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# A Project-Based Approach to Managing Non-Performing Mortgage Loans: Evidence from Europe and Asia

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## ABSTRACT

In the context of increasing macroeconomic instability and increasing credit risks, the analysis of the factors of formation of problem mortgage loans in the banking system is becoming particularly relevant. This study aims to develop and propose a conceptual project-based framework, the NPL Project Approach that conceptualizes the management of non-performing mortgage loans as an integrated project cycle. The methodological basis of the research consists of methods of descriptive statistics, correlation analysis and multiple regression modeling. The empirical basis of the study consists of data collected from the Bureau of National Statistics and the National Bank of the Republic of Kazakhstan for the period 2020-2024, including indicators of household income, gross domestic product, inflation, interest rates, deposits and overdue debt. The analysis results show that the average level of problem loans in the European Union decreased from 2.6% in 2020 to 1.9% in 2024, reflecting an increase in the effectiveness of credit risk management systems. In Central Asian countries, the level of problem loans in Kazakhstan decreased from 6.9% in 2020 to 3.1% in 2024, indicating a partial improvement in the quality of the loan portfolio, but sensitivity to the growth of mortgage lending remains. The prospects for further research include empirical verification of the model based on case studies of emerging market banks, quantification of its impact on loan portfolio performance, as well as adaptation of the approach to other non-mortgage lending segments.

**KEYWORDS:** Non-Performing Loan, Credit, Credit Risk, Bank, Banking Strategy, Financial Stability, Financial Regulation, Economic Sustainability

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# Проектный подход к управлению проблемными ипотечными кредитами: сравнительный анализ Европы и Азии

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## АННОТАЦИЯ

В условиях усиления макроэкономической нестабильности и роста кредитных рисков особую актуальность приобретает анализ факторов формирования проблемных ипотечных кредитов в банковской системе. Данное исследование направлено на разработку и предложение концептуальной проектной модели управления проблемной задолженностью (NPL), которая рассматривает управление проблемными ипотечными кредитами как интегрированный проектный цикл. Методологическую основу исследования составляют методы описательной статистики, корреляционного анализа и множественного регрессионного моделирования. Эмпирическую базу исследования составляют данные, собранные из Бюро национальной статистики и Национального банка Республики Казахстан за период 2020–2024 гг., включая показатели доходов населения, валового внутреннего продукта, уровня инфляции, процентных ставок, объема депозитов и просроченной задолженности. Результаты анализа показывают, что средний уровень проблемных кредитов в Европейском союзе снизился с 2,6% в 2020 г. до 1,9% в 2024 г., что отражает повышение эффективности систем управления кредитным риском. В странах Центральной Азии уровень проблемных кредитов в Казахстане сократился с 6,9% в 2020 г. до 3,1% в 2024 г., что свидетельствует о частичном улучшении качества кредитного портфеля, однако сохраняется чувствительность к росту ипотечного кредитования. Перспективы дальнейших исследований включают эмпирическую проверку модели на основе кейс-исследований банков развивающихся рынков, количественную оценку ее влияния на показатели кредитного портфеля, а также адаптацию подхода к другим сегментам кредитования, не связанным с ипотекой.

**КЛЮЧЕВЫЕ СЛОВА:** проблемный кредит, кредит, кредитный риск, банк, банковская стратегия, финансовая стабильность, финансовое регулирование, экономическая устойчивость

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## INTRODUCTION

Non-performing mortgage loans remain a major source of financial instability in banking systems, especially in emerging market economies, where rapid mortgage lending expansion is accompanied by heightened sensitivity to macroeconomic shocks. The level and persistence of non-performing loans (hereinafter – NPLs) in mortgage portfolios are determined by a complex interaction among borrower behaviour, housing-price dynamics, credit standards, monitoring quality, regulatory policy, and the organisational maturity of financial institutions. Since mortgage credit risk develops unevenly over time and across regions, the diagnosis, forecasting and management of NPLs remain serious challenges for both banks and regulators.

Recent international monitoring confirms significant regional differences in NPL dynamics. In the European Union, the average NPL ratio declined from approximately 2.6% in 2020 to around 1.9% in 2024, reflecting improvements in supervisory systems and risk-management practices. In contrast, several emerging markets in Europe and Asia continue to face higher and more volatile levels of non-performing assets due to rapid credit growth, institutional constraints and increased exposure to macroeconomic shocks, while the average NPL ratio for Asia as a whole remains around 1.6% but masks large cross-country differences (EBRD, 2025; ADB, 2025).

Existing approaches to managing NPLs tend to focus on individual components of the credit-risk management system. Numerous studies examine borrower-level credit-risk modelling, default forecasting, or macroprudential regulation, while others analyse monitoring procedures or restructuring mechanisms (Crouhy et al., 2000; Suryanto et al. 2022; Bermpei et al., 2023; Cenzon & Szabó, 2024). However, these approaches are often developed separately and rarely integrated into a single organizational framework. As a result, analytical models are implemented without clear links to operational processes, monitoring signals are not systematically connected to intervention decisions, and regulatory constraints do not always ensure coordinated action by banks, supervisory authorities and government agencies.

At the same time, recent research and practice in banking management show that complex orga-

nizational transformations such as digitalisation, risk-management reforms and process restructuring are increasingly implemented within project-based structures. Project management provides structured phases, clearly defined responsibilities and feedback mechanisms that help align analytical tools, operational procedures and strategic decisions within a single governance structure. Applying this logic to the management of non-performing mortgage loans suggests that NPL resolution should be organised as an integrated project cycle rather than as a set of fragmented analytical and operational activities.

Despite a growing body of research on credit risk, NPL determinants and supervisory policy, existing studies rarely treat the management of non-performing mortgage loans as a unified project-oriented process that links early-warning systems, ongoing monitoring, intervention measures and portfolio resilience within a single organizational framework. This gap limits the ability of banks and regulators to coordinate decisions at different stages of the credit cycle, especially in emerging economies characterised by rapid growth in mortgage lending and higher macro-financial volatility.

Therefore, this study aims to develop and propose a conceptual project-based framework, the NPL Project Approach that conceptualizes the management of non-performing mortgage loans as an integrated project cycle. The relevance of the framework is substantiated through an analysis of recent NPL dynamics and institutional practices in European and Asian banking systems, providing a basis for more coordinated and effective NPL management strategies.

## LITERATURE REVIEW

Early discussions of credit risk in the first half of the twentieth century were primarily descriptive and supervisory, relying on expert judgment and simple balance sheet indicators rather than formal statistical models. A major methodological shift occurred in the 1960s with the emergence of quantitative approaches, most notably Altman's Z-score model (1968), which introduced discriminant analysis for bankruptcy prediction and became a benchmark for firm-level credit-risk assessment. In the 1970s, structural models further advanced the field, with Merton's (1974) framework conceptualizing default as a contingent-claims problem driven by the sto-

chastic dynamics of firm asset values and leverage. During the 1980s and 1990s, the focus expanded to portfolio-level risk, leading to the development of credit portfolio models that account for default correlations and loss distributions (Crouhy et al., 2000). Regulatory and methodological reviews, including those of the Basel Committee on Banking Supervision (BCBS, 1999) and later retrospective analyses of credit-risk models, highlighted both the analytical strengths and practical limitations of these approaches, emphasizing issues such as parameter instability, data requirements, and model risk in real-world banking applications (Altman et al., 2017).

Since the early 2000s, the literature has increasingly focused on portfolio-level risk management, regulatory capital and the macro-financial environment in which NPLs accumulate. Advances in internal ratings-based approaches and credit portfolio modelling have stimulated research on stress testing and economic capital, highlighting how macroeconomic cycles, sectoral shocks and portfolio composition jointly shape expected and unexpected losses on bank balance sheets (Crouhy et al., 2000). At the same time, cross-country empirical studies have analyzed how GDP growth, unemployment, interest rates, credit expansion and bank-specific characteristics explain the accumulation of NPLs in different banking systems. International institutions have compiled extensive databases on the dynamics of NPLs during banking crises and on the effectiveness of alternative resolution strategies, World Bank reviews of NPL management in banks, and regional assessments of the causes, impacts and resolution strategies of NPLs in Asia and Europe (Van Zwieten, 2019; ADB & ECB, 2021). Complementary regional monitoring reports further document recent NPL developments: high-frequency evidence on the evolution of NPLs in Asian banking systems is provided by the Asian Development Bank and IPAF Asia, while European monitoring reports track post-crisis balance-sheet repair in Europe and Central and Eastern Europe (ADB, 2025; EBRD, 2025). Taken together, these contributions have shaped a macro-prudential and institutional perspective on NPLs, which complements traditional micro-level credit-risk models and provides a basis for more recent research on mortgage NPLs.

Against this backdrop, the contemporary academic literature on NPLs can be divided into several interconnected research streams, which provide

a structured framework for analysing prior work and positioning the proposed model. Recent studies emphasize that the formation and management of non-performing mortgage loans is a multifactorial process involving behavioral, macroeconomic, regulatory and institutional elements. Analyses of structural instability in default models show that borrowers and financial intermediaries adapt to lenders' policies, leading to systematic biases in default-probability forecasts and an increase in the volume of NPLs (Smith & Yezer, 2025). The importance of behavioural factors is confirmed by research showing that households' inflation experience and expectations affect mortgage-product choice and the probability of future delinquency (Cenzon & Szabó, 2024). The spatial connectedness of housing markets increases the sensitivity of mortgage portfolios, as Balçılar et al. (2024) showed that during periods of macroeconomic instability, price shocks spread more quickly across regions. At the same time, climate risks are becoming an independent driver of deterioration in mortgage asset quality. Holtermans et al. (2024) demonstrated that extreme weather events significantly increase the probability of payment arrears. At the institutional level, Bianco et al. (2025) showed that regulatory changes redistribute the share of risky loans between large and small banks, thereby affecting future NPL levels.

First, therefore, a large number of studies examine the macroeconomic and behavioral determinants of mortgage delinquency and default, highlighting the combined impact of income dynamics, housing prices, expectations and regulatory changes on the formation of non-performing mortgage loans and linking earlier macro-prudential work on NPL cycles with recent behavioral and spatial perspectives. In the field of credit risk modeling, there is a clear shift from static scoring models to more advanced algorithms that account for borrower behavior and external shocks. Bosker et al. (2025) examined machine-learning-based variable selection in clustered credit risk models, while Suryanto et al. (2022) and Sanz-Guerrero and Arroyo (2025) analyzed transfer learning and large language model approaches for credit risk and delinquency prediction in environments with limited or evolving default data. Chen et al. (2025) and Han et al. (2025) showed how non-linear optimisation, gradient-descent tree algorithms and symmetry-aware deep-learning architectures can be combined to enhance credit-risk assessment

and credit-strategy design. Noriega et al. (2025) provided evidence from Peru that crisis-period delinquency prediction can be improved by tailoring machine-learning models to critical external factors, reinforcing the importance of model adaptability in volatile macro-financial environments. Together with research on Bayesian models within international financial reporting standards and on cluster and deep-learning models for robust estimation of default probabilities and expected losses, these studies demonstrate how modern analytical tools expand the classical credit-risk toolkit.

Second, a rapidly expanding stream of research focused on methods for modeling and forecasting credit risk, shifting from traditional scoring systems to advanced statistical and machine learning approaches that integrated behavioral, textual, and macro-financial information and extended beyond the classic models of the late twentieth century. Research on credit monitoring emphasized the transition from static control procedures to process-oriented and digital methods. Process mining and business process analysis algorithms that integrated industry standards and internal bank knowledge were able to identify rare but critical deviations (Li et al., 2025). Bermpel et al. (2023) showed that managers' personality traits influenced monitoring styles in syndicated loans, with more individualistic managers tending to apply softer control, thereby altering the portfolio's risk profile. Instefjord and Nakata (2022) argued that micro-prudential regulation reduced banks' incentives to engage in dynamic monitoring, increasing their reliance on static approaches. Crosato et al. (2024) demonstrated that alternative digital data, such as website structure, content, and online activity, could be used to construct continuous monitoring indicators that signalled borrower deterioration earlier than traditional reporting. Beyond anomaly detection in business processes, Silva et al. (2019) and Simonović and Todorović (2019) showed that Monte Carlo simulation and project management techniques could be applied to banking operations and product development, highlighting the relevance of quantitative tools for operational risk and innovation management, while Christou et al. (2010) demonstrated that agile process frameworks could be successfully adapted to banking IT projects, anticipating later developments in digital transformation in the sector.

Third, a growing body of literature therefore anal-

yses monitoring mechanisms and early-warning systems, emphasising the transition from static checks to continuous, process- and data-driven oversight of borrowers and portfolios, and addressing weaknesses of earlier frameworks in which monitoring was primarily viewed as a static back-office function. The literature on restructuring and optimizing problem-loan processes analyzes how the combination of data, timing and intervention methods affects the effectiveness of debt collection. Chai et al. (2023) proposed an integrated analytical approach to identify hidden default patterns in loans to small and medium-sized enterprises. Witzany and Kozina (2022) described that regression models for estimating time to recovery outperform logistic models when choosing the timing of the transition to soft collection measures. Gutkowski (2021) demonstrated that successful sovereign-debt restructuring creates macro-economic conditions conducive to domestic credit growth. Forster and Sun (2022) confirmed that macro-prudential policies, including loan-to-value regulation, can smooth credit-price cycles and reduce the likelihood of future NPLs.

Fourth, a substantial body of work examines restructuring mechanisms and regulatory instruments aimed at reducing the accumulation of non-performing assets by linking micro-level collection strategies with macro-prudential instruments and sovereign-debt resolution, echoing the policy-oriented NPL literature developed by international institutions. The regulatory environment, more broadly, is a key factor in determining the volume of NPLs. Rahman et al. (2023) showed that fiscal consolidation in countries with high public debt increases the share of NPLs: soft consolidation leads to a moderate deterioration in portfolio quality, whereas hard consolidation causes a pronounced increase in NPLs. From a supervisory and accounting perspective, Jakubik and Teleu (2025) examined how IFRS-9-based expected-credit-loss frameworks affect credit-risk assessment in uncertain environments, while Scope Ratings (2025) and the EBRD's NPL Monitor (2025) provided practitioner-oriented evidence on how regulatory guidance, provisioning practices and secondary-market development influence banks' NPL trajectories. Authors also emphasise that cross-country data comparability is hampered by differences in NPL definitions, treatment of restructured loans, and compliance with international reporting standards, underscoring the need to

analyse regulatory and fiscal conditions when formulating NPL-management strategies.

Research on project management and organizational change in the banking sector shows that a significant proportion of transformation initiatives is implemented through structured project mechanisms. Iljins and Skvarciany (2015) showed that effective change management is crucial for building and maintaining customer trust in commercial banks, while Sarfraz et al. (2018) analyzed how environmental-risk-management strategies and corporate social responsibility shape project-financing decisions, highlighting the need to integrate sustainability and stakeholder engagement into banking project cycles. Rodrigues et al. (2023) highlighted the central role of technology-management capabilities in driving successful digital transformation in banks, demonstrating that the quality of coordination, communication and agile governance within project teams is a key determinant of transformation outcomes. These studies, together with earlier work on Monte Carlo simulation in banking operations, agile process frameworks in banking IT and project-management techniques in banking product development, reinforce the view that complex banking initiatives from risk-management reform to digitalisation, benefit from structured project cycles with clearly defined stages, roles and coordination mechanisms (Silva et al., 2019; Simonović & Todorović, 2019).

Finally, recent research on project management and organizational change in the banking sector emphasizes that complex transformations, including risk-management and digitalisation initiatives, are typically implemented through structured project cycles with clearly defined stages, roles and coordination mechanisms, suggesting that similar project structures may be useful for organising NPL management. International practice has contributed significantly to the understanding of NPL management. An analysis of World Bank country cases (Bauze, 2021) showed that the successful reduction of NPLs in countries such as Serbia, Albania, Slovenia, and Tunisia was achieved through comprehensive, structured, and inter-agency strategies that were broadly consistent with cross-country policy reviews of NPL management (World Bank, 2019; ADB & ECB, 2021). These countries established working groups on NPL reduction, set measurable targets, developed project plans and allocated roles

among banks, regulators and government agencies. This experience confirms that NPL management requires a project-based approach with phased implementation, coordination among participants, clear control mechanisms, stakeholder engagement and adaptable solutions.

Overall, the literature shows that macroeconomic variables, borrower behavior, supervisory intensity and the organizational maturity of banks influence the risk of non-performing mortgage loans. Multi-level and integrated NPL management should combine analytical models, process monitoring, restructuring mechanisms, the regulatory context and a project-based approach to managing banking processes. At the same time, existing research streams primarily develop these components in isolation and rarely conceptualise the management of non-performing mortgage loans as a single, integrated project cycle. As a result, banks and regulators receive fragmented recommendations on default forecasting, monitoring, restructuring or regulatory design, but lack a unified concept that combines early risk identification, continuous monitoring, intervention measures and long-term portfolio sustainability within a coherent organizational structure. This methodological gap motivates the present study and underpins the development of the NPL Project Approach model, which treats the management of non-performing mortgage loans as an integrated project cycle.

## METHODOLOGY

This study is qualitative and conceptual, relying on secondary data analysis and theoretical synthesis rather than on primary empirical data collection. It adopts a structured conceptual research design that integrates a targeted literature review, a comparative analysis of secondary macroeconomic data, and an integrative synthesis procedure to develop a practice-oriented framework for managing non-performing mortgage loans. A conceptual research design was chosen because the study aims to synthesise fragmented knowledge across multiple disciplines credit risk, banking regulation, and project management into an integrated framework, rather than to test specific hypotheses on primary data. The research followed four sequential stages.

At the first stage, a structured search and selection of academic sources was conducted. The search

covered international peer-reviewed journals indexed in Scopus and Web of Science, as well as reports and databases of international financial institutions (IMF, World Bank, ADB, EBRD, ECB, Scope Ratings). The primary time frame was 2010–2025, although seminal earlier works that established the theoretical foundations of credit risk analysis (e.g., Altman, 1968; Merton, 1974; Basel Committee, 1999; Crouhy et al., 2000) were also included where relevant.

The search was conducted in English using keyword combinations such as ‘non-performing loans’, ‘mortgage default’, ‘credit risk’ modeling”, ‘NPL resolution’, ‘early warning systems’, ‘loan portfolio monitoring’, ‘restructuring of distressed debt’, and ‘project management in banking’. Publications were retained if they (i) directly addressed non-performing loans in banking or mortgage markets, credit risk, monitoring or restructuring; (ii) analyzed institutional, regulatory or organizational mechanisms of NPL management; and (iii) contained conclusions with clear implications for managerial practice. Studies that mentioned non-performing loans only in passing were excluded. A large body of literature was initially reviewed, of which 41 publications met the inclusion criteria and were retained for thematic analysis. It should be noted that the search was limited to English-language sources and did not follow a formal systematic review protocol (e.g. PRISMA); accordingly, the procedure is best described as a structured narrative review with explicit inclusion criteria.

At the second stage, the selected publications were grouped into five thematic streams corresponding to the main components of NPL management: (1) macroeconomic and behavioral determinants of mortgage default; (2) credit-risk modeling and forecasting methods; (3) monitoring mechanisms and early-warning systems; (4) restructuring instruments and macroprudential tools; and (5) project management and change management in financial institutions. Within each stream, the strengths and limitations of existing approaches were identified, and possibilities for their integration into a unified system were assessed.

In the third stage, a comparative analysis of secondary data on NPL dynamics was conducted. Two

summary tables in heatmap format were compiled using publicly available data from Scope Ratings GmbH (2025) for EU countries and IPAF Asia (2025) for Asian sub-regions, covering the period 2020–2024. In addition, forward-looking NPL projections published by the Asian Development Bank (2025) were used to supplement the retrospective analysis. The comparative analysis illustrated regional differences in credit-risk trajectories and contextualised the relevance of the proposed framework for emerging mortgage markets.

At the fourth stage, a conceptual synthesis procedure was applied to develop the NPL Project Approach model. Based on the thematic analysis of the literature and the patterns identified in the comparative data, the key phases of non-performing loan management (early risk identification, monitoring and intervention, portfolio and sustainability management) were mapped to the typical stages of a project cycle (initiation, planning, implementation, monitoring and closure), drawing on established project-management standards (PMBOK, ISO 21502). For each phase, the roles of banks, regulators and government agencies, the main information flows and the decision points were specified, resulting in a formalised project-based framework for NPL management.

This four-stage methodological approach formed the basis for the results presented in the following section.

## RESULTS

This section presents the results of a comparative analysis of the dynamics of problem loans (NPL) in the banking systems of Europe and Asia for the period 2020–2024. The analysis is based on aggregated statistical data characterizing the level and change in the share of problem assets in banks' loan portfolios, which makes it possible to assess the quality of credit risk in various institutional and macroeconomic conditions. The presented data form an empirical basis for subsequent comparisons with emerging markets and for interpreting the identified trends in the context of institutional and structural features. Summary indicators for the European Union countries are presented in Table 1.

**Table 1.** NPL ratio in the EU for 2020–2024

Country	2020	2021	2022	2023	2024
European Union	2,6%	2,0%	1,8%	1,8%	1,9%
Austria	2,1%	1,9%	1,8%	2,2%	2,4%
Belgium	2,0%	1,5%	1,5%	1,2%	1,3%
Denmark	1,9%	1,7%	1,4%	1,3%	1,3%
Finland	1,5%	1,3%	0,9%	1,1%	1,2%
France	2,2%	1,9%	1,9%	1,9%	2,0%
Germany	1,3%	1,1%	1,1%	1,3%	1,6%
Italy	4,1%	3,1%	2,5%	2,4%	2,3%
Spain	2,9%	3,1%	2,8%	2,8%	2,7%
Sweden	0,5%	0,3%	0,2%	0,3%	0,4%
Netherlands	2,0%	1,5%	1,4%	1,4%	1,5%

Note: compiled by the authors based on Scope Ratings GmbH (2025)

As shown in Table 1, the average EU NPL ratio declined from 2.6% in 2020 to 1.9% by 2024. This trend reflects the maturity of the European credit risk management system, which includes a developed secondary market for non-performing assets, institutionalized restructuring procedures, stringent supervisory standards, and regular stress testing of mortgage portfolios. Italy and Spain, which initially exhibited comparatively elevated NPL levels (4.1% and 2.9%, respectively), demonstrated sustained reductions, while several Northern European countries (Sweden, Denmark, and Finland) maintained consistently low ratios throughout the period. At the same time, Austria and Germany showed a modest upward trend in 2023–2024, suggesting that even mature banking systems are not immune to localized credit quality pressures. Overall, the European

experience can serve as a benchmark for emerging mortgage markets, highlighting the importance of comprehensive regulation and transparent reporting for effective NPL management.

To compare regional credit risk features and assess the heterogeneity of problem-loan dynamics in developing financial systems, an analysis of Asian countries over the same period was conducted. Unlike European banking systems, the Asian region is characterised by greater variability in institutional conditions, credit growth rates, and levels of regulatory development, leading to significant differences in NPL dynamics. As shown in Table 2, the evolution of the share of NPLs across four Asian sub-regions (East, South, Southeast, and Central Asia) from 2020 to 2024 is presented.

**Table 2.** NPL ratio in Asia for 2020–2024

Country	2020	2021	2022	2023	2024
Asia				1,7%	1,6%
East Asia				1,5%	1,4%
Japan	1,2%	1,3%	1,2%	1,3%	1,2%
Mongolia	11,7%	10,0%	9,1%	7,5%	5,1%
People's Republic of China	1,8%	1,7%	1,6%	1,6%	1,5%
Republic of Korea	0,5%	0,4%	0,3%	0,4%	0,4%
South Asia				4,0%	3,5%
Bangladesh	7,7%	7,9%	8,2%	9,0%	20,2%
India	7,9%	6,5%	4,8%	3,4%	2,5%
Nepal	1,7%	1,2%	2,4%	3,8%	4,6%
Pakistan	9,2%	7,9%	7,3%	7,6%	6,3%
Sri Lanka	4,9%	4,5%	12,0%	13,1%	12,9%
Southeast Asia				2,6%	2,6%
Cambodia	2,1%	2,0%	3,1%	5,4%	7,0%
Indonesia	3,1%	3,0%	2,4%	2,2%	2,1%

Malaysia	1,6%	1,7%	1,7%	1,7%	1,4%
Philippines	3,6%	4,0%	3,2%	3,2%	3,3%
Singapore	2,6%	2,1%	1,8%	1,7%	1,3%
Thailand	3,1%	3,0%	2,7%	2,7%	2,7%
Viet Nam	1,7%	1,5%	2,0%	4,6%	5,4%
Central Asia				2,8%	2,7%
Armenia	4,5%	1,9%	2,8%	2,4%	1,2%
Azerbaijan	6,1%	4,6%	2,6%	1,9%	1,9%
Kazakhstan	6,9%	3,3%	3,4%	2,9%	3,1%
Uzbekistan	2,1%	5,1%	3,5%	3,5%	3,9%

Note: compiled by the authors based on IPAF Asia (2025)

The data in Table 2 reveal pronounced regional heterogeneity. East Asian banking systems (Japan, China, and the Republic of Korea) maintained low and stable NPL ratios (1.2–1.8%), reflecting well-developed risk-management infrastructure and institutional stability. In contrast, South Asia exhibited the highest and most volatile levels: Bangladesh experienced a sharp increase to 20.2% by 2024, while India achieved a notable reduction from 7.9% to 2.5% over the same period. In Central Asia, Kazakhstan occupies an intermediate position — its NPL ratio declined from 6.9% to 3.1%, yet sensitivity to accelerated mortgage-portfolio growth and

household debt burden persists, requiring stronger supervision. Uzbekistan's NPL ratio remains officially moderate (3.9% in 2024), but rapid lending expansion and the limited history of the mortgage market create potential vulnerabilities that warrant deeper monitoring and integrated risk-management mechanisms.

To supplement the retrospective analysis, Table 3 presents the Asian Development Bank's (2025) forecast of NPL dynamics for selected countries over the next four quarters, together with the key macro-economic determinants identified for each case.

**Table 3.** ADB NPL projections and key risk determinants in Asia (Next 4Q)

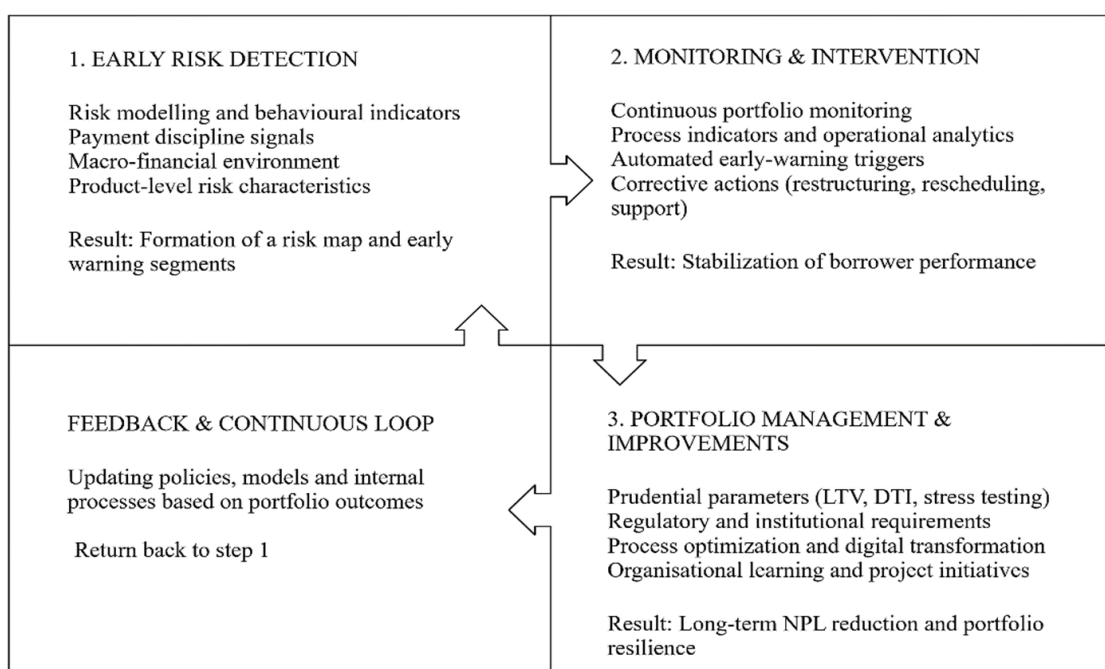
Country	Forecast NPL (% , min–max)	Summary	Key determinant
Indonesia	2.6%–3.1%	Sharp increase	Government Consumption
Kazakhstan	3.4%–4.2%	Less volatile	Government Debt
Malaysia	≈1.6%	Remain high	Government Consumption
Mongolia	7.3%–8.3%	More volatile	NPL Ratio (past)
People's Republic of China	≈1.6%	Maintain	NPL Volume (past)
Republic of Korea	0.3%–0.4%	Slight decline	Household Mortgage
Thailand	≈2.9%	Slight increase	Industrial Product Index
Vietnam	3.0%–3.3%	Fluctuating	Market Capitalization

Note: compiled by the authors based on ADB (2025)

These projections provide a forward-looking dimension that contextualizes the relevance of adaptive approaches to NPL management. As Table 3 indicates, the forecasts show mixed dynamics. China, South Korea, and Malaysia are expected to maintain low NPL levels, while Mongolia and Indonesia are projected to see increases. Kazakhstan shows a trend toward gradual stabilization (3.35–4.23%), consistent with the strengthening of supervisory measures. A comparison of the historical data (Tables 1–2) with these forward-looking estimates provides a comprehensive picture of the evolution

of credit risk in both regions and underscores the need for adaptive, project-oriented frameworks for NPL management, particularly in emerging markets where credit-risk trajectories remain volatile.

Based on the thematic analysis of the literature and the patterns identified in the comparative data above, this study proposes “the NPL Project Approach model”, which conceptualizes the management of non-performing mortgage loans as a structured project cycle and is illustrated in Figure 1.



**Figure 1.** Conceptual project cycle of the NPL Project Approach model

As shown in Figure 1, the model comprises three sequential stages that form a continuous cycle with feedback loops between analytical diagnostics, operational interventions, and strategic portfolio decisions. The first stage (early risk detection) focuses on the preliminary identification of borrowers and credit segments at increased risk of financial deterioration. At this stage, the bank uses risk-modelling outputs, borrower-behavior data, macroeconomic signals, and credit-product parameters to map potential risk areas, thereby enabling early corrective action. The second stage combines continuous monitoring with managerial intervention measures. Regular tracking of payment discipline, internal operational data, and changes in borrower behavior enables timely detection of deviations. Where necessary, intervention measures are initiated, such as restructuring, term adjustments, or personalized borrower support, to stabilize the client's financial situation and prevent the loan from being classified as non-performing. The third stage (portfolio management and sustainability) shifts the focus to the long-term resilience of the mortgage portfolio. Banks incorporate macroprudential requirements, stress test results, regulatory changes, and organizational factors into credit policy revisions, process improvements, and staff training, ultimately reducing NPL levels and strengthening risk management.

## DISCUSSION

The development of the NPL Project Approach confirms that managing non-performing mortgage loans requires a comprehensive, project-oriented approach rather than isolated tools. Empirical studies show that even advanced default-prediction and credit-risk models do not prevent NPL accumulation when not embedded in organizational decision-making processes (Smith & Yezer, 2025; Bosker et al., 2025). The proposed framework extends this literature by explicitly linking analytical models to monitoring, restructuring, and portfolio-level decisions within a single project cycle.

The three-stage structure of the model reflects evidence that mortgage distress is driven by a combination of behavioral, macroeconomic, and regulatory factors (Cenzon & Szabó, 2024; Balcilar et al., 2024; Holtermans et al., 2024). Early-warning tools and portfolio segmentation address the determinants of delinquency, while the monitoring and intervention stage translates risk signals into concrete actions, and the portfolio-management stage aligns underwriting and restructuring policies with long-term sustainability goals.

The emphasis on process-based monitoring and clearly defined responsibilities is consistent with research calling for a shift from static checks to con-

tinuous, data-driven surveillance (Li et al., 2025; Bermpei et al., 2023; Instefjord & Nakata, 2022). By assigning monitoring roles, decision rules, and escalation paths, the NPL Project Approach offers a practical way to ensure that early signals of borrower distress lead to timely interventions rather than remaining confined to risk reports.

The model also resonates with international practice. The World Bank's NPL Resolution: Country Cases (Bauze, 2021) and the European Parliament study by Bertay and Huizinga (2021) show that successful NPL reduction is achieved through coordinated strategies with clear timelines and institutional roles, not through individual instruments alone. The proposed approach provides a conceptual structure for such programs, formalizing the roles of banks, supervisors, and government agencies within an integrated project framework that can be adapted to emerging mortgage markets such as Kazakhstan and Uzbekistan, where rapid credit growth and macro-financial volatility heighten the need for coordinated NPL management.

Overall, the NPL Project Approach does not replace existing analytical or regulatory tools; it offers a unifying, project-based framework that connects early-warning systems, operational decisions, and portfolio-level adjustments, thereby transforming fragmented insights into NPL determinants, monitoring, and restructuring into a coherent organizational model.

## CONCLUSION

This study developed the NPL Project Approach model, a conceptual framework that reconceptualizes the management of non-performing mortgage loans as an integrated three-stage project cycle, moving beyond the fragmented treatment of credit risk diagnostics, monitoring, and restructuring that characterizes the existing literature. Three principal findings emerge from the analysis.

First, the comparative examination of NPL dynamics across EU and Asian banking systems (2020–2024) demonstrates that sustained NPL reduction in the EU over this period is associated not with any single instrument but with the coordinated functioning of supervisory standards, secondary NPL markets, and institutionalized restructuring procedures. Second, the pronounced heterogeneity observed in Asia, where NPL ratios range from below 2% to

above 7% across sub-regions, confirms that institutional maturity, regulatory capacity, and the pace of credit expansion are critical mediating factors that determine whether analytical tools translate into effective portfolio outcomes. Third, forward-looking ADB projections indicate that emerging markets in Central and Southeast Asia face continued credit-quality pressures, underscoring that reactive, instrument-by-instrument approaches are insufficient and that structured, anticipatory frameworks are required.

The theoretical contribution of this study lies in bridging two largely disconnected bodies of knowledge, credit-risk management and project-management theory, by demonstrating that the phased logic of the project cycle (initiation, planning, implementation, monitoring, closure) provides a productive organising structure for NPL management. The methodological contribution consists in the formalization of this logic into a three-stage model with specified roles, information flows, and decision points for banks, regulators, and government agencies, grounded in PMBoK and ISO 21502 standards. The practical contribution is a ready-to-adapt organizational blueprint: for banks, the model offers a mechanism to connect early-warning signals to concrete intervention decisions rather than leaving them isolated in risk reports; for regulators, it provides a framework for designing coordinated, multi-stakeholder NPL reduction programs of the type that proved effective in Serbia, Albania, Slovenia, and Tunisia.

Several limitations should be acknowledged. The model remains at the conceptual stage and has not been tested against operational data from individual banking institutions. The literature review, while structured and criterion-based, was confined to English-language sources and did not employ a formal systematic protocol (e.g. PRISMA), potentially omitting relevant work in other languages. The comparative NPL analysis is descriptive and does not isolate causal effects of specific policies or institutional arrangements on credit-quality outcomes.

These limitations define a concrete agenda for future research. First, case-study or action-research designs could be applied to pilot the NPL Project Approach within selected banks in Kazakhstan or Uzbekistan, generating evidence on implementation barriers and measurable portfolio effects. Second, quantitative studies using panel-data models could

test whether banking systems with project-structured NPL management exhibit lower default rates, higher recovery rates, or shorter resolution times than those relying on ad hoc practices. Third, extending the framework to non-mortgage credit segments, consumer lending, and SME portfolios would test its generalizability and reveal segment-specific adaptations required for effective implementation.

#### AUTHOR CONTRIBUTIONS

Conceptualization and theory: JM; research design: JM, TS and ZK; data collection: JM; analysis and interpretation: TS and ZK; writing draft preparation: JM; supervision: TS and ZK; correction of article: JM, TS and ZK; proofread and final approval of article: JM, TS and ZK. All authors have read and agreed to the published version of the manuscript.

#### REFERENCES

- Altman, E. I. (1968). Financial ratios, discriminant analysis and the prediction of corporate bankruptcy. *The Journal of Finance*, 23(4), 589–609. <https://doi.org/10.2307/2978933>
- Altman, E. I., Iwanicz-Drozdzowska, M., Laitinen, E. K., & Suvas, A. (2017). Financial distress prediction in an international context: A review and empirical analysis of Altman's Z-score model. *Journal of International Financial Management & Accounting*, 28(2), 131–171. <https://doi.org/10.1111/jifm.12053>
- Ari, A., Chen, S., & Ratnovski, L. (2019). *The dynamics of non-performing loans during banking crises: A new database* (IMF Working Paper 19/272). International Monetary Fund. <https://doi.org/10.5089/9781513521152.001>
- ADB. (2025). *Nonperforming loans watch in Asia 2025*. <https://doi.org/10.22617/TCS250316-2>
- Asian Development Bank, & European Central Bank. (2021). *Nonperforming loans in Asia and Europe—Causes, impacts, and resolution strategies*. Asian Development Bank. <http://dx.doi.org/10.22617/TCS210412-2>
- Balcılar, M., Usman, O., Yülek, M., Ağan, B., & Erdal, B. (2024). *House price connectedness and consumer sentiment in an era of destabilizing macroeconomic conditions: Empirical evidence from Türkiye*. *Borsa Istanbul Review*, 24(1), 14–34. <https://doi.org/10.1016/j.bir.2023.08.006>
- BCBS. (1999). *Credit risk modeling: Current practices and applications*. Bank for International Settlements. Retrieved January 30, 2026 <https://www.bis.org/publ/bcbs49.pdf>
- Bauze, K. (2021). *NPL resolution: Country cases. Regulatory framework for NPL resolution and private sector participation* [Conference presentation]. IFC Workshop on NPL Resolution, FinSAC, World Bank Group, Vietnam. Retrieved January 30, 2026 <https://www.ifc.org/content/dam/ifc/doc/mgrt/2-npl-resolution-country-cases-karlis-bauze-eng.pdf>
- Bermpei, T., Degl'Innocenti, M., Kalyvas, A. N., & Zhou, S. (2023). *Lender individualism and monitoring: Evidence from syndicated loans*. *Journal of Financial Stability*, 66, 101123. <https://doi.org/10.1016/j.jfs.2023.101123>
- Bertay, A. C., & Huizinga, H. (2021). *Non-performing loans – New risks and policies? NPL resolution after COVID-19: Main differences to previous crises* [In-depth analysis]. Economic Governance Support Unit, European Parliament. Retrieved January 30, 2026 [https://www.europarl.europa.eu/RegData/etudes/IDAN/2021/659648/IPOL\\_IDA\(2021\)659648\\_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/IDAN/2021/659648/IPOL_IDA(2021)659648_EN.pdf)
- Bianco, T., Cornwall, G., & Sauley, B. (2025). *Financial reform and mortgage lending by systemically important financial institutions*. *Economics Letters*, 256, 112633. <https://doi.org/10.1016/j.econlet.2025.112633>
- Bosker, J., Gürtler, M., & Zöllner, M. (2025). *Machine learning-based variable selection for clustered credit risk modeling*. *Journal of Business Economics*, 95, 617–652. <https://doi.org/10.1007/s11573-024-01213-8>
- Cenzon, J., & Szabó, B. E. (2024). *Mortgage choice and inflation experiences in the Eurozone*. *Journal of Monetary Economics*, 147, 103611. <https://doi.org/10.1016/j.jmoneco.2024.103611>
- Chai, N., Shi, B., & Dong, Y. (2023). *Default feature selection in credit risk modeling: Evidence from Chinese small enterprises*. *SAGE Open*, 13(2). <https://doi.org/10.1177/21582440231165224>
- Chen, G., Chutiman, N., Suraphee, S., Busababodhin, P., & Volodin, A. (2025). *Gradient Descent Decision Tree Algorithm and Nonlinear Programming for Credit Risk Assessment and Credit Strategy*. *Emerging Science Journal*, 9(4), 04–05. <https://doi.org/10.28991/ESJ-2025-09-04-05>
- Christou, I., Ponis, S., & Palaiologou, E. (2010). Using the Agile Unified Process in banking. *IEEE Software*, 27(3), 72–79. <https://doi.org/10.1109/MS.2009.156>
- Crosato, L., Domenech, J., & Liberati, C. (2024). *Websites' data: A new asset for enhancing credit risk modeling*. *Annals of Operations Research*, 342, 1671–1686. <https://doi.org/10.1007/s10479-023-05306-5>
- Crouhy, M., Galai, D., & Mark, R. (2000). A comparative analysis of current credit risk models. *Journal of Banking & Finance*, 24(1–2), 59–117. [https://doi.org/10.1016/S0378-4266\(99\)00053-9](https://doi.org/10.1016/S0378-4266(99)00053-9)
- EBRD. (2025). *NPL monitor: H1 2025*. Vienna Initiative. Retrieved January 30, 2026 <https://npl.vienna-initiative.com/assets/Uploads/2025/NPL-Monitor-H1-2025-fv.pdf>
- Forster, R., & Sun, X. (2022). *Taming the housing crisis: An LTV macroprudential policy*. *Economic*

*Modeling*, 108, 105761. <https://doi.org/10.1016/j.econmod.2022.105761>

Gutkowski, V. A. (2021). *Sovereign debt restructuring and credit recovery*. *Economía LACEA Journal*, 23(1), 230–258. <https://doi.org/10.31389/eco.409>

Han, X., Yang, Y., Chen, J., Wang, M., & Zhou, M. (2025). *Symmetry-Aware Credit Risk Modeling: A Deep Learning Framework Exploiting Financial Data Balance and Invariance*. *Symmetry*, 17(3), 341. <https://doi.org/10.3390/sym17030341>

Holtermans, R., Kahn, M. E., & Kok, N. (2024). *Climate risk and commercial mortgage delinquency*. *Journal of Regional Science*, 64(4), 994–1037. <https://doi.org/10.1111/jors.12681>

Ilijins, J., & Skvarciany, V. (2015). *The role of change management in trust formation in commercial banks*. *Business: Theory and Practice*, 16(4), 373–378. <https://doi.org/10.3846/btp.2015.557>

Instefjord, N., & Nakata, H. (2022). *Micro-prudential regulation and loan monitoring*. *Journal of Financial Services Research*, 63, 339–362. <https://doi.org/10.1007/s10693-021-00376-7>

IPAF Asia. (2025). *NPLs in Asia: 2024 Data Analysis*. International Public AMC Forum. Retrieved from <https://ipafasia.org/news-and-data/npl-data&rid=4>

Jakubik, P., & Teleu, S. (2025). *Improving Credit Risk Assessment in Uncertain Times: Insights from IFRS 9*. *Risks*, 13(2), 38. <https://doi.org/10.3390/risks13020038>

Li, Y., Ni, Z., & Xiao, B. (2025). *Domain Knowledge-Enhanced Process Mining for Anomaly Detection in Commercial Bank Business Processes*. *Systems*, 13(7), 545. <https://doi.org/10.3390/systems13070545>

Merton, R. C. (1974). *On the pricing of corporate debt: The risk structure of interest rates*. *Journal of Finance*, 29(2), 449–470. <https://doi.org/10.2307/2978814>

Noriega, J., Rivera, L., Castañeda, J., & Herrera, J. (2025). *From Crisis to Algorithm: Credit Delinquency Prediction in Peru Under Critical External Factors Using Machine Learning*. *Data*, 10(5), 63. <https://doi.org/10.3390/data10050063>

Rahman, H. U., Arian, A., & Sands, J. (2023). *Does fiscal consolidation affect non-performing loans? Global evidence from heavily indebted countries (HICs)*. *Journal of Risk and Financial Management*, 16(9), 417. <https://doi.org/10.3390/jrfm16090417>

Rodrigues, L. F., Oliveira, A., & Rodrigues, H. (2023). *Technology management has a significant impact on dig-*

*ital transformation in the banking sector*. *International Review of Economics & Finance*, 88, 1375–1388. <https://doi.org/10.1016/j.iref.2023.07.040>

Sanz-Guerrero, M., & Arroyo, J. (2025). *Credit Risk Meets Large Language Models: Building a Risk Indicator from Loan Descriptions in P2P Lending*. *Inteligencia Artificial*, 28(75), 220–247. <https://doi.org/10.4114/intartif.vol28iss75pp220-247>

Sarfraz, M., Qun, W., Hui, L., & Abdullah, M. I. (2018). *Environmental risk management strategies and the moderating role of corporate social responsibility in project financing decisions*. *Sustainability*, 10(8), 2771. <https://doi.org/10.3390/su10082771>

Scope Ratings GmbH. (2025). *European Bank NPL Monitor*. Retrieved January 30, 2026 <https://www.scoperatings.com/ScopeRatingsApi/api/download-study?id=a4f8e84c-d1d8-4446-90ad-9cb1b0e1dc92>

Silva, S. A., de Abreu, P. H. C., de Amorim, F. R., & Santos, D. F. L. (2019). *Application of Monte Carlo simulation for analysis of costs and economic risks in a banking agency*. *IEEE Latin America Transactions*, 17(3), 418–425. <https://doi.org/10.1109/TLA.2019.8863311>

Simonović, I., & Todorović, M. (2019). *Banking product and services development projects: The way to implement innovations*. *European Project Management Journal*, 9(1), 3–9. <https://doi.org/10.18485/epmj.2019.9.1.1>

Smith, B. C., & Yezer, A. M. (2025). *A Lucas Critique of Mortgage Lending: Theory, Evidence, and Implications*. *The Journal of Real Estate Finance and Economics*, 70, 637–676. <https://doi.org/10.1007/s11146-023-09951-2>

Suryanto, H., Mahidadia, A., Bain, M., Guan, C., & Guan, A. (2022). *Credit Risk Modeling Using Transfer Learning and Domain Adaptation*. *Frontiers in Artificial Intelligence*, 5, 868232. <https://doi.org/10.3389/frai.2022.868232>

Van Zwieten, K. (2019). *Managing Non-Performing Loans in Banks: A Review of the Evidence of the Impact of Insolvency and Creditor Rights Regimes (English)*. Washington, D.C.: World Bank Group. Retrieved January 30, 2026 <http://documents.worldbank.org/curated/en/389811561742153005>

Witzany, J., & Kozina, A. (2022). *Recovery process optimization using survival regression*. *Operational Research*, 22, 5269–5296. <https://doi.org/10.1007/s12351-022-00703-3>

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