



# Principles of Mortgage Loan Portfolio Formation in Commercial Banking

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## Abstract

*This article is dedicated to the principles of forming a commercial bank's mortgage loan portfolio, drawing on Canadian practices and comparing them with international approaches. The relevance of the topic is driven by the high share of mortgage assets on bank balance sheets and the increased debt burden of households. The novelty is formulated by linking regulatory requirements, insurance mechanisms, diversification, and asset-liability matching into a unified risk management framework. The paper describes underwriting standards, the logic of mandatory and portfolio insurance, diversification strategies that account for climate factors, and the impact of securitization on liquidity and capital. The study examines regulatory documents, industry reports, and academic publications on credit risk and stress testing. Particular attention is given to the consequences of short-term interest rate fixation in Canada and the impact of term renewals on portfolio stability. The work aims to develop a set of principles for maintaining an acceptable risk-return trade-off. To achieve this objective, comparative analysis, synthesis, regulatory analysis, and elements of scenario-based stress testing were employed. The conclusion describes the practical applicability of the findings for banks and supervisory authorities. The article will be useful for risk managers, regulators, and researchers of banking stability.*

**Keywords:** Mortgage Portfolio, Mortgage Insurance, Diversification, Liquidity, Securitization.

## INTRODUCTION

The relevance of studying the principles of forming a commercial bank's mortgage portfolio is driven by the key role of mortgage lending in the financial system and banking stability. In Canada, for instance, mortgage loans constitute about half of the banking sector's assets [7], and household debt is at a historically high level. The reliability of mortgage portfolio management directly affects the resilience of banks and the financial stability of the economy. The purpose of this work is to develop scientifically grounded principles for the formation and management of a commercial bank's mortgage loan portfolio, taking into account modern risks and regulatory requirements. To achieve this goal, the following tasks are addressed:

1. to analyze the impact of the regulatory environment and government requirements on the structure and quality of the mortgage portfolio;
2. to identify optimal approaches to the diversification of mortgage loans and the management of default risks;
3. to investigate the role of risk mitigation mechanisms—such as mortgage insurance and securitization—in forming a balanced portfolio;
4. to assess contemporary challenges (e.g., cyclical fluctuations in interest rates, rising debt burdens, and

climate risks) and their consideration in mortgage portfolio management.

This study is theoretical and analytical in nature and focuses on the experience of the Canadian banking system, comparing it with global practices.

## METHODS AND MATERIALS

This section summarizes the sources and tools used, noting the contribution of each author and organization to the research argumentation, after which the outcome of the data processing procedures is formulated. M. Khan, O. Bilyk, and M. Akman [1] provided an analytical framework for housing market imbalances and household debt burdens, which set the parameters for macro-stresses to assess portfolio resilience. The Canada Mortgage and Housing Corporation [2] provided the structure of the mortgage market and the practice of mandatory default insurance; this material was used to reconstruct product and risk-oriented segmentation. J. Huynh and D. V. Dang [3] investigated the relationship between portfolio diversification and bank profitability, considering business models and market power; their results were applied in forming risk distribution criteria. P. Liu and J. V. O'Neill [4] identified a reduction in cash flow volatility for projects with brand backing; this analogy was used to interpret borrower quality and concentration risks. I. Mačerinskienė and L. Ivaškevičiūtė [5] proposed a model

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for credit portfolio assessment; elements of this framework were used in describing the risk-return balance. E. Reinauer and H. Parthasarathy [6] showed the vulnerability of the urban hotel segment amid a weak recovery in business travel; their findings were extrapolated to real estate sectors as a source of correlated losses. K. Rogers [7] characterized the balance of the Canadian mortgage market and the impact of OSFI Guideline B-20, which allowed for refining the logic of solvency stress testing. The Royal Bank of Canada [8] provided data on asset structure and funding sources, used to illustrate ALM and securitization practices. M. S. S. Wong and H. M. Ho [9] integrated the risk of extreme weather events into PD and LGD for mortgages; this approach was used in describing climate diversification and the catastrophic tail of the loss distribution.

To write this article, the comparative method, critical analysis of regulatory and corporate materials, content analysis of scientific publications, logical-structural synthesis, and legal-regulatory analysis were applied.

## RESULTS AND DISCUSSION

The analysis showed that the formation of a sustainable

**Table 1.** Regulatory and Underwriting Standards for Mortgage Portfolio Formation (compiled by the author based on [1, 3, 7])

| Principle                     | Content                                                   | Expected Outcome                                |
|-------------------------------|-----------------------------------------------------------|-------------------------------------------------|
| Solvency Stress Testing       | Verifying borrowers' ability to withstand rate increases. | Increased portfolio resilience to macro shocks. |
| Limits on LTV and Debt Burden | Establishing maximum thresholds.                          | Reduction of default risk.                      |
| Capital Adequacy Ratios       | Requirements for equity capital for mortgages.            | Maintenance of a low level of delinquencies.    |
| Conservative Credit Policy    | Strict selection of borrowers.                            | Low level of defaults.                          |

Thus, the principle of strict borrower selection and compliance with regulatory criteria (e.g., debt-to-income ratio, limits on loan-to-value ratio, etc.) is the foundation for forming a reliable mortgage portfolio.

The second most important principle is the optimal use of credit risk transfer and mitigation mechanisms, primarily the mortgage insurance system. In Canada, mandatory default insurance is required for mortgage loans with a low down payment: for all loans issued by banks with a down payment of less than 20%, mortgage insurance is required to protect the lender from losses in case of non-payment [2]. This federally mandated requirement shapes the portfolio structure: a significant portion of loans (especially those

mortgage loan portfolio relies on a complex set of principles aimed at ensuring an acceptable balance between profitability and risk while complying with regulatory standards. The most important principle is adherence to high underwriting standards (credit policy) and fulfillment of supervisory requirements. In Canada, after the global financial crisis, regulators tightened requirements for the quality of the mortgage portfolio: specifically, the Office of the Superintendent of Financial Institutions (OSFI) introduced Guideline B-20, which establishes strict standards for mortgage origination, including mandatory stress testing of borrowers' ability to pay for both insured and uninsured mortgages [7]. The introduction of stress tests meant that banks form their portfolios primarily with borrowers capable of withstanding interest rate increases, which enhances the overall resilience of the portfolio. Simultaneously, the tightening of capital and asset quality regulations incentivizes banks to maintain a low level of delinquent debt. Empirically, Canadian banks have historically demonstrated low mortgage default rates due to a conservative credit policy [7, 8]. A systematization of these approaches is presented below (Table 1).

with high LTV) is insured by government insurers (CMHC and others), which reduces the credit risk for banks. In recent years, the share of insured mortgages in the total volume has decreased (to ~35% by 2021) due to an increase in the proportion of borrowers with large down payments, but banks continue to actively use insurance for portfolio management [2]. In addition to individual insurance for new originations, a mechanism of portfolio (pool) insurance is used: banks form pools of previously uninsured mortgages and insure them entirely at their own expense. This strategy facilitates securitization (since government-backed mortgage securities require insured assets) and at the same time saves the bank's capital by reducing the weight of risk-weighted assets [3]. The instruments are structured below (Table 2).

**Table 2.** Forms of Mortgage Insurance and Their Impact on Portfolio Structure (compiled by the author based on [2, 5])

| Type of Insurance       | Conditions for Application                               | Effect for the Bank                              | Effect for the Borrower                     |
|-------------------------|----------------------------------------------------------|--------------------------------------------------|---------------------------------------------|
| Mandatory Individual    | For down payments < 20%                                  | Reduction of credit risk.                        | Access to credit with a small down payment. |
| Pool (Portfolio)        | Insurance for a group of previously uninsured mortgages. | Facilitation of securitization, capital savings. | No direct impact.                           |
| Government through CMHC | Support for high-risk mortgages.                         | Redistribution of risk to the insurance sector.  | Broader access to mortgages.                |
| Voluntary               | At the bank's discretion.                                | Flexible risk management.                        | Opportunity to choose optimal terms.        |

Consequently, the principle of active use of mortgage insurance—both mandatory and optional—serves as an important tool for portfolio formation, ensuring the redistribution of risk from banks to insurance institutions and investors. When planning its mortgage portfolio, a commercial bank aims to achieve an optimal balance between insured and uninsured loans, considering that insured loans are less risky (but also less profitable due to insurance premiums), while uninsured loans require more equity capital and loss reserves.

The third key principle is the diversification of the mortgage portfolio across various parameters to reduce concentration risks. Banks strive to distribute mortgage loans by geographical region, borrower types, and other characteristics to avoid excessive dependence on local economic conditions and specific segments of the real estate market. For example, regional diversification reduces the portfolio's vulnerability to a downturn in a specific local housing market (in case of a recession or price decline in a particular city). Diversification by borrower quality is also important: maintaining a certain share of clients with high credit ratings alongside those with lower ratings ensures a balance of risk and return. Studies show that even within the hotel industry—one of the riskier real estate segments—the support of a well-known brand reduces income volatility and default risk compared to independent projects [1,4].

By analogy, in a mortgage portfolio, the distribution of loans among different borrower categories (by credit score, income level, etc.) should align with the bank's specified risk level. Furthermore, diversification is applied to mortgage product types (classic loans vs. home equity lines of credit, etc.) and interest rate fixation terms (the portfolio contains both floating-rate loans and those with rates fixed for several years, which reduces exposure to a simultaneous shock). The COVID-19 pandemic and related shocks confirmed the importance of diversification: for example, in 2020, the greatest increase in non-repayment risks was observed in the high-end housing segment of large cities, dependent on business travel, while smaller markets and the rental segment showed greater resilience [6]. Thus, distributing mortgage assets across different clusters reduces the aggregate volatility of losses. Modern practice also pays special attention to diversification considering climate risks: regulators and banks are increasingly conducting stress tests on mortgage portfolios for losses from extreme weather events (floods, hurricanes, etc.), the results of which highlight the need for geographical dispersion of loans and the use of property insurance [9]. Studies model that a strong, correlated shock (e.g., a natural disaster in a region) can cause bank losses on a mortgage portfolio to exceed expected values by many times, reaching 40% of the portfolio in stress scenarios [9]. A classification of diversification directions is presented below (Table 3).

**Table 3.** Directions for Mortgage Portfolio Diversification (compiled by the author based on [6, 8, 9])

| Direction of Diversification | Example of Implementation                        | Risk Mitigated                                  |
|------------------------------|--------------------------------------------------|-------------------------------------------------|
| Geographical                 | Distribution of loans across regions.            | Local recessions, housing price declines.       |
| By Borrower Categories       | Balance of clients with high and medium ratings. | Concentration of defaults in a low-rated group. |
| By Products                  | Loans with fixed and floating interest rates.    | Simultaneous interest rate shock.               |
| By Real Estate Sectors       | Residential, rental, hotel business.             | Sectoral crises.                                |
| Considering Climate Factors  | Avoiding concentration in high-risk zones.       | Losses from extreme weather events.             |

Therefore, in forming their portfolios, banks are increasingly integrating climate diversification—taking into account the location of collateral, insurance coverage against disasters, etc.—as an integral principle of credit risk management.

The fourth principle is managing the portfolio from an asset and liability perspective, i.e., considering interest rate risk and liquidity when forming mortgage assets. Mortgage loans are typically issued for long terms (in Canada, amortization up to 25 years) and have a fixed interest rate for only a relatively short period (a 5-year term for the predominant types of mortgages) [7]. This creates a specific risk structure: borrowers in Canada face an interest rate reset every 5 years, which transfers a significant portion of the interest rate risk to them, while banks are more protected from long-term interest rate risk compared to systems with long fixed-rate terms (e.g., 30-year fixed-rate loans in the U.S.) [7]. Nevertheless, banks must manage the risk of maturity mismatch: it is crucial to fund the mortgage portfolio with liabilities of comparable maturity so that changes in interest rates do not lead to gaps (for example, Canadian banks try to attract

deposit resources or issue bonds with terms comparable to the 5-year fixed-rate periods on mortgages). Additionally, banks hold a sufficient buffer of liquidity or access to capital markets to avoid being forced to sell mortgage loans during an unfavorable period. The U.S. experience showed that mass securitization of mortgages, where banks immediately sell the originated loans to investors, can weaken incentives for careful borrower selection and ultimately threaten stability (this was a major contributor to the 2008 mortgage crisis in the U.S.) [5, 7]. In Canada, however, the vast majority of mortgage loans remain on banks' balance sheets, so they bear the credit and interest rate risk until maturity and are interested in the quality of the assets [7, 8]. This approach, on the one hand, enhances the stability of standards—banks initially form a portfolio with a margin of safety—but on the other hand, it requires maintaining high capital for the mortgage portfolio. To manage liquidity, banks still use securitization tools: there is a program for issuing Canada Mortgage Bonds and NHA MBS securitization, which allows banks to sell a portion of their mortgage portfolio, primarily insured loans, to investors [7]. Crucially, securitization serves

as a supplementary principle of portfolio management—it diversifies funding sources and reduces asset concentration on the balance sheet, but Canadian banks use it moderately and retain a large share of mortgages themselves to avoid weakening risk control. In summary, the principle of aligning the portfolio structure with the debt policy (in terms of maturity and risks) is manifested in maintaining a balanced combination: the bank retains a substantial share of mortgage assets to maintain incentives for their quality, but can also flexibly manage the portfolio volume through proven mechanisms (insurance, refinancing), without being exposed to the risk of a sudden liquidity outflow.

Thus, the results of the analysis confirm that the effective formation of a commercial bank's mortgage portfolio is based on: strict compliance with regulatory norms and underwriting standards; active use of insurance mechanisms to reduce credit risk; diversification of the portfolio by region, borrower category, and product; and consistency of the financing strategy with the portfolio parameters to limit interest rate and liquidity risks. These principles are supported by both empirical experience (using the Canadian banking system as an example) and modern risk research, which emphasizes the importance of considering new factors (macroeconomic and climatic) in managing mortgage loans [9].

### DISCUSSION

The results obtained confirm that mortgage portfolio management is a complex balance between business profitability and the need to limit risks for the sake of financial stability. The principles discussed are closely interrelated: for instance, strict borrower selection and compliance with regulations (the principle of regulatory compliance) ensure a low level of non-performing loans, but at the same time can restrain lending growth and competition. Banks are forced to find a compromise between expanding their mortgage business and maintaining high portfolio quality. In Canada, this balance has historically shifted towards conservatism—thanks to strict supervision (OSFI B-20, etc.) and government participation through insurance—which has generally proven effective: even during crises (the 2008 financial crisis, the 2020 pandemic), Canadian banks avoided massive mortgage losses. Approaches in other countries differ. For example, in the U.S. before the 2008 crisis, the emphasis was on securitization and transferring risk to investors, which led to a weakening of standards and an accumulation of troubled loans. The Canadian experience, in contrast, shows that retaining risk on the bank's balance sheet while having an insurance system in place stimulates more responsible portfolio formation.

The principle of diversification deserves special discussion. On the one hand, diversification is a recognized way to reduce unsystematic risks: our analysis confirmed that spreading loans across regions, borrower categories, etc., mitigates the impact of individual negative events. On the other hand, excessive diversification can reduce a bank's focus on its key competencies: for example, a regional bank that knows its local market exceptionally well may be able to maintain high

credit quality without broad geographical diversification. Nevertheless, for large universal banks, diversification is a necessary principle, especially given new threats. For example, the increasing frequency of extreme weather events makes it critical to avoid concentrating mortgage collateral in areas of high climate risk. Discussions in academic literature and among regulators agree that integrating climate metrics (e.g., the share of loans in flood zones) into portfolio management will become standard in the coming years. This expands classic diversification by adding an environmental and social context to financial parameters.

Automatic insurance for high-risk mortgages in Canada is an interesting tool that is sometimes criticized in discussions for its potential moral hazard (banks might be less strict with borrowers, shifting part of the risk to the insurer). However, practice shows that the presence of government insurance tends to discipline the market through uniform standards: for a loan to be insured, it must meet CMHC criteria, which effectively sets a minimum quality bar for the entire industry [2]. Furthermore, banks pay premiums to the insurance agency, which economically incentivizes them to carefully assess whether a risky loan is worth originating. Thus, insurance acts as a kind of buffer and a standardization mechanism, rather than an invitation to undue risk. In discussions about banking sector stability, the Canadian model is often cited as a successful example of how a combination of market principles and government support can increase mortgage lending volume (housing affordability) without compromising the reliability of banks.

An important aspect of the discussion is the influence of macroeconomic conditions. The structure of a mortgage portfolio should be formed considering the phases of the credit cycle, the dynamics of interest rates, and real estate prices. After a period of low interest rates in the 2010s, when banks actively grew their mortgage balances, the sharp rate hike that began in 2022 became a test: the share of borrowers experiencing stress when renewing their loans at higher rates increased. Banks, following the principles described (solvency stress testing), had generally prepared their portfolios for this: the regulatory B-20 tests assumed a borrower's ability to withstand a +2% rate increase, which is close to the actual scale of the rate hikes. Nevertheless, regulatory discussions in 2023–2024 point to a possible further tightening of requirements (e.g., revising debt service ratios) due to the increasing number of borrowers extending their amortization periods to the maximum because of rising payments. This shows that the principles of portfolio formation are not static: they must evolve in response to new data. In particular, the importance of monitoring specific groups of borrowers (e.g., those who took advantage of mortgage deferrals during the pandemic) and proactively managing such sub-portfolios may increase.

Finally, the balance between return and risk is evident in decisions about securitization. In discussing the results, it should be noted that selling part of a mortgage portfolio through bonds allows a bank to free up capital for new

originations but deprives it of some interest income and control over the loans. Canadian banks use securitization selectively—mainly for liquidity management, not turning it into the primary funding channel as is done in the U.S. Discussions about the advisability of expanding securitization in Canada are ongoing, especially as mortgage debt grows: on the one hand, greater investor involvement could increase credit availability; on the other hand, the risk of weakening underwriting standards and investors ending up with riskier loans on their balance sheets, with potential systemic effects, deters regulators from drastically expanding this practice. Thus, optimal mortgage portfolio formation involves a balanced approach: the bank retains a substantial share of mortgage assets to maintain incentives for their quality, while being able to flexibly manage the portfolio volume through proven mechanisms (insurance, refinancing), without exposing its liquidity and stability to undue risk.

## CONCLUSION

In conclusion, it should be emphasized that the principles for forming a commercial bank's mortgage loan portfolio, examined through the example of the Canadian banking system, demonstrate their effectiveness in maintaining a balance between financial stability and lending development. The key findings of the study are as follows: first, strict standards for borrower selection and compliance with regulatory requirements (stress testing, capitalization norms) create a high-quality portfolio composition that is resilient to economic stresses. Second, risk mitigation mechanisms—primarily mandatory mortgage insurance—significantly reduce a bank's credit losses and shift some risks to external participants without undermining the bank's incentives for responsible lending. Third, portfolio diversification by geography, client types, and other parameters minimizes concentration risks and smooths the impact of local crises, and accounting for new factors (such as climate risks) is becoming an integral part of this principle. Fourth, mortgage portfolio management must be interconnected with the management of the bank's liabilities: aligning maturities and interest rate terms, using securitization judiciously, and maintaining sufficient liquidity allow for limiting interest rate risk and avoiding cascading problems during market shifts.

The scientific and practical significance of these findings is that they confirm that adherence to this set of principles increases the reliability and profitability of a bank's mortgage business. The Canadian experience analyzed in this paper can serve as a benchmark for banks in other countries and jurisdictions, demonstrating that sustainable development of mortgage lending is possible with strict risk management. The presented results and conclusions can be used in further

research in the field of banking risk management, as well as in the development of supervisory policies to ensure the stability of the financial system.

## REFERENCES

1. Bank of Canada. (2021). *Update on housing market imbalances and household indebtedness* (Staff Analytical Note 2021-4). M. Khan, O. Bilyk, & M. Ackman. <https://doi.org/10.34989/san-2021-4>
2. Canada Mortgage and Housing Corporation. (2021). *Residential mortgage industry report – October 2021*. <https://assets.cmhc-schl.gc.ca/sites/cmhc/professional/housing-markets-data-and-research/housing-research/research-reports/housing-finance/residential-mortgage-industry-report/2021/residential-mortgage-industry-report-2021-10-en.pdf?rev=e269b608-9ebc-4e28-ae3e-1629f9a5a674>
3. Huynh, J., & Dang, V. D. (2021). Loan portfolio diversification and bank returns: Do business models and market power matter? *Cogent Economics & Finance*, 9(1), Article 1891709. <https://doi.org/10.1080/23322039.2021.1891709>
4. Liu, P., & O'Neill, J. W. (2023). Do brand-affiliated hotels have lower cash-flow risk? *Cornell Hospitality Quarterly*, 64(3), 363–380. <https://doi.org/10.1177/19389655221102385>
5. Mačerinskienė, I., & Ivaškevičiūtė, L. (2008). The evaluation model of a commercial bank loan portfolio. *Journal of Business Economics and Management*, 9(4), 269–277. <https://doi.org/10.3846/1611-1699.2008.9.269-277>
6. Office of the Comptroller of the Currency. (2022). *Uncertain business travel outlook increases credit risk of urban hotel loans* (OnPoint Report). E. Reinauer & H. Parthasarathy. <https://www.occ.treas.gov/publications-and-resources/publications/economics/on-point/on-point-business-travel-outlook.html>
7. Rogers, C. (2024). *Canada's mortgage market – a question of balance* [Speech]. Bank for International Settlements. <https://www.bis.org/review/r241107c.htm>
8. Royal Bank of Canada. (2020). *Quarterly results investor presentation Q2 2020*. [https://www.rbc.com/investor-relations/\\_assets-custom/pdf/2020q2\\_report.pdf](https://www.rbc.com/investor-relations/_assets-custom/pdf/2020q2_report.pdf)
9. Wong, M. C. S., & Ho, H. M. (2023). A framework for integrating extreme weather risk, probability of default, and loss given default for residential mortgage loans. *Sustainability*, 15(15), 11808. <https://doi.org/10.3390/su151511808>