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THE IMPACT OF COVID-19 AND PREFERENTIAL MORTGAGE LENDING PROGRAMS ON MORTGAGE LENDING: EVIDENCE FROM RUSSIA

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This study explores the relationship between preferential mortgage programs and regional mortgage lending in Russia during the COVID-19 pandemic and the subsequent recovery period. Using quarterly data from 87 Russian regions, the research examines how preferential mortgage programs — *Standard Preferential*, *Family*, *Far Eastern*, and *IT* — were associated with lending growth and delinquency rates. The findings underscore the complex interplay between housing policies, regional economic conditions, and mortgage market activity under varying external economic shocks. The study reveals that overall mortgage lending volumes were higher during the pandemic and post-pandemic periods in regions with greater adoption of preferential mortgage programs. This pattern suggests that these programs supported housing market activity, particularly in economically resilient regions. However, regions with higher program utilization also experienced elevated delinquency rates, reflecting the challenges of balancing increased borrowing with financial risks. Program-specific analysis highlights variations in lending dynamics and emphasizes the importance of tailoring housing policies to regional and demographic needs, providing insights for designing adaptive support measures that promote mortgage market stability and economic recovery.

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1. Introduction

The COVID-19 pandemic introduced unprecedented challenges to global housing markets, prompting governments worldwide to adopt measures to stabilize markets and mitigate economic uncertainty. In Russia, preferential mortgage programs emerged as a significant policy initiative, designed to stimulate the real estate market while addressing regional economic disparities. This study examines how these preferential mortgage programs corresponded with changes in mortgage lending dynamics across Russia during the pandemic and subsequent recovery periods. By focusing on the temporal and regional variations in mortgage market activity, the research provides a comprehensive analysis of how housing policies interacted with broader economic trends under evolving market conditions.

The relationship between economic crises and housing markets has been widely studied, the literature highlights that periods of economic uncertainty often correlate with constrained lending activity and increased financial risks. However, the unique circumstances of the COVID-19 pandemic—characterized by widespread uncertainty and targeted policy responses—require a more nuanced understanding. While earlier studies documented tightened lending practices and heightened delinquency risks during the pandemic, the Russian context offers a distinctive perspective due to the diversity of its preferential mortgage programs and the vast regional disparities in economic conditions and housing demand.

This research focuses on four key preferential mortgage programs — *Standard Preferential*, *Family*, *Far Eastern*, and *IT* — and their association with mortgage lending growth across regions with varying economic resilience. Unlike conventional studies that evaluate policy interventions in terms of their effectiveness, this study emphasizes how these programs corresponded with lending and delinquency patterns in different regions, highlighting their role in aligning housing market activity with broader economic recovery trends.

Using quarterly panel data from 87 Russian regions spanning 2019 to 2024, the study tests four hypotheses. First, it examines whether regions experienced higher lending growth during and after the pandemic. Second, it explores how regions with greater adoption of preferential mortgage programs exhibited distinct lending dynamics. Third, it investigates the relationship between preferential program uptake and delinquency rates, particularly during periods of heightened economic uncertainty. Finally, it evaluates the associations between different preferential mortgage programs and mortgage lending volumes across regions.

The empirical results reveal several critical insights. Mortgage lending growth during the COVID-19 pandemic was significantly higher compared to the pre-pandemic period. This pattern

persisted during the post-COVID period, albeit with some moderation. Additionally, the analysis of delinquency rates highlights the complex interplay between expanded borrowing and financial risks, particularly in regions with lower economic resilience. The findings demonstrate that while preferential programs aligned with increased lending activity, they were also associated with increased delinquency rates, reflecting the challenges of balancing market stimulation with risk management.

Program-specific analysis reveals distinct regional and temporal patterns. For example, *Family* consistently corresponded with higher lending volumes, reflecting its broad applicability, while *Far Eastern* showed its strongest associations in regions prioritized for development. These variations underscore the importance of tailoring housing policy measures to local economic and demographic contexts.

By contextualizing these findings within the broader framework of the housing market and the economic recovery, this study makes several important contributions to the literature on housing policies during crises. First, it extends prior research by providing a comprehensive regional analysis of how mortgage lending activity varied across diverse economic contexts in Russia. While much of the literature focuses on national-level trends, this study underscores the significant heterogeneity in the housing market across regions, demonstrating the importance of considering local economic conditions and demographic factors when assessing policy outcomes.

Second, the study contributes to the understanding of how preferential mortgage programs correspond to lending dynamics during periods of economic uncertainty. By examining four distinct programs — *Standard Preferential*, *Family*, *Far Eastern*, and *IT* — it provides new insights into how program-specific designs align with housing market trends. This analysis highlights how different programs catered to various demographic and regional needs, addressing market segments that might otherwise have faced barriers to accessing mortgage financing.

Third, the research explores the relationship between expanded borrowing through preferential mortgage programs and delinquency rates, offering a nuanced perspective on the potential risks associated with these policies. Unlike previous studies that emphasize the stabilizing role of government interventions, this study illuminates the trade-offs between increasing housing market activity and managing financial vulnerabilities. By focusing on delinquency trends, it adds a critical dimension to the discussion of how targeted housing policies interact with borrower behavior and regional economic resilience.

Fourth, this study adds to the literature by examining the temporal patterns of program associations with market activity during and after the pandemic. It demonstrates that while preferential programs corresponded to higher lending volumes during the peak of the crisis, their

popularity extended into the recovery phase, albeit with lower intensities. This temporal analysis provides a deeper understanding of how housing policy measures evolve in response to shifting economic conditions.

Finally, the study contributes to methodological advancements in housing market research by employing a detailed panel data analysis that incorporates regional and temporal fixed effects (FE). This approach allows for a more precise estimation of how mortgage markets responded to the pandemic and the implementation of preferential mortgage programs, accounting for unobserved heterogeneity and broader macroeconomic trends.

These contributions collectively enhance our understanding of how targeted housing policies interact with diverse economic environments during crises, offering valuable insights for academic research and policy design. By highlighting the complexity of regional and program-specific dynamics, the study lays the groundwork for future research on optimizing housing policy interventions in periods of economic uncertainty and recovery.

The remainder of this paper is organized as follows: Section 2 reviews the literature and develops the hypotheses. Section 3 describes the data and methodology. Section 4 presents and discusses the empirical results. Section 5 concludes with policy implications.

2. Literature review and hypotheses

The COVID-19 pandemic disrupted mortgage markets globally, including in Russia, altering regional lending practices and emphasizing the critical role of targeted policy measures in supporting real estate markets. Rather than focusing solely on the crisis–response aspect of these measures, recent research examines their broader role in stimulating real estate activity under varying economic conditions.

Several studies document changes in mortgage lending practices during the pandemic. (Koniagina and Khashaev, 2022) identify regional variations in mortgage issuance in Russia, with some areas experiencing more restrictive lending practices due to heightened economic uncertainty. (Sadowa, 2021) provides evidence from Poland, where tightened mortgage conditions reduced credit availability, especially in the early stages of the pandemic. (Pavlenko, 2022) explores unemployment trends across multiple countries, including Russia, highlighting labor market risks that constrained mortgage accessibility.

Policy measures, particularly preferential mortgage programs, have been pivotal in shaping real estate markets. In the US, legislative initiatives like mortgage forbearance and refinancing programs eased financial pressures on households and supported market liquidity (Gerardi,

Lambie-Hanson and Willen, 2022; Larson, Makridis and Redmer, 2024). Similarly, in China, government interventions aimed at stabilizing the housing and construction sectors helped mitigate systemic risks (Qian, Qiu and Zhang, 2021; Huang *et al.*, 2022). These findings illustrate the broader implications of government policies for sustaining market activity during economic disruptions.

In Russia, the four preferential mortgage programs significantly influenced housing market activity. These programs introduced fixed interest rates at relatively low levels, stimulating demand in primary housing markets and encouraging residential construction (Koniagina and Khashaev, 2022). (Svobodová and Hedvičáková, 2021) report similar outcomes in Czechia, where declining interest rates improved housing affordability and spurred mortgage uptake. However, increased demand driven by these programs often exceeded supply, contributing to housing price inflation in regions with limited market capacity (Montebruno *et al.*, 2021; Pavlenko, 2022).

Regional disparities in the effects of these policies underscore the importance of localized analysis. For example, (Roshchina and Ilyunkina, 2021) demonstrate that housing affordability and the outcomes of mortgage subsidies in Russia vary significantly across regions, influenced by local income levels and housing supply constraints. Likewise, (Huang *et al.*, 2022) highlight that in China, the impact of systemic financial risks tied to the real estate sector differed across regions, shaped by local economic conditions.

(Larson, Makridis and Redmer, 2024) investigate borrower expectations in the US, showing that housing price dynamics and employment outlooks played a crucial role in mortgage performance during the pandemic. These findings align with (Qian, Qiu and Zhang, 2021), who observed heightened sensitivity of housing prices to COVID-19 in Chinese regions with severe infection rates and limited healthcare infrastructure.

This research highlights the importance of tailoring policy interventions to regional characteristics to ensure equitable market outcomes.(Demidova et al., 2024) analyze the regional heterogeneity of monetary transmission mechanisms in Russia, noting that variations in competition levels, income disparities, and housing demand significantly influence the effectiveness of mortgage programs. Regions with greater banking competition and higher purchasing power exhibit stronger transmission effects, fostering lower mortgage rates and increased housing affordability. Regions with higher shares of preferential mortgage issuance often saw more robust growth in new housing developments, suggesting that these programs effectively addressed supply gaps. Conversely, regions with elevated baseline housing prices or limited infrastructure experienced muted benefits, as housing supply lagged behind surging demand. These observations indicate that policies designed with regional variations in mind can optimize their

impact, fostering both market stability and broader economic recovery.

Expanding on this perspective, recent studies have explored how changes in mortgage market conditions influence broader economic indicators. For instance, (Svobodová and Hedvičáková, 2021) provide evidence that declining mortgage rates in Czechia were associated with increased residential investments, aligning with trends observed in other European markets. In Russia, the adoption of preferential mortgage programs has been linked to sustained activity in the primary housing sector, although challenges related to price inflation and supply shortages remain prominent concerns.

The interplay between mortgage policy measures and broader macroeconomic conditions reveals the necessity of context-specific approaches. This study leverages quarterly data from Q1 2019 to Q2 2024 to examine how preferential mortgage programs influenced housing activity and affordability across Russian regions. By accounting for variations in local economic structures and program uptake, the analysis contributes to a deeper understanding of how tailored interventions can enhance real estate market dynamics and regional economic resilience.

We begin with an analysis of mortgage lending across Russian regions during the pandemic and post-pandemic periods. Research suggests that economic uncertainty and tightened lending conditions influenced regional variations in mortgage issuance (Sadowa, 2021; Koniagina and Khashaev, 2022). (Pavlenko, 2022) highlights how unemployment trends shaped mortgage market outcomes. By comparing lending volumes across different regions, we observe substantial heterogeneity in market activity. Therefore, we test the first hypothesis:

H1: Mortgage lending during the COVID-19 pandemic and post-pandemic periods is higher than during the pre-pandemic period across Russian regions.

Next, we turn to the role of preferential mortgage programs in supporting mortgage lending activity.(Svobodová and Hedvičáková, 2021; Koniagina and Khashaev, 2022) show that such programs were correlated with increased lending volumes, albeit with regional disparities. Regions with higher shares of preferential mortgages demonstrated relatively larger mortgage lending volumes. However, the degree to which these programs aligned with broader economic trends varied. Thus, we formulate our second hypothesis:

H2: Regions with higher participation in preferential mortgage programs exhibit greater increases in mortgage lending volumes during and after the COVID-19 pandemic compared to regions with lower participation.

Our analysis proceeds by examining the relationship between preferential mortgage programs and mortgage delinquency rates. (Qian, Qiu and Zhang, 2021; Larson, Makridis and Redmer, 2024) indicates that borrower characteristics and program uptake influence delinquency

trends. Regions with more preferential mortgages are expected to show fewer delinquencies, reflecting improved affordability and credit quality. Based on this, we propose the third hypothesis:

H3: Regions with higher shares of preferential mortgages are associated with lower mortgage delinquency during and after the COVID-19 pandemic.

Finally, we assess how different preferential mortgage programs contribute to mortgage lending. The diversity of programs in Russia allows for a comparative analysis. (Montebruno *et al.*, 2021; Pavlenko, 2022) emphasize that program-specific design influences market performance.

The following describes the characteristics and implementation details of the four key preferential mortgage programs — *Standard Preferential, Family, Far Eastern,* and *IT*. These programs were designed to stimulate real estate market activity across various demographics in Russia.

Standard Preferential was launched in Russia in 2020 to support citizens in acquiring housing and to stimulate the construction sector. It provided an opportunity to obtain a mortgage loan at a reduced interest rate for purchasing apartments in new residential buildings or constructing individual housing units. Initially, the program offered an interest rate of 6.5% per annum, which was later increased to 8%. The maximum loan amount was set at 12 million rubles for Moscow, Moscow Region, St. Petersburg, and Leningrad Region, and 6 million rubles for other regions. The minimum down payment was 20% of the property value.[2]

The program was implemented nationwide, allowing the purchase of housing in any region. Key eligibility criteria included Russian citizenship and compliance with the lending bank's requirements regarding creditworthiness and financial history.

During its implementation, the program's terms were adjusted multiple times. For instance, as of January 1, 2023, the interest rate was raised to 8% per annum, and the program's duration was extended until July 1, 2024. These changes reflected the evolving economic conditions and the necessity of adapting the program to current market demands.

The program concluded on July 1, 2024, following the achievement of its objectives and the stabilization of the real estate market. As a result of the program, there was a significant increase in demand in the primary housing market, which supported the construction industry. However, some experts noted that the program also contributed to a notable rise in real estate prices.

Statistical data indicate that a considerable number of government-backed mortgage loans

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[2] Preferential Mortgage 2024: Terms and changes in mortgage programs from July 1 // Yandex Realty (2024): https://realty.yandex.ru/journal/post/lgotnaya-ipoteka/

were issued during the program's operation, demonstrating its popularity.[3]

After the conclusion of the *Standard Preferential* program, other government-supported initiatives continued to operate with updated terms reflecting the economic environment.

Family was launched in Russia in 2018 to support families with children in purchasing housing. Initially, it allowed families with a second or subsequent child born between January 1, 2018, and December 31, 2022, to obtain a mortgage loan at a reduced interest rate.[4] The program's conditions were later expanded. Starting in 2023, the *Family* mortgage became available to families with a first child born on or after January 1, 2018, as well as families raising a minor with disabilities. The program offers an interest rate of up to 6% per annum, with a minimum down payment of 15% of the property's cost. Families are also allowed to use maternity capital[5] as part of the down payment.

Family is implemented across Russia, enabling families to purchase housing in any region. Eligible properties include apartments in new buildings (either completed or under construction), private homes, townhouses, and land for construction. In certain regions, the secondary housing market was included.[6]

In July 2024, the Ministry of Finance announced the program's extension until 2030. Updated terms ensure a 6% annual interest rate for families with children under six years old and for families raising a minor with disabilities.[7]

The program has positively impacted the real estate market and improved housing conditions for families with children. According to the Ministry of Finance, by the end of 2024, over 500,000 loans had been issued under the program, totaling more than 1.3 trillion rubles.[8]

Far Eastern was launched in Russia in 2019 to improve housing conditions and stimulate the economic development of the Far Eastern Federal District (FEFD). The program offers mortgage loans at a preferential interest rate of up to 2% per annum for purchasing or constructing

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[3] Ministry of Finance of the Russian Federation proposed amendments to preferential mortgage programs // Website of the Ministry of Finance of the Russian Federation (2022): https://minfin.gov.ru/ru/press-center/?id_4=38304-minfin_rossii_vnes_v_pravitelstvo_proekty_postanovlenii_ob_izmenenii_lgotnykh_ipotechnykh_programm

[4] What is "Family Mortgage": How to Obtain a Loan on Preferential Terms // Official website of RBC Realty (2021): https://realty.rbc.ru/news/611f973c9a7947edd5d80a01

[5] The Maternity Capital is a Russian government initiative established in 2007 to provide financial support to families upon the birth or adoption of a child. The primary objectives of this program are to enhance housing conditions, facilitate children's education, and bolster the formation of the mother's pension savings.
Maternity Capital // Official website of Gosuslugi (2025): https://www.gosuslugi.ru/maternity-capital

[6] Family Mortgage in 2025: Rates, Conditions, and Terms // Official website of Banki.ru (2025): https://www.banki.ru/products/hypothec/catalogue/semeynaya_ipoteka/

[7] Who Will Keep and Who Will Lose the Right to "Family Mortgage" at 6% // Official website of RBC (2024): https://www.rbc.ru/finances/10/07/2024/668e78389a79475a5758e3ff

[8] Family Mortgage Limits to Be Redistributed in a New Way // Official website of Banki.ru (2024): https://www.banki.ru/news/lenta/?id=11009415

housing within FEFD.[9]

Initially, the maximum loan amount was set at 6 million rubles. However, in December 2023, Russian President Vladimir Putin directed an increase in the loan limit to 9 million rubles. The minimum down payment was 15% of the property's value, with the option to use maternity capital as part of this payment.[10]

The program applies to all regions of FEFD. Eligibility criteria include the borrower's age of up to 35 years, the presence of at least one child in the family, or participation in the Far Eastern Hectare program.[11]

In December 2022, the government extended the program until the end of 2030. The program's implementation during 2023–2025 includes funding of approximately 70 billion rubles, with 20 billion rubles allocated in 2023. According to government data, over 55,000 loans were issued under the program in the first three years for purchasing or constructing housing at the preferential 2% rate.[12]

In September 2024, President Putin reaffirmed the program's 2% interest rate despite economic conditions, emphasizing the importance of housing accessibility for residents of the Far East.[13]

IT was introduced in Russia in May 2022 to support professionals in the information technology sector and encourage their long-term settlement in regional areas of the country. Initially, the program provided mortgage loans at an interest rate of up to 5% per annum, with a maximum loan amount of 18 million rubles. However, from August 1, 2024, the terms were adjusted: the maximum interest rate was increased to 6% per annum, and the maximum loan amount was reduced to 9 million rubles. Additionally, Moscow and St. Petersburg were excluded from the program.[14]

The program operates across the Russian Federation, excluding Moscow and St. Petersburg. Key eligibility criteria include the applicant's age (18 to 50 years), employment at an accredited IT

[9] Far Eastern Mortgage: Everything You Need to Know // Official website of RBC Realty (2021): https://realty.rbc.ru/news/60a61d6e9a7947045b23294c

[10] Far Eastern Mortgage: Conditions Will Change in 2023 // Official website of RBC (2023): https://prim.rbc.ru/prim/freenews/655407919a7947a466a76c1d

[11] Far Eastern Mortgage: What It Is, Who Can Apply, and Conditions // Official website of Banki.ru (2023): https://www.banki.ru/news/daytheme/?id=10979024

[12] Government Extends Far Eastern Mortgage Program Until 2030 // Official website of RBC Realty (2022): https://realty.rbc.ru/news/6391d3cc9a7947a3f87cf689

[13] Putin Directs to Maintain the Far Eastern Mortgage Rate at 2% // Official website of RBC (2024): https://www.rbc.ru/society/05/09/2024/66d951359a7947ec0263b3ab

[14] Preferential Mortgage for IT Specialists 2022: Terms // Official website of RBC Realty (2022): https://realty.rbc.ru/news/624c68939a79477787d21777

company, and meeting minimum income thresholds (150,000 rubles per month in cities with over one million residents, Moscow and Leningrad Regions; 90,000 rubles in other regions).

As of July 2024, over 75,000 mortgages had been issued under the program, totaling 700 billion rubles. The majority of *IT* mortgages were taken by specialists from Moscow and the Moscow Region, St. Petersburg, Krasnodar Krai, Tatarstan, Novosibirsk, and Sverdlovsk Regions.[15]

The diversity of preferential mortgage programs in Russia provides a unique opportunity to analyze their distinct contributions to mortgage lending. Each program's design, target demographics, and regional focus suggest that their effects on mortgage lending may vary. These variations can be attributed to differences in eligibility criteria, program objectives, and the socio-economic characteristics of the target population.

Standard Preferential was designed as a broad initiative to stimulate the construction sector and support citizens in acquiring housing. Given its general applicability across all regions and its focus on new housing, this program is expected to have a moderate but consistent association with lending growth. Its impact may be more pronounced during periods of heightened uncertainty, such as the COVID-19 pandemic, as it provides an accessible option for households seeking to secure housing in a volatile economic environment.

Family, targeting families with children, is anticipated to show the strongest and most consistent association with lending. Its demographic focus on households with young children or those raising children with disabilities suggests that it caters to a high-demand segment of the population. Additionally, the program's relatively low interest rates and allowance for using maternity capital as a down payment made it highly attractive for families, particularly during and after the pandemic, when financial stability and long-term investments were priorities for many.

Far Eastern, aimed at stimulating housing development in FEFD, is expected to exhibit regionally concentrated effects. The program's targeted nature may lead to significant increases in lending activity where housing needs align with broader regional development goals.

IT, targeting professionals in the information technology sector, offers competitive terms. Given the relatively high and stable income levels of IT specialists, this program is expected to show strong associations with lending growth, particularly during the COVID period when this demographic was less economically disrupted than others. Its effects may be geographically concentrated in regions with higher concentrations of IT professionals, such as major urban centers.

Based on these program characteristics, we hypothesize the following:

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[15] Authorities Extend IT Mortgage and Adjust Its Terms // Official website of RBC (2024): https://www.rbc.ru/technology_and_media/31/07/2024/66aa2ae69a7947be7fb378e0

H4: Different preferential mortgage programs are associated with varying levels of mortgage lending, with family-oriented programs linked to higher increases compared to other program types.

By systematically examining these hypotheses, our study provides a comprehensive understanding of how preferential mortgage programs are associated with regional mortgage markets. This framework offers insights into tailoring policy measures to enhance financial stability and equitable access to housing finance.

3. Empirical strategy

This section outlines our empirical strategy for examining how mortgage lending dynamics in Russian regions during and after the COVID-19 pandemic are associated with the implementation of preferential mortgage programs. Building on prior research, we develop a series of panel data models which capture both regional differences and changes over time in mortgage lending trends.

Our methodological approach utilizes econometric specifications tailored to address each research hypothesis, while accounting for the unique characteristics of the dataset and potential estimation challenges. Following the work of (Larson et al., 2024) on the responses of regional mortgage markets during COVID-19, we employ FE models to control for unobserved regional characteristics.

To analyze variations in mortgage lending growth across regions and periods, we use a FE panel model specification as shown in equation (1)

$$MortgageGrowth_{r,t} = \delta_0 + \delta_1 \cdot COVIDPeriod_{r,t} + \delta_2 \cdot Regions_{r,t-1} + \quad (1)$$
$$+\alpha_i + \gamma_t + \varepsilon_{r,t},$$

where r indexes Russian regions, t are quarters; α_i are individual regional-level FE, and γ_t are time FE.

The dependent variable $MortgageGrowth_{r,t}$ is measured as the growth rate of mortgage lending volume in region r during quarter t. This variable captures the relative changes in lending activity over time and serves as a key indicator for analyzing the dynamics of mortgage market development across the pre-COVID, during COVID, and post-COVID periods. By examining the growth rate of mortgage lending volumes, this study evaluates how regional mortgage markets responded to external shocks like COVID-19 and the role of preferential mortgage programs in influencing lending trends. This variable provides a robust framework for understanding both short-term fluctuations and longer-term trajectories in the mortgage market.

The data on mortgage lending volumes and other mortgage market indicators are sourced

from the Central Bank of Russia (CBR)[16] and DOM.RF[17] websites.

$COVIDPeriod_{r,t}$ categorizes the timeline of the study into three distinct phases—before, during, and after the COVID-19 pandemic for region *r* during quarter *t*. These periods are defined as follows:

- Pre-COVID Period ($COVIDPeriod_{r,t} = 0$): This baseline period spans from the 1st quarter of 2019 through the 4th quarter of 2019. It represents a stable, pre-pandemic timeframe, characterized by typical economic and housing market conditions prior to the onset of COVID-19.

- COVID Period ($COVIDPeriod_{r,t} = 1$): This period covers the 1st quarter of 2020 through the 1st quarter of 2023. It includes the onset and peak of the pandemic, during which the global economy and real estate markets were significantly disrupted. This phase captures the dynamics of mortgage markets during a period of heightened uncertainty.

- Post-COVID Period ($COVIDPeriod_{r,t} = 2$): This phase extends from the 2nd quarter of 2023 through the 2nd quarter of 2024. It reflects the post-pandemic recovery period, during which markets began stabilizing, and the longer-term impacts of pandemic-induced changes could be observed.

Analyzing distinct pandemic phases provides a structured framework for assessing how preferential mortgage programs influenced mortgage markets over time. By structuring the analysis around these periods, the study emphasizes the temporal evolution of mortgage market dynamics and the role of preferential programs during different stages of the pandemic. This approach ensures consistency across models and enhances the comparability of results across regions and timeframes.

The data on the spread of COVID-19 in Russian regions is extracted from Yandex DataLens[18] and verified by Johns Hopkins University[19], on стопкоронавирус.рф[20], and Yandex services.

Following the literature, we include a set of regional control variables, $Regions_{r,t-1}$, to

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[16] Housing (Mortgage Housing) Lending Market Indicators: https://cbr.ru/statistics/bank_sector/mortgage/
[17] Unified Reporting on Preferential Mortgage Lending Programs: https://дом.рф/programmy-gosudarstvennoj-podderzhki/operational-reporting/
[18] Coronavirus. Dashboard and data. The official website of Yandex Cloud (2022):
https://cloud.yandex.com/en/marketplace/products/yandex/coronavirus-dashboard-and-data.
[19] Coronavirus Resource Center. The official website of Johns Hopkins University (2022).
https://coronavirus.jhu.edu/map.html.
[20] Official information about coronavirus in Russia. The official website of the Government of the Russian Federation (2022). (In Russian). https://xn--80aesfpebagmfblc0a.xn--p1ai/.

account for factors influencing mortgage market dynamics. These variables ensure robust model specifications by capturing regional heterogeneity and economic conditions. Below are the specific variables used and their relevance, supported by prior research:

- Real estate prices ($AveragePrice_{r,t-1}$) are defined as the logarithm of the average price per square meter of the total apartment area in the housing market. Real estate prices are a critical determinant of mortgage demand, as rising prices can encourage borrowing by households expecting further appreciation. Research shows that price increases can also strain affordability, leading to potential risks of delinquency and default (Roshchina and Ilyunkina, 2021; Larson, Makridis and Redmer, 2024).

- Income ($Income_{r,t-1}$) is calculated as the logarithm of average per capita income in a region. Income levels reflect households' repayment capacity and are strongly linked to housing affordability (Qian, Qiu and Zhang, 2021). Studies demonstrate that income growth correlates with increased homeownership rates and stable loan performance (Roshchina and Ilyunkina, 2021).

- Unemployment ($Unemployment_{r,t-1}$) is measured as the growth rate of unemployment in percentage terms. Higher unemployment can directly impact borrowers' ability to make mortgage payments, increasing the likelihood of delinquency. (Larson, Makridis and Redmer, 2024) emphasize the relationship between unemployment expectations and loan performance, noting its critical role in shaping borrower behavior during economic shocks.

- Inflation ($Inflation_{r,t-1}$) is defined as the inflation growth rate in percentage terms. Inflation affects borrowing costs through changes in nominal interest rates and impacts real disposable income. Fluctuations in inflation have been shown to influence housing affordability and borrowing behavior (Qian, Qiu and Zhang, 2021).

- GRP per capita ($GRPpercapita_{r,t-1}$) is the logarithm of gross regional product per capita, this variable serves as a proxy for regional economic development. Higher GRP per capita is associated with stronger economic resilience and greater borrowing capacity among households (Roshchina and Ilyunkina, 2021).

The inclusion of these control variables is essential for isolating the effects of preferential mortgage programs and understanding their impact across varying regional conditions. As previous research highlights, neglecting regional disparities can lead to biased results, as mortgage market dynamics are influenced by complex interactions between income levels, unemployment rates, and housing prices (Roshchina and Ilyunkina, 2021; Larson et al., 2024). Data for regional variables in

Russia are obtained from the Federal State Statistics Service (Rosstat) website.

Our second model examines the association between preferential mortgage programs and changes in mortgage lending during and after the pandemic, addressing the second hypothesis (H2). To capture how these programs aligned with lending activity over time, we include interaction terms between program implementation and period indicators. This approach, shown in equation (2), enables us to analyze whether regions with higher program uptake experienced differing lending dynamics compared to those with lower uptake during the same period:

$$MortgageGrowth_{r,t} = \delta_0 + \delta_1 \cdot COVIDPeriod_{r,t} + \delta_2 \cdot$$
$$PreferentialMortgage_{r,t} + \delta_3 \cdot (COVIDPeriod_{r,t} \cdot PreferentialMortgage_{r,t}) + \quad (2)$$
$$\delta_4 \cdot Regions_{r,t-1} + \alpha_i + \gamma_t + \varepsilon_{r,t},$$

$PreferentialMortgage_{r,t}$ represents the change in the share of the preferential mortgage programs in the total mortgage lending volume in region r during quarter t, measuring the relative importance of preferential mortgage lending programs.

$COVIDPeriod_{r,t} \cdot PreferentialMortgage_{r,t}$ represents the interaction between pandemic phases and the share of preferential mortgage programs, allowing an assessment of how program effectiveness varied across different periods.

At the second step of our analysis we also control for regional characteristics using the set of independent determinants, $Regions_{r,t-1}$, including the same variables used for the first model.

To examine our third hypothesis regarding delinquency (H3), we develop a model that builds on findings from the literature about the relationship between preferential mortgage programs and regional loan performance during the pandemic. This specification enables us to evaluate whether differences in program participation across regions align with observed changes in delinquency. Equation (3) specifies this relationship:

$$Delinquency_{r,t} = \delta_0 + \delta_1 \cdot COVIDPeriod_{r,t} + \delta_2 \cdot PreferentialMortgage_{r,t} +$$
$$\delta_3 \cdot (COVIDPeriod_{r,t} \cdot PreferentialMortgage_{r,t}) + \delta_4 \cdot Regions_{r,t-1} + \quad (3)$$
$$\alpha_i + \gamma_t + \varepsilon_{r,t},$$

The dependent variable $Delinquency_{r,t}$ represents the growth rate of the share of delinquent mortgage loans within the total mortgage lending volume in region r during quarter t. This variable allows for an analysis of loan performance and the risks associated with preferential mortgage programs during the periods before, during, and after COVID-19.

The inclusion of delinquency growth is particularly relevant for examining whether

preferential mortgage programs, designed to stimulate real estate markets and promote housing affordability, may inadvertently heighten financial risks. These risks could manifest as increased delinquency rates due to expanded borrowing under less restrictive lending terms. Such an analysis is vital to understanding whether these programs during the COVID-19 and post-COVID periods contributed to heightened systemic risks or maintained financial stability in regional mortgage markets.

Our final model addresses the fourth hypothesis (H4) by analyzing how different types of preferential mortgage programs are associated with changes in mortgage lending volumes. The diversity of programs in Russia, such as *Family* and *IT*, provides a basis for comparative analysis. Building on (Montebruno *et al.*, 2021; Pavlenko, 2022), who highlight the significance of program-specific design in shaping market trends, we examine whether regions with varying adoption rates of specific programs demonstrate distinct lending patterns. This approach is captured in equation (4)

$$MortgageGrowth_{r,t} = \delta_0 + \delta_1 \cdot COVIDPeriod_{r,t} + \delta_2 \cdot$$
$$SpecificPreferentialMortgageProgram_{r,t} + \delta_3 \cdot (COVIDPeriod_{r,t} \cdot \qquad (4)$$
$$SpecificPreferentialMortgageProgram_{r,t}) + \delta_4 \cdot Regions_{r,t-1} + \alpha_i + \gamma_t + \varepsilon_{r,t},$$

To test this hypothesis, we estimate separate regression models for each program (*Standard Preferential*, *Family*, *Far Eastern*, and *IT*) to capture the unique dynamics associated with their adoption and implementation. The variable $SpecificPreferentialMortgageProgram_{r,t}$ represents the change in the share of different preferential mortgage lending programs in the total mortgage lending volume in region *r* during quarter *t*. This approach allows us to isolate the contributions of different programs and better understand the heterogeneity in their effects across regions and time periods.

All models include a comprehensive set of regional control variables based on factors identified in the literature as important determinants of mortgage market outcomes. The use of lagged controls follows standard practice, helps address potential endogeneity concerns, and reflects the delayed impact of macroeconomic conditions on mortgage market outcomes.

The FE specification is particularly appropriate for our analysis for several reasons. First, it controls for unobserved time-invariant regional characteristics (α_i) that might correlate with mortgage lending and our explanatory variables, addressing potential omitted variable bias. Second, the inclusion of time FE (γ_t) accounts for common macroeconomic shocks affecting all

regions simultaneously, which is crucial given the nationwide nature of both the pandemic and preferential mortgage programs. The Hausman test confirms the preference for FE over random effects (RE) estimation, indicating a significant correlation between regional characteristics and our explanatory variables. Therefore, this model allows us to capture how the pandemic affected mortgage lending differently across regions and time periods, building on findings by (Svobodová and Hedvičáková, 2021) about varying market responses during different pandemic phases.

We employ a comprehensive panel dataset covering 87 Russian regions over the period from Q1 2019 to Q2 2024, which encompasses pre-COVID, COVID, and post-COVID periods.

Table 1 shows the descriptive statistics of the variables analyzed at all steps.

Table 2 shows the correlation matrix and confirms that the data are not exposed to the multicollinearity problem.

Table 1. Descriptive statistics

Variable	N	Mean	Standard deviation	Min	Max
Dependent variables					
$Mortgage\ Growth_{r,t}$	1848	0.1512	0.4917	-0.7461	3.2760
$Delinquency_{r,t}$	1848	0.0720	0.5275	-0.7715	3.3308
Independent and control variables					
$COVID\ Period_{r,t}$	1936	1.0455	0.6381	0.0000	2.0000
$Preferential\ Mortgage_{r,t}$	1936	0.2492	0.2542	0.0014	2.2765
$Standard\ Preferential\ Mortgage_{r,t}$	1368	0.1175	0.1386	0.0005	1.1081
$Family\ Preferential\ Mortgage_{r,t}$	1671	0.0973	0.1250	0.0007	1.1104
$Far\ Eastern\ Preferential\ Mortgage_{r,t}$	218	0.0070	0.0183	0.0001	0.2506
$IT\ Preferential\ Mortgage_{r,t}$	633	0.0273	0.0871	0.0001	0.5655
$Average\ Price_{r,t-1}$	1771	11.1700	0.4296	10.0253	12.8338
$Income_{r,t-1}$	1848	10.4942	0.4052	9.4790	11.9606
$Unemployment_{r,t-1}$	1848	5.4190	3.8020	1.0000	32.4000
$Inflation_{r,t-1}$	1848	7.2007	5.1765	-1.9600	24.8900
$GRP\ per\ capita_{r,t-1}$	1848	13.3560	0.7356	11.8600	16.4769

Source: elaborated by the author.

Table 2. Pairwise correlations

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13
1. $Mortgage\ Growth_{r,t}$	1.000												
2. $Delinquency_{r,t}$	-0.833***	1.000											
3. $COVID\ Period_{r,t}$			1.000										
4. $Preferential\ Mortgage_{r,t}$	0.102	-0.209*	0.275***	1.000									
5. $Standard\ Preferential\ Mortgage_{r,t}$	0.176*	-0.185*	0.316***	0.391***	1.000								
6. $Family\ Preferential\ Mortgage_{r,t}$	0.136	-0.168	0.334***	0.396***	0.948***	1.000							
7. $Far\ Eastern\ Preferential\ Mortgage$	0.119	-0.142	0.326***	0.300***	0.717***	0.777***	1.000						
8. $IT\ Preferential\ Mortgage_{r,t}$	-0.121	-0.028	0.286***	0.118	0.034	0.032	-0.105	1.000					
9. $Average\ Price_{r,t-1}$	0.068	-0.096	0.198***	-0.173*	0.042	0.137	0.365***	0.266**	1.000				
10. $Income_{r,t-1}$	0.200*	-0.217**	-0.115**	-0.100	-0.250**	-0.226**	-0.017	0.268**	0.159***	1.000			
11. $Unemployment_{r,t-1}$	-0.108***	0.275***	0.298***	-0.130	-0.244***	-0.297***	-0.286***	0.022	-0.302***	-0.240**	1.000		
12. $Inflation_{r,t-1}$	-0.198*	0.078	0.187*	-0.002	-0.002	-0.109	-0.105	0.244***	0.060	-0.221**	0.025	1.000	
13. $GRP\ per\ capita_{r,t-1}$	0.063	-0.117	-0.176*	-0.097	-0.263**	-0.266**	-0.107	0.143	0.293***	0.288***	-0.087	-0.244***	1.000

Source: elaborated by the author.

Note: ***, **, * indicate significance at the 1%, 5%, and 10% level, accordingly.

4. Results and discussion

This section presents and discusses the empirical findings from our analysis of how COVID-19 and preferential mortgage programs affected mortgage lending across Russian regions. We begin by examining the pandemic's direct impact on mortgage lending growth (Model 1), followed by analyses of the effectiveness of preferential mortgage programs and their interaction with pandemic periods (Models 2–4). The results of testing first three hypotheses are presented in Table 3.

The analysis of mortgage lending during the COVID and post-COVID periods reveals notable differences when compared to the pre-pandemic baseline. Prior to the pandemic, mortgage lending was influenced by stable macroeconomic conditions. However, the COVID-19 period introduced unique factors that contributed to an unexpected rise in lending activity.

One potential explanation for the increase in mortgage lending during the COVID period could be the reduction in interest rates, which may have created more favorable borrowing conditions for households. Additionally, existing government measures, including preferential mortgage programs, might have continued to support mortgage market activity during this period. Broader fiscal policies introduced to stabilize economic activity during the pandemic may have also contributed to this trend. Furthermore, the uncertainty brought about by the pandemic could have led some households to view homeownership as a relatively stable and secure financial investment, potentially motivating increased borrowing.

The results confirm that mortgage lending growth during the COVID period was significantly higher compared to the pre-COVID baseline, with an increase of 151.57 percentage points (significant at the 1% level). This substantial growth reflects a robust response from both borrowers and financial institutions to the evolving economic environment. While initial expectations suggested a downturn in lending activity due to uncertainty and reduced economic output, the results demonstrate that targeted interventions and favorable borrowing conditions created a supportive environment for mortgage expansion.

In the post-COVID period, mortgage lending growth remained elevated, with an increase of 21.17 percentage points compared to the pre-COVID baseline (significant at the 1% level). However, this growth was noticeably lower than during the COVID period. This deceleration could be attributed to the gradual normalization of interest rates, the reduction in demand as a result of saturation in the housing market, and potentially stricter lending criteria introduced to manage financial risks accumulated during the pandemic. The recovery phase may have been characterized by regional economic disparities, where not all regions experienced uniform growth in borrowing capacity or housing market activity.

The analysis also highlights the role of key macroeconomic factors in shaping regional mortgage lending dynamics. Regions with higher real estate prices showed greater lending growth, likely due to expectations of

continued appreciation, which incentivized households to secure mortgages early. Higher income levels were associated with stronger growth, underscoring the importance of financial capacity in sustaining borrowing activity. Conversely, inflation was linked to lower lending growth, reflecting the constraining effect of rising costs on household budgets. Interestingly, unemployment exhibited a positive association with lending growth, possibly reflecting the impact of targeted government support measures in regions with elevated job market vulnerabilities. Finally, GRP per capita was positively associated with lending activity, indicating that economically resilient regions were better positioned to sustain the mortgage market momentum.

In summary, these findings support H1, demonstrating that mortgage lending volumes during the COVID and post-COVID periods were consistently higher compared to the pre-COVID baseline. While the growth in lending activity was most pronounced during the pandemic, the post-pandemic period maintained the positive momentum, albeit at a moderated pace. These results underscore the complex interplay of fiscal measures, macroeconomic conditions, and regional disparities in shaping mortgage lending trends during and after a global economic shock.

The results of the second model shed light on how preferential mortgage programs were associated with lending growth during and after the COVID-19 pandemic. These findings highlight temporal and regional variations in lending activity, providing insights into how these programs aligned with broader economic trends and housing market dynamics.

During the COVID period, mortgage lending was substantially higher than in the pre-COVID baseline, with the coefficient for the COVID period indicating a significant increase of 1.5260 (significant at the 1% level). This increase reflects heightened borrowing activity during the pandemic, which could be attributed to a combination of lower interest rates and increased demand for housing finance. In the post-COVID period, lending growth remained elevated, though to a lesser extent, with a coefficient of 0.1933 (significant at the 1% level). This sustained growth suggests that recovery dynamics and continued program implementation supported ongoing mortgage activity.

The role of preferential mortgage programs is particularly notable. The direct coefficient for these programs (0.5685, significant at the 5% level) indicates a consistent association with higher lending volumes across regions. The interaction term for preferential programs and the COVID period (0.8533, significant at the 1% level) highlights that regions with greater participation in these programs saw stronger lending growth during this period. This pattern underscores the alignment between preferential mortgage program adoption and increased housing market activity during the pandemic. In the post-COVID period, the interaction term remains positive (0.6279, significant at the 1% level), reflecting that regions with higher shares of these programs continued to exhibit elevated lending volumes during the recovery phase.

Macroeconomic control variables further contextualize these results. Real estate prices maintained a positive relationship with mortgage lending growth (0.0888, significant at the 5% level), suggesting that regions with rising property prices also experienced greater borrowing activity, possibly due to expectations of further price increases.

The unemployment rate (0.0011, significant at the 1% level) was positively associated with lending growth, potentially reflecting targeted support measures in economically vulnerable regions. Inflation, on the other hand, had a negative association with lending volumes (−0.0052, significant at the 1% level), consistent with the idea that higher prices may constrain borrowing capacity. GRP per capita exhibited a small negative relationship (−0.0108, significant at the 1% level), which could indicate that preferential programs contributed to sustaining lending growth in regions with weaker overall economic performance.

These findings allow us to assess the validity of H2, which posited that regions with higher participation in preferential mortgage programs would exhibit greater increases in mortgage lending volumes during and after the COVID-19 pandemic compared to regions with lower participation. Based on the results, we do not reject H2. The positive and statistically significant interaction terms and the direct association between preferential programs and lending growth suggest that regions with higher program adoption consistently experienced stronger mortgage activity during the COVID and post-COVID periods. This pattern highlights the alignment of these programs with housing market trends, demonstrating their role in sustaining mortgage lending growth across diverse regional contexts.

The results from the third model examining delinquency rates provide important insights into how mortgage market dynamics during the COVID-19 pandemic were associated with preferential mortgage programs and broader economic conditions. The findings highlight the complex relationship between external shocks caused by the pandemic, preferential mortgage programs, and regional economic resilience.

The analysis reveals that delinquency rates increased significantly during the COVID period (1.1371, significant at the 1% level) and remained elevated in the post-COVID period (0.6553, significant at the 1% level), compared to the pre-COVID baseline. These results underscore that the pandemic introduced significant financial strain on households, potentially exacerbating repayment difficulties and increasing the share of delinquent mortgages. The external shock of the pandemic coincided with heightened financial vulnerability, particularly in regions with existing economic challenges.

Preferential mortgage programs, while associated with higher mortgage lending activity, were also linked to increased delinquency rates (0.8092, significant at the 1% level). This finding suggests that in regions with greater program uptake the share of delinquent loans was relatively higher. The interaction term for the COVID period and preferential mortgage programs (1.1114, significant at the 1% level) further indicates that regions with high program utilization experienced even larger increases in delinquency rates during the pandemic. In the post-COVID period, the interaction term remains positive (0.8025, significant at the 1% level), reflecting a continued association between program participation and higher delinquency rates during the recovery phase.

Several factors could explain the observed increases in delinquency rates during these periods. The initial economic uncertainty caused by the pandemic, coupled with job losses and reduced income for many households,

likely strained borrowers' ability to meet mortgage obligations. Regions with lower economic resilience may have faced heightened risks as economic recovery progressed unevenly. The design of preferential mortgage programs, which aimed to stimulate market activity, may have inadvertently contributed to higher delinquency rates by increasing borrowing among households with limited financial stability. This dynamic reflects the challenges of balancing market stimulation with credit risk management, particularly during periods of external economic shocks.

The macroeconomic control variables provide additional context. Higher average property prices are positively associated with delinquency rates (0.0094, significant at the 5% level), suggesting that regions with rapidly increasing housing costs may have seen affordability pressures that contributed to repayment difficulties. In contrast, higher income levels are associated with lower delinquency rates (−0.0478, significant at the 1% level), highlighting the role of financial capacity in mitigating repayment risks. The unemployment rate shows a small positive association with delinquency rates (0.0039, significant at the 1% level), consistent with the notion that economic vulnerability exacerbates repayment challenges. Inflation, as expected, exhibits a negative association (−0.0042, significant at the 5% level), possibly reflecting the broader macroeconomic environment's effect on borrowing costs. GRP per capita is negatively associated with delinquency rates (−0.0387, significant at the 1% level), indicating that regions with stronger economic performance experienced relatively lower delinquency growth.

These findings lead to a rejection of H3, which posited that regions with higher shares of preferential mortgage program utilization would experience lower delinquency growth during and after the pandemic. Instead, regions with higher program participation demonstrated higher delinquency rates, particularly during the pandemic. This outcome likely reflects the unanticipated external shock of COVID-19, which increased financial risks and repayment difficulties, especially in economically vulnerable regions.

Table 3. Estimated coefficients of the regression equations (1)-(3)

VARIABLES	(1) Mortgage Growth$_{r,t}$	(2) Mortgage Growth$_{r,t}$	(3) Delinquency$_{r,t}$
COVID Period$_{r,t}$	1.5157***	1.5260***	1.1371***
	(0.1199)	(0.1244)	(0.0762)
post − COVID Period$_{r,t}$	0.2117***	0.1938***	0.6553***
	(0.0681)	(0.0723)	(0.0509)
Preferential Mortgage$_{r,t}$		0.5685**	0.8092***
		(0.2256)	(0.2575)
COVID Period $_{r,t}$ · Preferential Mortgage $_{r,t}$		0.8533***	1.1114***
		(0.2249)	(0.2493)
post − COVID Period $_{r,t}$ · Preferential Mortgage $_{r,t}$		0.6279***	0.8025***
		(0.2235)	(0.2625)
Average Price$_{r,t-1}$	0.0818*	0.0888**	0.0094**
	(0.0449)	(0.0430)	(0.0037)
Income$_{r,t-1}$	0.0749*	-0.0044	-0.0478***
	(0.0163)	(0.0058)	(0.0045)
Unemployment$_{r,t-1}$	0.0418*	0.0011***	0.0039***
	(0.0110)	(0.0003)	(0.0004)
Inflation$_{r,t-1}$	-0.0033*	-0.0052***	-0.0042
	(0.0013)	(0.0008)	(0.0004)
GRP per capita$_{r,t-1}$	0.0729*	-0.0108***	-0.0387***
	(0.052)	(0.0026)	(0.0051)
Constant	-2.5739	-0.3949***	-0.1432***
	(1.6689)	(0.0417)	(0.0707)
Observations	1771	1771	1771
R-squared	0.9184	0.9284	0.9652
Number of number_region	87	87	87
Region& Time FE	YES	YES	YES

Source: elaborated by the author.
Note: Base category is pre-COVID period. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

The results of the fourth model highlight how different types of preferential mortgage programs were associated with mortgage lending growth during and after the COVID-19 pandemic and are presented in Table 4. These findings reveal distinct patterns of lending activity across the programs, reflecting their alignment with broader regional and temporal housing market trends.

Standard Preferential, column (1), shows a relatively modest association with lending growth in its base effect (0.0147, significant at the 5% level), indicating consistent but moderate levels of support across regions. During the COVID period, this program was associated with a significant additional increase in lending growth (0.2828, significant at the 1% level), reflecting heightened activity in regions with greater adoption. In the post-COVID period, the program continued to support mortgage lending, with an additional increase of (0.1052, significant at the 10% level), suggesting its relevance persisted during the recovery phase.

Family Preferential, column (2), demonstrates the strongest base association with lending growth (0.3482,

significant at the 1% level), aligning with the program's targeting of families, which may have driven increased borrowing demand. The COVID-period interaction term (0.4663, significant at the 1% level) indicates a further amplification of lending growth in regions with higher program uptake during this time. Post-COVID, the program maintained a positive relationship with lending growth (0.3141, significant at the 1% level), highlighting its continued significance in supporting housing finance for families during the recovery.

Far Eastern, column (3), reflects a unique regional pattern. The base association with lending growth is not statistically significant (0.1221), but the interaction terms for both the COVID (1.4392, significant at the 1% level) and post-COVID periods (1.8533, significant at the 1% level) demonstrate a substantial increases in lending activity. These results suggest that this program was particularly effective in addressing regional housing needs during and after the pandemic, likely reflecting its focus on stimulating development in FEFD.

IT, column (4), shows a strong base effect (0.0614, significant at the 1% level), indicating robust lending activity in regions with significant *IT* adoption. During the COVID period, the program is associated with the largest additional increase in lending growth among all programs (1.5985, significant at the 1% level), reflecting its alignment with the housing demands of IT professionals, a group less affected by pandemic-related economic disruptions. In the post-COVID period, the program's relationship with lending growth moderates but remains positive and significant (0.4724, significant at the 10% level).

Across all models, control variables exhibit consistent patterns. Real estate prices are positively associated with mortgage lending growth, suggesting that rising housing prices correspond to increased borrowing activity. Inflation demonstrates a negative relationship with lending growth, underscoring the constraining effects of higher borrowing costs. The unemployment rate shows a small but positive association, possibly reflecting targeted support measures aimed at stabilizing markets in regions facing economic challenges.

These results support hypothesis H4, which posited that different types of preferential mortgage programs are associated with varying levels of mortgage lending growth. The findings reveal that while all programs contributed to lending activity, their effects varied depending on program, target demographics, and regional implementation. *Family* demonstrated the strongest and most consistent association with lending growth across periods, while *Far Eastern* exhibited significant regional effects during and after the pandemic. *IT* showed the largest increase during the COVID period, reflecting its alignment with the housing demands of a resilient demographic group. These results highlight the importance of program diversity in addressing varied market needs and sustaining mortgage lending growth across different economic contexts.

Table 4. Estimated coefficients of the regression equation (4) for Program-Specific Effects

VARIABLES	(1) Mortgage Growth $_{r,t}$	(2) Mortgage Growth $_{r,t}$	(3) Mortgage Growth $_{r,t}$	(4) Mortgage Growth $_{r,t}$
$COVID\ Period_{r,t}$	0.2655***	1.5081***	1.3007*	1.8603***
	(0.0628)	(0.1212)	(0.6896)	(0.4628)
$post-COVID\ Period_{r,t}$	0.1252***	0.2581***	0.7327*	1.2574**
	(0.0221)	(0.0506)	(0.0976)	(0.4650)
$Preferential\ Mortgage_{r,t}$	0.0147**	0.3482***	0.1221	0.0614***
	(0.0182)	(0.0833)	(0.1130)	(0.1720)
$COVID\ Period_{r,t}$ $\cdot Preferential\ Mortgage_{r,t}$	0.2828***	0.4663***	1.4392***	1.5985***
	(0.0647)	(0.0911)	(0.3989)	(0.5369)
$post-COVID\ Period_{r,t}$ $\cdot Preferential\ Mortgage_{r,t}$	0.1052*	0.3141***	1.8533***	0.4724*
	(0.0533)	(0.0793)	(0.2623)	(0.0455)
$Average\ Price_{r,t-1}$	0.0237***	0.0165***	0.2655***	0.4790**
	(0.0005)	(0.0041)	(0.0923)	(0.1922)
$Income_{r,t-1}$	-0.0140**	-0.0170**	-0.0064***	-0.1044
	(0.0059)	(0.0077)	(0.0024)	(0.2136)
$Unemployment_{r,t-1}$	0.0012***	0.0004**	0.0066*	0.0301*
	(0.0002)	(0.0002)	(0.0041)	(0.0285)
$Inflation_{r,t-1}$	-0.0015*	-0.0049***	-0.0162***	-0.0305*
	(0.0008)	(0.0009)	(0.0060)	(0.0159)
$GRP\ per\ capita_{r,t-1}$	-0.0056**	-0.0113***	-0.0475*	-0.2248*
	(0.0028)	(0.0032)	(0.0463)	(0.1211)
Constant	-0.7011***	-0.8831***	-0.7233***	-8.5280**
	(0.0396)	(0.0450)	(0.1076)	(3.2282)
Observations	1,368	1,671	218	633
R-squared	0.9327	0.9216	0.9658	0.8672
Number of number_region	83	84	78	18
Region& Time FE	YES	YES	YES	YES

Source: elaborated by the author.

Note: Base category is pre-COVID period. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

For each of the models (1) - (4) for Hypothesis 4, the variable $PreferentialMortgage_{r,t}$ means $StandardPreferentialMortgage_{r,t}$, $FamilyPreferentialMortgage_{r,t}$, $FarEasternPreferentialMortgage_{r,t}$, and $ITPreferentialMortgage_{r,t}$ respectively.

5. Conclusions

This research highlights how preferential mortgage programs were associated with changes in regional mortgage lending volumes during and after the COVID-19 pandemic. By analyzing the dynamics of mortgage markets in Russian regions, this study provides important insights into the role of government-backed housing initiatives under varying economic conditions. The empirical findings emphasize substantial variations across programs, periods, and regions.

First, the results suggest that mortgage lending volumes during the pandemic were higher compared to the pre-pandemic period. This increase may reflect a combination of factors, including lower interest rates, continued support from preferential mortgage programs, and the potential for households to prioritize homeownership as a secure investment during a period of heightened uncertainty. In the post-pandemic period, lending activity remained above pre-pandemic levels, though the growth rate was more moderate. This trend might be linked to the gradual normalization of borrowing conditions, varying levels of regional economic recovery, and potential market adjustments after the surge in lending during the pandemic. The inclusion of macroeconomic controls underscores the importance of regional factors, such as real estate prices and GRP per capita, in shaping mortgage market activity, suggesting that economically resilient regions were better positioned to sustain lending growth.

Second, the findings from the delinquency model demonstrate that regions with greater utilization of preferential mortgage programs exhibited higher delinquency rates during the pandemic and post-pandemic periods. This dynamic reflects the challenges of extending credit in an uncertain economic environment, where increased borrowing coincided with heightened repayment risks. Rising delinquency rates can be partially attributed to the external economic shock of COVID-19, which introduced significant financial strain on households, especially in regions with pre-existing vulnerabilities.

Finally, *Family* demonstrated the strongest and most consistent associations with lending growth, likely reflecting its broad applicability and demographic targeting. *Far Eastern* showed significant increases in FEFD, aligning with its geographic focus and development goals. *IT* exhibited the largest increases during the COVID period, corresponding to the economic resilience of its target demographic. Meanwhile, the *Standard Preferential* provided moderate but widespread support, particularly during the pandemic, when uncertainty heightened the appeal of accessible housing finance options.

These results underscore the complexity of mortgage market dynamics during periods of economic disruption and recovery. While preferential mortgage programs were consistently associated with higher lending activity, their association with increased delinquency rates highlights the importance of balancing market stimulation with financial risk management. The regional variations also emphasize the necessity of tailoring housing policy measures to local economic and demographic conditions.

The findings suggest several key policy implications for designing and implementing preferential mortgage programs, particularly during periods of economic uncertainty and recovery.

First, the association between preferential mortgage programs and higher lending volumes highlights their potential as a tool for stimulating housing markets during crises. However, the corresponding increase in delinquency rates suggests that these programs must be accompanied by measures to manage credit risk effectively. Policymakers might consider integrating stricter borrower eligibility criteria or mechanisms to monitor and mitigate default risks without compromising accessibility to housing finance.

Second, the distinct patterns observed across different program types underline the importance of tailoring housing initiatives to target specific demographic and regional needs. For example, the association of *Family* with higher lending activity demonstrates the value of demographic targeting, while *Far Eastern* underscores the benefits of addressing regional development priorities. Policymakers should adopt a portfolio approach that combines broad-based programs with targeted interventions to address diverse market segments and socioeconomic contexts.

Third, the regional disparities in lending and delinquency rates point to the necessity of flexible program designs that can be adapted to local economic conditions. Regions with weaker economic resilience may benefit from additional support measures, such as subsidies or loan guarantees, to prevent financial distress among borrowers while sustaining market activity.

Finally, the findings emphasize the importance of a long-term perspective in program design. While preferential mortgage programs can stimulate short-term lending growth, their potential to contribute to financial imbalances requires careful consideration. Policymakers should prioritize policies encouraging sustainable borrowing and repayment behaviors, particularly during periods of market recovery.

Such policies would strike a balance between stimulating housing markets and ensuring financial stability, providing a framework for designing more adaptive and resilient preferential mortgage programs.

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