finally, export growth showed largely non-significant results, indicating that NPLs within our sample were mainly affected by domestic conditions rather than external economic shocks. Thus, these findings have important implications for the stability and health of the banking sector within transition economies, since they underscore the importance of macroeconomic conditions. In particular, the results

underline the need for pro-growth macroeconomic policies within these countries, particularly the need to attract domestic and foreign investment in order to boost growth and employment.

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