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The analysis and assessment of the impact of the early pension savings withdrawal program on housing prices in the real estate market of Kazakhstan.

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Working Paper

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Abstract

In this paper we investigate the effectiveness of pension withdrawal policy implemented by the government of Kazakhstan in response to Covid-19 pandemic. This policy change was primarily utilized by Kazakhstani households to improve living conditions. We use administrative transaction-level data of real estate market to track both quantitative and qualitative characteristics of housing units. We use regression discontinuity in time design (RDiT) to empirically assess the efficacy of government intervention. Our preliminary results show that the government intervention increased housing prices by about 9-14% on average across Kazakhstan. The policy effect seems to have varied depending on the region under study. These findings provide additional insights for policymakers to further draft well-balanced housing policy.

Keywords: *Pension system, early withdrawals, real estate market, housing price growth, regression discontinuity design, Kazakhstan.*

JEL codes: H24, H55, R38, R50, O53

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1. Introduction

Covid-19 pandemic related restrictions caused sharp and sectors-wide decline in economic activity throughout the world. As a measure to counteract this downturn and financially bolster both households and corporate entities, national authorities allowed its citizens to withdraw part of their accumulated pension savings. As most of the international experience comprised some conditionality regarding the potential areas of use, Kazakhstan's case was primarily aimed and directed to improve housing conditions of Kazakhstani residents. The funds could optionally be allocated towards either for servicing up mortgage payments or as an additional source for down payment.

As of April 2022, total amount of pension withdrawals amounted for about 3% of post-pandemic GDP, which makes Kazakhstan's case study an important field experiment to analyze the impact of an additional funding on domestic housing market characteristics. In particular, given the prevalence of a target sector that benefited the most out of the change in the regulation, newly introduced measure on pension withdrawal can be considered as a "government intervention" in the housing market. As a result, in this paper, we are interested to study market distortion segments in the housing market that government initiative has created.

Distortions in the housing markets are reflected through elevated housing prices, a rise in investment-purpose real estate deals, and subsequently lead to a decrease of housing affordability, especially for the most vulnerable groups. Therefore, market failures often result in inadequate living conditions for low-income group of people, particularly in terms of floor area. In this paper we investigate if the supposed positive effects from the government intervention in the form of a change in the regulation of pension withdrawal for the purposes of improving living conditions come into realization. We use administrative transaction-level data of real estate market that enable us to track price, quantitative and qualitative characteristics of housing units. We use regression discontinuity in time design (RDiT) methodology to empirically assess the efficacy of government intervention. Our preliminary results show that government intervention increased housing prices by about 9-14% on average across Kazakhstan. These findings provide additional insights for policymakers to further draft well-balanced housing policy.

This paper is organized as follows. Section 3 provides stylized facts about housing market in Kazakhstan as well as details on pension withdrawal policy. Section 4 describes the dataset and methodology. Section 5 presents results. Section 6 concludes.

2. Literature Review

It is hard to understate the importance of housing market for the economy. As Global Financial Crisis of 2007-09 showed, collapse of the real estate market had severe economic implications worldwide, affecting governments, banks, firms and households. The impact was especially burdensome on the latter, since housing takes up the largest share of households' balance sheet. Given the importance of housing market for the overall economy, and households in particular, it is necessary to monitor the market imbalances in order to backstop or, at least, alleviate the negative consequences of real estate price swings and avoid stagnation. For this reason, governments may opt for various property market interventions to achieve the desired outcomes.

Depending on the tool at use, policy measures can be broadly classified into three categories: monetary, fiscal and macroprudential. These tools are oftentimes implemented on their own or in conjunction with the tools from the other category (or the same) to either contract or stimulate the activity in the housing market. Effectiveness of such interventions is always a central question as none of these measures are perfect and each of the tools has its own advantages and flaws.

Though not explicitly stated in the literature, access to withdraw pension savings before retirement can also be viewed as a fiscal policy measure which may influence housing market dynamics. The intuition behind is rather simple: mandatory pension contributions can be regarded as a form of "taxation", while permission to withdraw accumulated pensions (partially or fully) can be seen as a form of "tax reimbursement". Moreover, use of government funds to support pension withdrawals relates this policy closer to the realm of fiscal, rather than monetary or macroprudential tools. While there are plenty of countries that allow early pension withdrawals, the number of states that permit use of pension funds for housing purposes is limited (Zhakupova et al., 2019). Up to recently, some of the countries where such policy existed were Switzerland, Singapore, South Africa, and Mexico (Lawson & Milligan, 2007; Zhakupova et al., 2019).[5] Despite the relatively long history of implementation of these policies, academic literature on the topic of effectiveness of such measures is scarce.

Zhakupova et al. (2019) provide an overview of the trade-offs and consequences associated with early pension withdrawals. One of the main concerns with introducing this policy measure is related to sustainability of pension payments in the future. Put differently, policymakers need to be cautious with defining the limits that one can extract from pension funds "today", to make sure that the person has enough savings left for "tomorrow". As practice shows, setting such limits is a non-easy task, hence maximum withdrawal amounts experience periodic adjustments (Lawson & Milligan, 2007; Agarwal et al., 2019).

Further, historical cases suggest that pension withdrawals may promote homeownership at the expense of market distortions. In particular, policy measures in South Africa left middle-income households out of the housing market, while subsidized interest-rates exclusive to workers of formal sector put at risk exacerbating income-inequality in Mexico (Zhakupova et al., 2019). Lastly, households that utilized pension savings to invest into real estate market may face difficulties in generating a constant stream of payments upon a retirement, because housing assets are generally illiquid. This was the case in Singapore, which has become known as "asset-rich but cash-poor", and induced policy responses from the government (Zhakupova et al., 2019). Yet, quantitative evaluation of effects of pension withdrawals on house prices and real estate transaction volumes is, to our knowledge, absent in the academic literature. We aim to address this gap.

Recent Covid-19 pandemic has left the economies in a distress which induced governments' response to stabilize the economic situation. Some of the countries relied upon the pension withdrawals as a form of economic stimulus (OECD 2021; Bekbossinova et al., 2022;

[5] It should be noted that channels through which pension funds can be utilized for housing vary with countries, and can be categorized into three groups: direct withdrawal of funds (Singapore, Switzerland), direct loan for housing from the pension fund, where accumulated savings serve as a collateral (Switzerland, Mexico), and loan from third party organizations, where pension funds serve as a collateral (South Africa). As can be seen, some of the countries provide several withdrawal options. For more detailed discussion of channels, and associated benefits and flaws of each withdrawal measure, readers are welcome to look into Zhakupova et al. (2019).

Madeira 2024). In 2021, Kazakhstan has become one of the countries that adopted such measure. As a consequence, citizens of Kazakhstan who have accumulated pensions beyond "minimum sufficiency thresholds" were eligible to extract funds from their accounts. As of April 2022, total withdrawals amounted 3.1 trillion tenge – approximately 3% of 2022 nominal GDP (the National Bank of the Republic of Kazakhstan [NBRK], 2023). Major part of it, about 64%, was withdrawn specifically for real estate purchases. This situation resulted in an unprecedented demand shock to the housing market of Kazakhstan. While qualitative assessment of benefits and drawbacks of this measure has already been conducted (Bekbossinova et al., 2022), quantitative evaluation of this government intervention on housing market remains unexplored. Our paper aims to address this gap by investigating the causal effect of immense pension withdrawals on house prices and housing transaction volumes. Using Regression Discontinuity Design and GBD-RN, a unique housing transaction dataset not utilized in literature before, we find that the government intervention had a distortionary effect on housing prices and elevated transaction volumes.

3. Stylized Facts about Kazakhstan's Housing Market and Summary of Government Interventions

Kazakhstani Housing Market

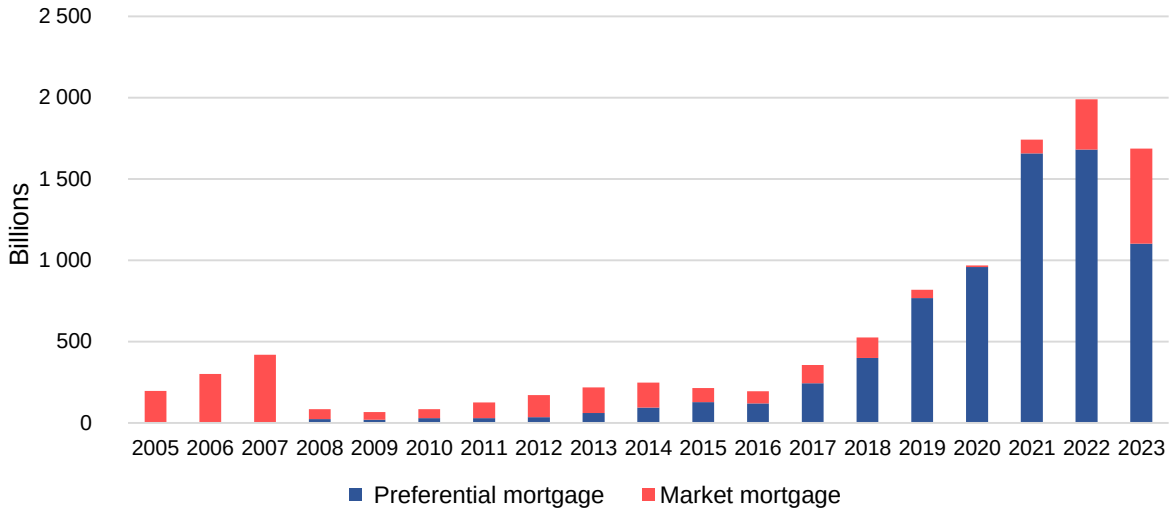
Kazakhstan's housing market is characterized by fragmentation across several dimensions, such as a high homeownership rate, low floor space per capita, and significant concentration of market activity in two major cities, Astana and Almaty. According to the World Bank, the home ownership rate in Kazakhstan is 95% (Seitz, 2018), which ranks higher than most of the other countries. Yet, based on Bureau of National Statistics (BNS) estimates, in 2023, the floor space per capita, defined as the ratio of the total area of residential premises (apartments) to the population, was just 23.9 square meters (BNS, 2024). In comparison, this indicator ranges between 30 and 40 square meters in European countries, and in developed countries such as Canada, the United States, and Australia, it is 72, 77, and 89 square meters, respectively (Chatzivasileiadi et al., 2022). The highest housing provision rates are observed in Astana, with 31.3 square meters per person, followed by Almaty with 30 square meters per person. According to statistics of BNS, these two cities are the primary hubs of activity in the housing market. In 2023, these two cities accounted for 34.8% of all housing transactions and 53.4% of the total residential area commissioned in Kazakhstan.

Kazakhstan's housing market is predominantly focused on preferential mortgages, most of which are supplied by "Otbasy Bank" JSC – state-owned bank in Kazakhstan implementing the housing construction savings system. Established in 2003, it serves as an instrument of the state's social policy to provide citizens with affordable housing. The volume of mortgage lending by "Otbasy Bank" JSC has increased annually, and in 2015, for the first time, it surpassed the commercial mortgage market in terms of share (Figure 1). In 2018, government introduced "7-20-25" and "Baspana Hit" programs that were aimed at providing Kazakhstanis with affordable mortgages.[6] Mortgage rates in these programs were close to the base rate of the National Bank (or even lower), which resulted in a crowding-out of the market-based mortgage programs due to lack

[6] Detailed information on terms and requirements of the "7-20-25" and "Baspana Hit" programs is provided in the Appendix A1

of competitiveness. The share of preferential mortgages peaked in 2020 and 2021, when, respectively, 99.1% and 95.3% of all mortgages issued were subsidized.

Figure 1. The volumes of mortgage lending



Source: NBRK, Author's calculations

A summary of government intervention

On September 1, 2020, in the Address to the Nation, President Kassym-Jomart Tokayev announced plans for the early withdrawal of pension savings by citizens of Kazakhstan. One of the main goals of this measure was to improve the financial situation of the population, especially in the context of the economic downturn caused by the Covid-19 pandemic. On December 23, the Parliament passed a law aimed at restoring economic growth, which included provisions for the use of pension savings for housing, medical treatment, or transfer to financial management organizations. On January 2, 2021, the President of Kazakhstan signed the Law of the Republic of Kazakhstan On Amendments and Additions to Certain Legislative Acts of the Republic of Kazakhstan on the Recovery of Economic Growth.[7]

Since January 2021, citizens of Kazakhstan who are contributors to the UAPF have been granted the right to early withdrawal of part of their pension savings before reaching retirement age.[8] In order to exercise the right to early withdrawal, citizens needed to have an amount on their pension account exceeding the so-called «minimum sufficiency threshold». This threshold was calculated based on the contributor's age and the minimum amount required to ensure a sufficient pension coverage upon reaching retirement age.[9]

According to government estimates, 721,000 individuals, representing 7.9% of the total working population in 2021, were eligible to utilize a portion of their pension savings, with the potential to withdraw up to 1.4 trillion tenge. Consequently, from January 2021 to April 2022, 1.3 million applications from contributors for housing improvements were processed, amounting to 3.1 trillion tenge, which constitutes about 3% of GDP in 2022 (NBRK, 2022).

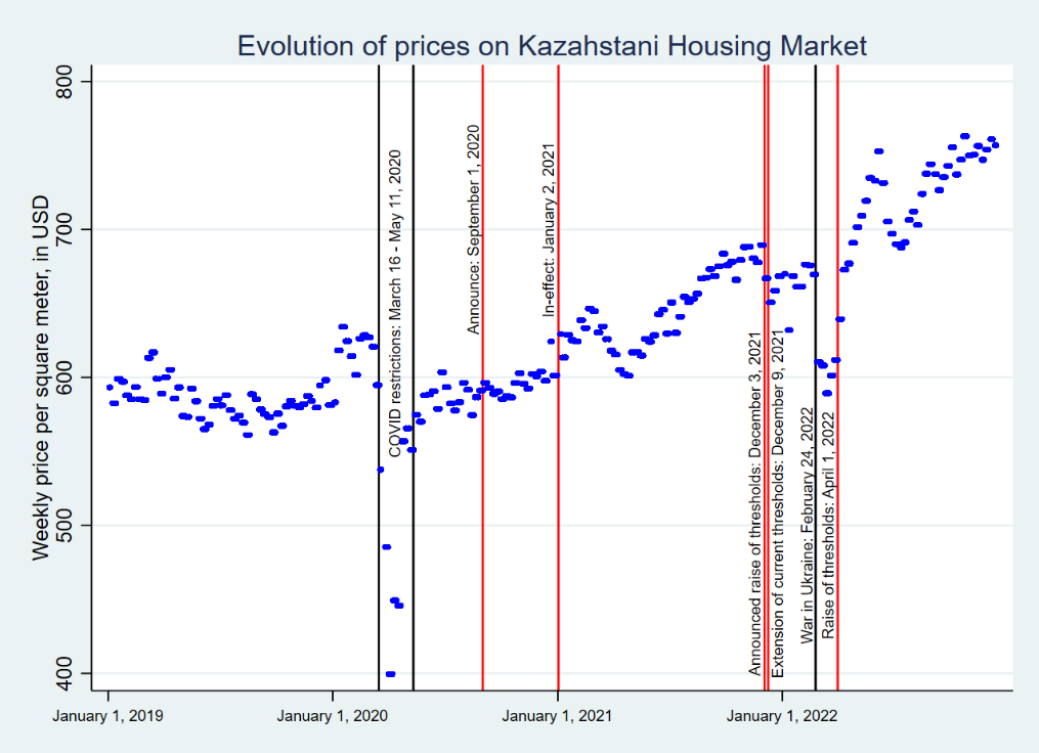
[7] Detailed information regarding the timeline of the pension savings withdrawal program is provided in the Appendix A2.
[8] Unified Accumulative Pension Fund of Kazakhstan
[9] Detailed information regarding the levels of "minimum sufficiency thresholds" by age of the UAPF contributor can be found in the Appendix A3.

Given the fact that both "7-20-25" and "Baspana Hit" programs continued to be in-effect throughout 2021,[10] implementation of early pension withdrawal policy in the same year further boosted the volume of mortgage lending, since approximately 64% of all early withdrawals of pension savings were directed towards housing purchases. Thus, in 2021, the volume of mortgages issued increased by 88.9% compared to 2020 (see Figure 1).

Such unprecedented demand shock on the housing market elicited government's response, which repeatedly reviewed and adjusted the sufficiency thresholds required for early withdrawal of pension savings during 2022 and 2023. These changes were necessitated by the need to adapt to economic conditions and to ensure a balance between the ability of citizens to use their pension funds and the sustainability of the pension system, which ultimately resulted in a decrease of the total amount of savings withdrawn. Thus, in 2021, about 2.5 trillion tenge was withdrawn for improving housing conditions, but by 2022, this figure had decreased to just 700 billion tenge.

To illustrate the dynamics on the Kazakhstan's housing market, we present scatterplots of weekly average prices and transaction volumes below on Figures 2a and 2b, respectively. Our figures cover housing transaction data over 2019-2022 period. Key policy dates as well as global events that had spillover effects on Kazakhstan's housing market are depicted by vertical lines. As can be seen, prices and transaction volumes surged after the policy in-effect date on January 2, 2021. Both prices and volumes remained at elevated levels throughout the April 1, 2022, when "sufficiency thresholds" were raised for the first time.[11] Interestingly, while transaction volumes have returned to pre-policy period levels after pension savings withdrawal restrictions, prices have continued to go upwards.

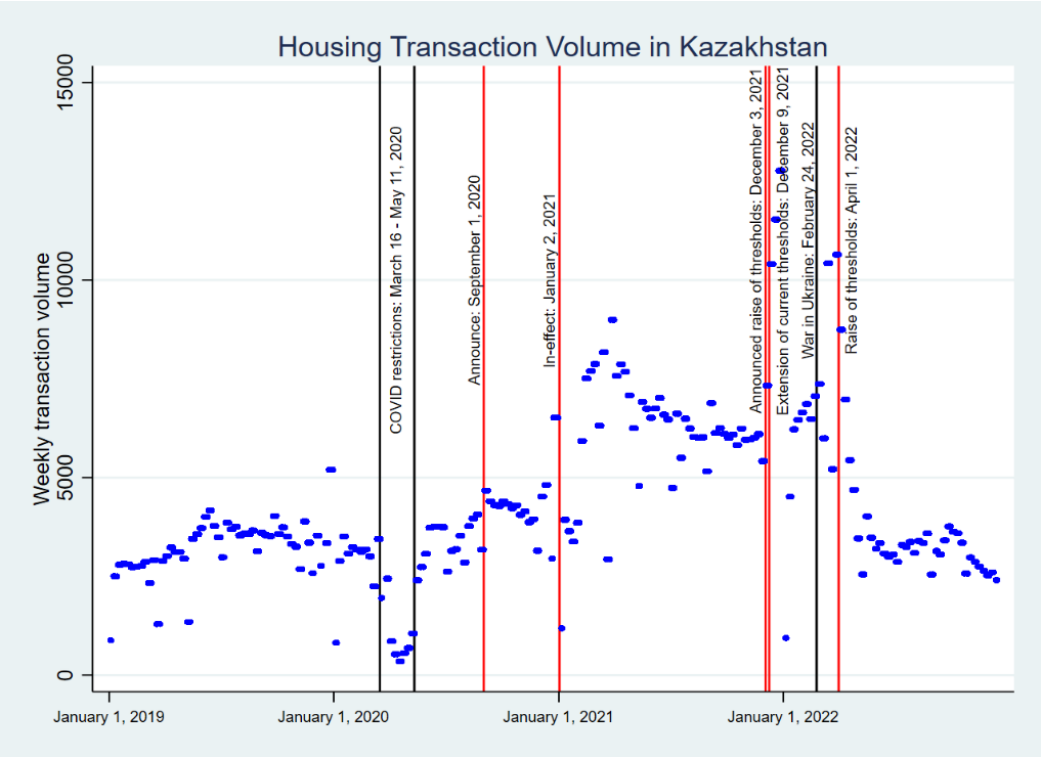
Figure 2a. Average weekly prices on Kazakhstani housing market over 2019-2022 period.



Source: GBD-RN, Author's calculations

[10] "7-20-25 program" continues to operate, while "Baspana Hit" program was terminated in the end of 2021.
[11] Detailed information regarding the levels of "minimum sufficiency thresholds" by age of the UAPF contributor after April 1, 2022 is provided in the Appendix A3

Figure 2b. Weekly transaction volumes on Kazakhstani housing market over 2019-2022 period.



Source: GBD-RN, Author's calculations

4. Empirical Design and Data

Data

Our data come from a confidential governmental housing transaction database (GBD-RN), which has not been previously utilized in academic research. GBD-RN supplies all housing transaction records starting from January 2014, and contains detailed housing characteristics for every housing purchase. We use information on purchase price, date of the purchase agreement and housing attributes (such as floor area, number of rooms) in our analysis. Also, we extract unique housing identifier (cadaster code) to retrieve information on the location of the real estate.

Housing market activity in Kazakhstan is predominantly concentrated in two local "super-star" cities – Astana and Almaty. These major cities have higher salaries, living standards and more diverse housing market with higher prices than the rest of the country. For this reason, these two cities are analyzed separately. The remainder of the housing market activity is further grouped into major cities and the rest of Kazakhstan. As a result, we split our analysis of pension savings withdrawal by four regions: Astana, Almaty, cities and the rest of Kazakhstan. Our dataset covers 24 January, 2020 – 09 December, 2021 period and spans for 98 weeks (±343 days around policy start date January 1, 2021). Detailed information on the dataset and variables is summarized in Table 1 below.

Based on Table 1, we can notice that average price per square meter has risen by $42, $70 and $58 in Astana, cities and the rest of Kazakhstan, respectively. The highest average price per square meter change before and after policy is observed in Almaty – $153. Overall, there is a

country-wide trend towards apartments with lower floor space. Also, share of speculative deals has risen across the country after the policy was in effect.[12] Interestingly, the demand for newly-built and secondhand apartments seems to have geographic variation. While the share of firsthand estates in Astana has grown after January 1, 2021, the opposite happened in Almaty and other cities. For the rest of Kazakhstan, share of firsthand estate transactions remained unchanged. This finding is also supported by changes in age of the estates before and after the policy implementation date. Lastly, it can be noticed that most of the traded residential estates fit the conditions of the government's subsidized mortgage programs. However, after the introduction of the pension savings withdrawal program, the share of such housing has declined, which indirectly indicates a rise in prices, since the upper-limits of preferential mortgage programs remained unchanged.

[12] Using cadaster information, we marked the properties as "speculative" if they were sold within 1-year period after their purchase.

Table 1. Descriptive Statistics

	Astana				Almaty				Cities				Rest of Kazakhstan			
	Before policy (N=30,604)		After policy (N=58,200)		Before policy (N=34,676)		After policy (N=53,128)		Before policy (N=84,398)		After policy (N=154,106)		Before policy (N=13,916)		After policy (N=43,556)	
Variable	Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.
Price per sq. meter (in USD)	759.65	152.21	802.91	184.05	804.82	231.01	958.03	273.83	441.03	134.67	511.36	166.53	291.13	123.17	347.29	157.80
Area (sq. meters)	60.15	24.56	57.24	23.02	59.23	22.94	55.83	20.37	56.33	20.99	54.78	20.86	51.85	15.06	50.59	15.25
Age	11.62	13.04	10.16	12.72	19.08	20.04	22.16	21.07	31.09	19.99	32.08	19.91	38.31	15.94	38.76	16.42
Primary	0.35	0.48	0.37	0.48	0.35	0.48	0.26	0.44	0.20	0.40	0.14	0.35	0.09	0.29	0.09	0.29
Speculation	0.12	0.33	0.18	0.38	0.19	0.39	0.23	0.42	0.10	0.30	0.21	0.41	0.08	0.26	0.24	0.43
Covid	0.06	0.24	0	0	0.07	0.25	0	0	0.08	0.28	0	0	0.08	0.28	0	0
Baspana Hit	0.87	0.33	0.85	0.35	0.84	0.37	0.74	0.44	0.93	0.26	0.88	0.32	0.98	0.13	0.93	0.25
Number of districts (N)	4		4		8		8		22		22		14		14	

Note: Data are taken from GBD-RN over the January 24, 2020 – December 09, 2021 period (±343 days from policy start date on January 01, 2021). Age is calculated as difference between 2022 and estate's built-year. Primary is a dummy for firsthand real estates. It equals 1 for estates that appear in the GBD-RN for the first time after year 2015. Speculation is a dummy for speculative behavior on the market. It takes value of 1 if the estate was resold on the market within a year from its purchase. Covid dummy is equal to 1 if transaction record falls within March 16 – May 11, 2020 period when strict mobility restrictions were enforced in Kazakhstan. We introduce "Baspana Hit" dummy to mark the residential properties that meet the requirements of the "Baspana Hit" program.[13] Using cadaster data, we extracted geographical information of each transaction and summarized it in district variable. For "super-star" cities, districts refer to actual districts within Astana and Almaty. For the rest of Kazakhstan, districts represent cities and periphery of cities.

[13] Since the '7-20-25' program is aimed at providing preferential conditions only for housing from the primary market, and has similar upper limits on real estate price as "Baspana Hit", we did not introduce a "7-20-25" dummy due to high correlation with variable "Primary". Instead, we use the "Baspana Hit" dummy to mark the apartments that could have been purchased under the conditions of preferential mortgage programs.

Empirical Design

Regression discontinuity design (RDD) is one of the methods commonly applied to evaluate the effectiveness of a policy intervention. The idea behind RDD is to compare observations on the margin to the left (typically control) and to the right (typically treatment) of the cut-off point, which allows for an estimation of the local average treatment effect (LATE). Identification in a RDD requires several assumptions to hold for the effects to be unbiased.

Firstly, the treatment needs to be exogenous and running variable (that defines the threshold for treatment) must not be manipulated. Secondly, the outcome variable is expected to be a smooth series in the absence of treatment. Thirdly, the treatment must be the only source of discontinuous jump for the outcome variable. Lastly, there should not be any discontinuous jumps around the cut-off point among explanatory (and confounding) variables.

Compared to other quasi-experimental identification strategies, RDD assumptions are relatively mild, while implementation is fairly straightforward. Moreover, conditional on the assumptions above, estimates produced by RDD are credible and can be thought of as derived from "local randomized experiment" (Lee & Lemieux, 2010). Hence, it not surprising to see wide applicability of this identification strategy in economics and policy evaluation (Lee & Lemieux, 2010; Hausman & Rapson, 2018).

RDD has also been applied to evaluate the effectiveness of government interventions to housing market. Berger et al. (2020) explored variation in yearly income to evaluate the effect of First Time Homebuyer Credit tax deduction, while Wang et al. (2024) and Deng et al. (2024) utilized variation in time to assess effects of "cooling" measures on the real estate market. In cases when time is used as a running variable (and cut-off point), RDD transforms into Regression Discontinuity in Time (RDiT). We will adopt a similar RDiT methodology as in Wang et al. (2024) and Deng et al. (2024), by estimating regression specification below:

$$Y_{ijt} = \alpha_0 + \alpha_1 D_{it} + \alpha_2 T_{it} + \alpha_3 D_{it} \times T_{it} + \beta X_{it} + \rho_j + \varepsilon_{ij}$$

where Y_{ijt} is a log price per square meter in dollar terms of unit *i* in district *j* at time *t*. We decided to convert prices to dollar terms to capture real rather nominal changes to asset prices. T_{it} is a running variable (number of weeks before or after policy implementation date), D_{it} is a policy dummy that is equal to 1 after policy implementation (i.e. after January 1, 2021). X_{it} is a set of unit controls (such as floor area, age of estate, "Baspana Hit" indicator, etc.), while ρ_j is a set of district fixed effects.

The effect of the policy is captured by the coefficients of D_{it} which reflect changes in prices after policy implementation. Given the presence of subsidized mortgage programs and anticipated growth in demand by property sellers, we hypothesize that early pension withdrawal policy has driven up real estate prices and transaction volumes. Therefore, we expect the marginal effect of the policy dummy to have a positive and statistically significant coefficient.

For our analysis, we select a window of 49 weeks (approximately 11 months) before and after the policy implementation day. Our data start from the January 24, 2020 and spans through December 09, 2021. We denote the running variable as 0 for the week of January 1, 2021, and increment it by 1 for every week after, and decrement by 1 for every week before.

We aimed at maximizing the bandwidth to cover as much data points as possible. For this reason, we set the right tail of the analysis period to December 09, 2021 – the official announcement of the extension of existing "sufficiency thresholds". This announcement may have

spurred additional activity of market participants biasing the estimates obtained earlier. Hence, we were cautious about extending the bandwidth beyond the announcement date extension of sufficiency thresholds. Moreover, "Baspana Hit" program got terminated in the end of 2021, which favors the choice of a right tail of the analysis period outlined above. As for the left tail, we took an equivalent interval, which coincided with January 24, 2020.

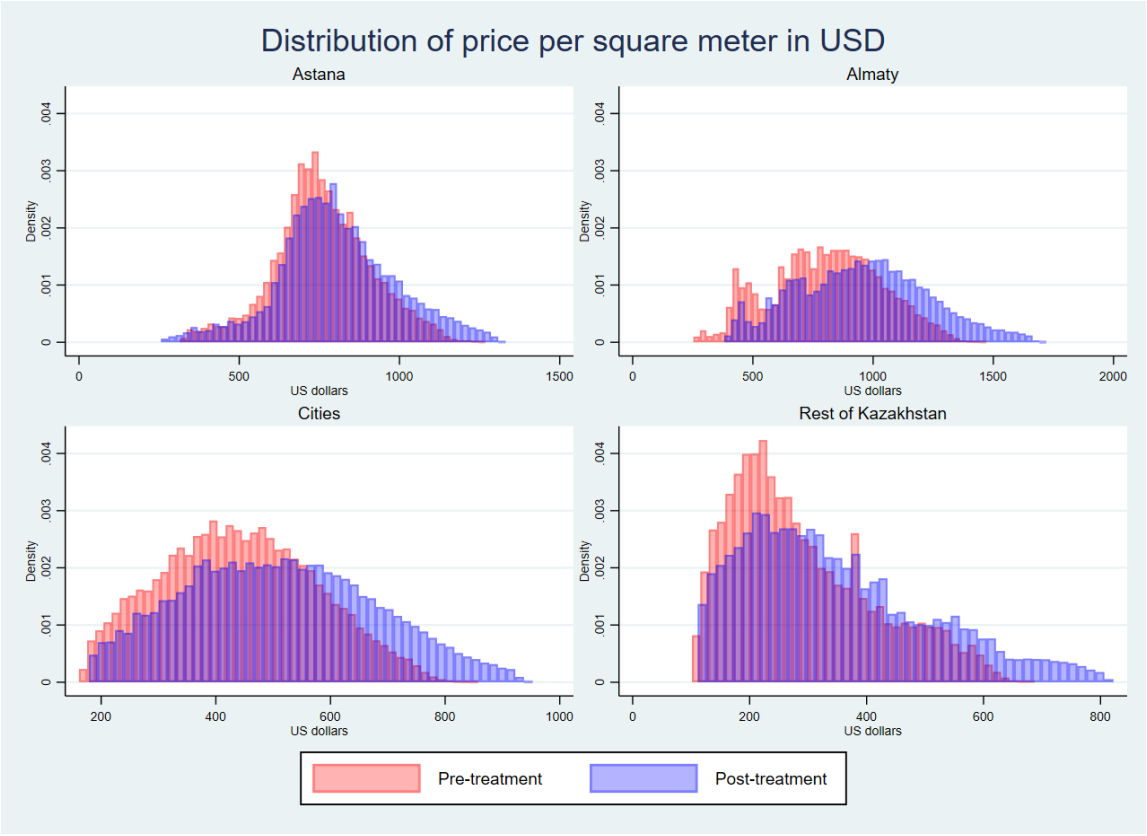
We make an assumption that presence of preferential mortgage programs did not affect the validity of our empirical method, because these programs were introduced back in 2018, and all market-participants were aware of them. Also, the requirements and conditions of the "7-20-25" and "Baspana Hit" did not experience any changes (within the analysis period), which makes it unlikely that preferential mortgage programs themselves caused structural changes in the housing market (although they may have amplified the effect of the pension savings withdrawal program).

It should be noted that our interval prior to policy implementation covers the March 16 – May 11, 2020 period, when Government of Kazakhstan has enforced strict mobility restrictions in Astana and Almaty cities. These measures were taken in response to Covid-19 pandemic and primarily affected housing transaction volumes in local "super-stars". We recognize that inclusion of this time interval may have biased our results upward, therefore we include a "Covid" dummy in our analysis and explore alternative interval specifications in our Robustness Analysis.

Before proceeding to results, we perform a preliminary analysis of prices before and after policy implementation date to examine dynamics on the housing market. Figure 3 depicts changes in distribution of prices by regions of interest. Further, we perform a linear and quadratic fitting of weekly prices as functions of time around the cut-off point for Astana, Almaty, cities and the rest of Kazakhstan. Figures 4a and 4b showcase the results of linear and quadratic fit, respectively. Additionally, we perform an analysis of price and transaction volume dynamics by submarkets and present findings in the Appendix.

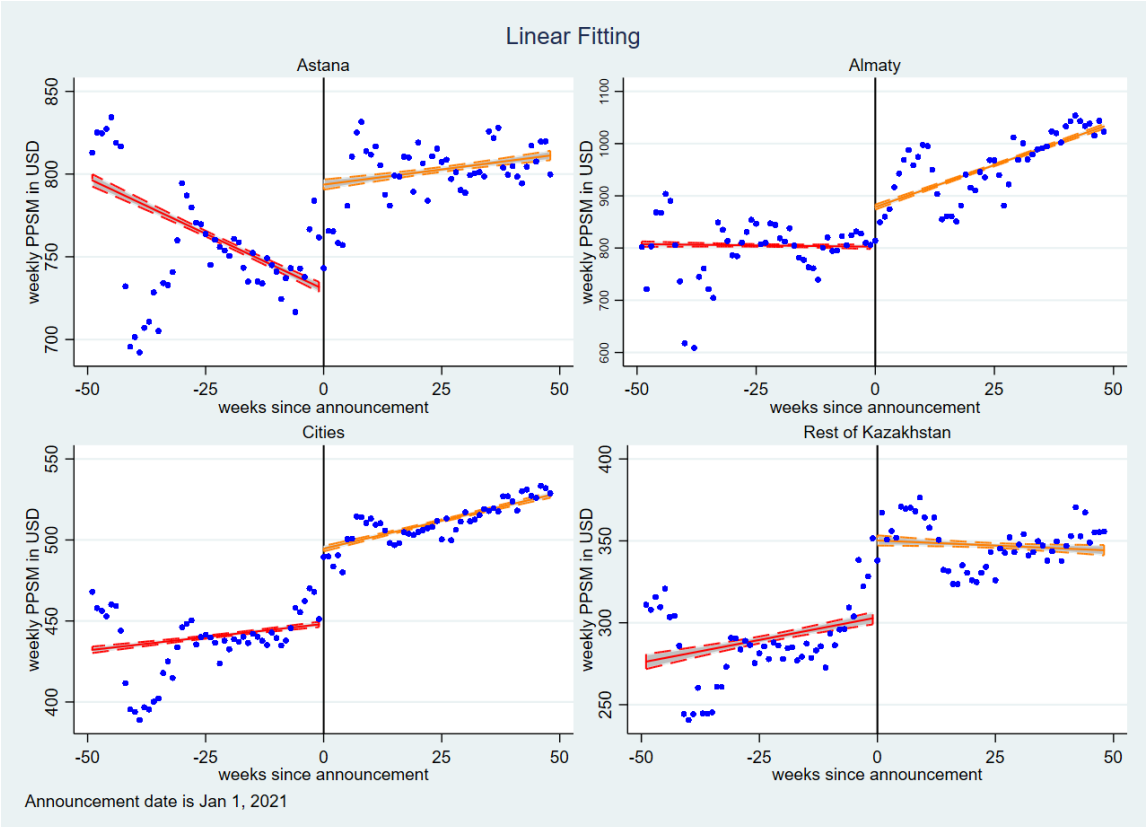
As can be noticed, there is a rightward shift in price distributions across all localities after the policy was in effect. Distribution changes are supported by linear and quadratic fit results, as prices experience a discontinuous jump around the policy implementation date, which suggests that the government intervention may have triggered price growth. Still, these findings are not yet indicative of a price increase because characteristics of housing units traded before and after the cut-off point were not taken into account.

Figure 3. Quadratic fitting of weekly price per sq. meter



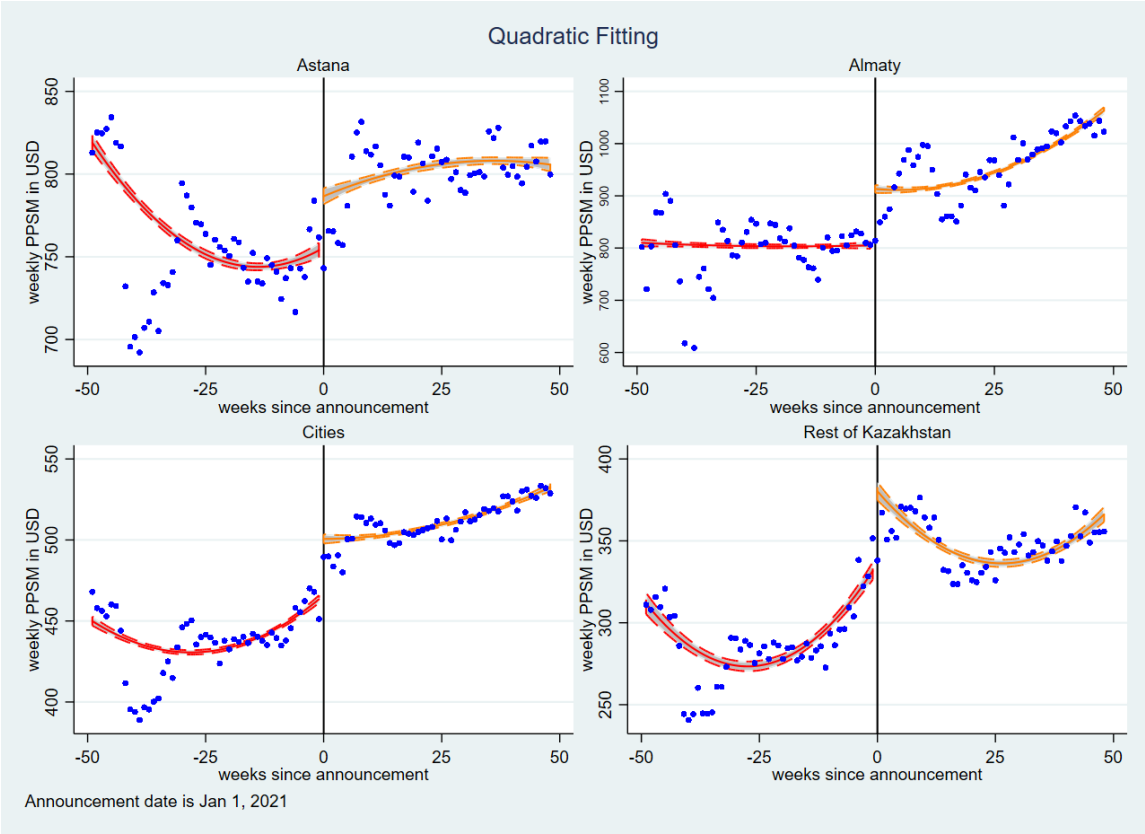
Source: GBD-RN, Author's calculations

Figure 4a. Linear fitting of weekly price per sq. meter



Source: GBD-RN, Author's calculations

Figure 4b. Quadratic fitting of weekly price per sq. meter



Source: GBD-RN, Author's calculations

5. Empirical Results and Discussion

Baseline Results

Our results are presented in a Table 2 below. Following our methodology, we investigate a linear interaction regression model for every region of interest. Although not reported explicitly, all regressions include district fixed effects. Standard errors are clustered at the level of residential blocks (using cadaster information)

As can be noticed, our regression model predicts positive significant coefficient for the policy dummy for all regions of interest. The coefficient of D_i is around 0.08 for Astana and Almaty, around 0.12 for cities and 0.15 for the rest of Kazakhstan. This suggests that instantaneous policy effect had contributed to the growth of price per square meter in dollar terms by 8%, 12% and 15% in Astana and Almaty, cities and the rest of Kazakhstan, respectively. Moreover, the coefficient of interaction of policy dummy with running variable is also positive and statistically significant in all regions of interest, except the rest of Kazakhstan. This indicates that prices have increased over time after the policy was in-effect.

The coefficients of control variables are negative and statistically significant independent of the region of interest. These findings align with the patterns on the Kazakhstani housing market since newly constructed, older or more spacious apartments tend to have lower price per square meter, on average. It also should be pointed out that "Baspana Hit" dummy has negative and statistically significant coefficient. This is due to the fact that residential properties qualifying for the "Baspana Hit" program have an upper-limit on their price, hence, they have a lower cost of a square meter.

Table 2. Regression results

	Astana	Almaty	Cities	Rest of Kazakhstan
D	0.0806***	0.0767***	0.119***	0.147***
	(0.00911)	(0.0106)	(0.00848)	(0.0235)
T	-0.00243***	-0.00117**	-0.000130	0.000144
	(0.000425)	(0.000494)	(0.000160)	(0.000408)
D x T	0.00254***	0.00322***	0.00148***	-0.000445
	(0.000611)	(0.000679)	(0.000251)	(0.000557)
Age	-0.00256***	8.21e-05	-0.00224***	-0.00589***
	(0.000299)	(0.000417)	(0.000301)	(0.000800)
ln(Area)	-0.201***	-0.299***	-0.130***	-0.296***
	(0.0122)	(0.0353)	(0.0123)	(0.0275)
Speculation	-0.0606***	-0.0632***	-0.0502***	-0.0166**
	(0.00901)	(0.0111)	(0.00550)	(0.00807)
Primary	-0.143***	-0.122***	-0.164***	0.0476
	(0.0123)	(0.0285)	(0.0193)	(0.0363)
Covid	-0.0879***	-0.115*	-0.0988***	-0.0871***
	(0.00899)	(0.0617)	(0.00620)	(0.00931)
Baspana Hit	-0.228***	-0.322***	-0.321***	-0.534***
	(0.0116)	(0.0218)	(0.0110)	(0.0419)
Constant	7.624***	8.215***	7.027***	7.438***
	(0.0527)	(0.154)	(0.0682)	(0.147)
Observations	88,804	87,804	238,475	57,468
R-squared	0.240	0.492	0.424	0.404

Clustered standard errors in parentheses

*** p<0.01, ** p<0.05, *p<0.1

In order to assess predicted changes in prices after pension withdrawals were allowed, we estimate the average marginal effects of the policy dummy (D_{it}) holding other covariates at their mean values. These estimations are presented in a Table 3 below.

Table 3. Average marginal policy effect

Region	D = 1	SE	t-stat	pvalue	95% CI LB	95% CI UB
Astana	0,1036	0,013	7,992	< 0.001	0,0778	0,1293
Almaty	0,0968	0,0109	8,8573	< 0.001	0,0752	0,1184
Cities	0,1309	0,0084	15,5421	< 0.001	0,1143	0,1475
Rest of Kazakhstan	0,1409	0,0223	6,2958	< 0.001	0,0968	0,185

Note: Values in the column "D=1" represent the average marginal effect of policy implementation dummy when all other covariates are held at their means. Values provided in the last two columns represent the 95% confidence intervals.

Based on Table 3, we observe that when $D_{it} \times T_{it}$ term is taken into account, predicted policy effect grows in magnitude in all regions of interest (except rest of Kazakhstan). This effect is statistically significant since confidence intervals do not contain zero. Overall, our

estimates indicate that pension withdrawal policy has on average contributed to 10%, 9%, 13% and 14% dollar price increase of real estates in Astana, Almaty, cities and the rest of Kazakhstan, respectively.

Robustness Checks

In order to test the validity of our results we conduct a series of robustness checks with our data. Namely, we experiment with the interval of analysis and different policy implementation date (placebo check). For brevity purposes, we will not be reporting regression tables. Instead, regression results will be summarized by tables with average marginal policy effect.

Other intervals

Strict Covid related restrictions in Kazakhstan, which have temporarily lowered prices and transaction volumes may have biased our final results upward. For this reason, we exclude 9 weeks of Covid restrictions and extend pre-treatment period by the same amount of time. Table 4 contains results from the specification with extended pre-treatment period.

Table 4. Average marginal policy effect with Covid restrictions period omitted

Region	D = 1	SE	t-stat	pvalue	95% CI LB	95% CI UB
Astana	0,0834	0,0103	8,0984	< 0.001	0,0629	0,1038
Almaty	0,0727	0,0145	5,0037	< 0.001	0,0439	0,1014
Cities	0,1167	0,0084	13,9404	< 0.001	0,1002	0,1331
Rest of Kazakhstan	0,1447	0,0204	7,0807	< 0.001	0,1044	0,1850

Note: Values in the column “D=1” represent the average marginal effect of policy implementation dummy when all other covariates are held at their means. Values provided in the last two columns represent the 95% confidence intervals.

As can be observed, omission of the period with strict mobility restrictions and extension of the pre-treatment interval yields very similar results. Average policy effect amounts to 8% in Astana, 7% in Almaty, 12% in cities, and 14% in the rest of Kazakhstan.

Another robustness check that can be carried out is to exclude observations right around the policy implementation date. Since it takes time for individuals to withdraw their pension savings and realize funds on the real estate market, policy effect may not be immediately reflected on housing prices and transaction volume dynamics. Moreover, the first week of the year in Kazakhstan contains two National holidays, which additionally limits the amount of activity on the housing market. On the contrary, historically, the weeks before New Year are associated with elevated activity on the real estate market of Kazakhstan. For the abovementioned reasons, we excluded 5 weeks around the policy implementation date and re-run our analysis. The findings are summarized on Table 5 below.

Table 5. Average marginal policy effect with 5 weeks around policy implementation date omitted

Region	D = 1	SE	t-stat	pvalue	95% CI LB	95% CI UB
Astana	0,1391	0,0134	10,4073	< 0.001	0,1125	0,1656
Almaty	0,1367	0,0176	7,7709	< 0.001	0,1019	0,1715
Cities	0,1602	0,0099	16,2462	< 0.001	0,1408	0,1796
Rest of Kazakhstan	0,1974	0,0216	9,1260	< 0.001	0,1548	0,2400

Note: Values in the column "D=1" represent the average marginal effect of policy implementation dummy when all other covariates are held at their means. Values provided in the last two columns represent the 95% confidence intervals.

Based on Table 5, we can observe that exclusion of interval around the policy implementation date produces sharper estimates. On average, prices are predicted to have risen by 14% in Astana and Almaty, 16% in Cities, and 20% in the rest of Kazakhstan. This potentially indicates that market participants needed some time to respond to the policy implementation.

Alternative policy implementation date (Placebo check)

In part, our results are based on the assumption that market participants responded to pension withdrawal policy after it was implemented on January 2, 2021. However, one may argue that individuals, construction companies or other entities have reacted to policy announcement date and changed their behavior and expectations after September 1, 2020. In that case, validity of our results may be in question. For this reason, we treat policy announcement date as a "policy in-effect" date and center 98-week analysis interval around the September 1, 2020. Table 6 below summarizes the results of such analysis.

Table 6. Average marginal policy effect around September 1, 2020

Region	D = 1	SE	t-stat	pvalue	95% CI LB	95% CI UB
Astana	-0,0144	0,0090	-1,5966	0,1136	-0,0323	0,0035
Almaty	0,0004	0,0249	0,0167	0,9867	-0,0488	0,0496
Cities	0,0042	0,0066	0,6392	0,5232	-0,0088	0,0172
Rest of Kazakhstan	0,0953	0,0157	6,0872	< 0.001	0,0644	0,1261

Note: Values in the column "D=1" represent the average marginal effect of policy implementation dummy when all other covariates are held at their means. Values provided in the last two columns represent the 95% confidence intervals.

As can be seen, marginal policy effect for Astana is negative and amounts to 1%. For Almaty and cities, marginal policy effect is close to zero. This suggests that it is unlikely that policy announcement had triggered price growth on the real estate market in these three localities. On the contrary, marginal policy effect is around 10% for the rest of Kazakhstan – a positive and statistically significant amount. It is possible that this effect reflects an increase in demand for housing in less densely populated areas after strict covid-related restrictions, rather than the effect of the program announcement. Nonetheless, while it seems that policy announcement has contributed to growth of prices in the rest of Kazakhstan, there is not enough evidence to conclude that announcement of the policy caused country-wide surge in housing prices.

Heterogeneity Analysis

We further complement our discussion with the analysis of the interaction between the pension withdrawal policy and preferential mortgage programs. For this purpose, we introduce an additional interaction variable $D_{it} \times Baspana\ Hit_{it}$ into the Equation 1, and re-estimate the model. The findings are shown on Table 7 below.

Table 7. Heterogeneity Analysis Results

	Astana	Almaty	Cities	Rest of Kazakhstan
D	0.0994***	0.0371**	0.0993***	0.186***
	(0.0119)	(0.0151)	(0.0101)	(0.0328)
T	-0.00243***	-0.00117**	-0.000143	0.000149
	(0.000425)	(0.000489)	(0.000159)	(0.000410)
D x T	0.00254***	0.00326***	0.00150***	-0.000452
	(0.000612)	(0.000678)	(0.000249)	(0.000558)
Baspana Hit	-0.213***	-0.355***	-0.337***	-0.497***
	(0.0142)	(0.0234)	(0.0124)	(0.0360)
D x Baspana Hit	-0.0216**	0.0478***	0.0217***	-0.0407
	(0.00969)	(0.0162)	(0.00812)	(0.0254)
Constant	7.611***	8.251***	7.043***	7.400***
	(0.0559)	(0.155)	(0.0687)	(0.152)
Observations	88,804	87,804	238,475	57,468
R-squared	0.240	0.493	0.424	0.404
Covariates	Yes	Yes	Yes	Yes

Clustered standard errors in parentheses
*** p<0.01, ** p<0.05, *p<0.1

Coefficients of the interaction variable ($D_{it} \times Baspana\ Hit_{it}$) from the Table 7 indicate that Baspana Hit dummy had a mixed effect on the price of a square meter after the policy was in effect. In Almaty and cities of Kazakhstan, the coefficient is positive and statistically significant, which suggests that apartments satisfying the conditions of the preferential mortgage programs experienced higher price increase compared to the properties that did not meet these requirements. In Astana, this coefficient is negative and statistically significant, which points to the opposite effect. This may be explained by a higher share of primary housing, prices for which are more regulated by the government and construction companies. As for the rest of Kazakhstan, coefficient of the interaction variable is insignificant. As before, we estimate the average marginal policy effect and provide it in the Table 8 below.

Table 8. Average marginal policy effect (Heterogeneity Analysis)

Region	D = 1	SE	t-stat	pvalue	95% CI LB	95% CI UB
Astana	0,1037	0,0128	8,1132	< 0.001	0,0783	0,1291
Almaty	0,0947	0,0109	8,6499	< 0.001	0,0730	0,1163
Cities	0,1307	0,0084	15,6264	< 0.001	0,1143	0,1472
Rest of Kazakhstan	0,1421	0,0224	6,3485	< 0.001	0,0980	0,1863

Note: Values in the column "D=1" represent the average marginal effect of policy implementation dummy when all other covariates are held at their means. Values provided in the last two columns represent the 95% confidence intervals.

Similar to the baseline results, heterogeneity analysis predicts positive and statistically significant growth of real estate prices across all regions of interest after policy implementation. Specifically, prices per square meter has grown on average by 10% in Astana, 9% in Almaty, 13% in cities, and by 14% in the rest of Kazakhstan.

6. Conclusion

The housing market plays a significant role in the well-being of Kazakhstani citizens, as real estate remains to be the primary asset on most households' balance sheets. Despite a high homeownership rate, the amount of floor space per capita in Kazakhstan remains low, which drives demand for housing. To improve the housing conditions of its citizens, the government of Kazakhstan has repeatedly introduced various state support measures, one of which was the early pension withdrawal program.

This paper evaluates the impact of the early pension withdrawal policy on Kazakhstan's housing market. Using a novel housing transaction dataset and Regression Discontinuity in Time Design, we analyze the price dynamics of housing units over an 11-month period surrounding the policy implementation date. We find that, over the period of the analysis, government intervention led to a 10% increase in real estate prices in Astana, 9% in Almaty, 13% in other cities, and 14% in the rest of Kazakhstan. These results have shown to be robust to alternative variations of the analyzed period.

Additionally, our findings highlight the need for further research into the effectiveness of this government initiative. While the policy improved housing conditions for some citizens through the withdrawal of pension surpluses, it may have decreased housing affordability for others due to the rapid rise in housing prices. Thus, our findings provide valuable insights for policymakers to further draft well-balanced housing policy.

The uniqueness of our research lies in the use of detailed housing transaction data from the GBD-RN – a database that has not previously been utilized in academic research. The GBD-RN enables us to incorporate information on both qualitative and quantitative characteristics of residential properties. Considering the level of detail and data time span, this database holds significant potential for further research, including studies that involve other granular data sources.

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Appendix A1. Detailed information on "Baspana Hit" and "7-20-25" preferential mortgage programs.

	Baspana Hit	**7-20-25**
Program duration	From November 2018 until December 2021	From 2018 until present
Mortgage conditions	• Down payment above 20% • Mortgage rate is equal to the base rate of the National Bank + 1.75% • Mortgage term up to 15 years • Both primary and secondary markets are covered	• Down payment above 20% • Mortgage rate 7% • Mortgage term up to 25 years • Only covers housing from primary market
Upper limits on property price	• Astana and Almaty: o 35 million tenge for housing from the primary market o 25 million tenge for housing from the secondary market • Cities of Aktau, Atyrau, and Shymkent: o 25 million tenge for housing from both primary and secondary market • City of Karaganda: o 20 million tenge for housing from both primary and secondary market • Other localities: o 15 million tenge for housing from both primary and secondary market	• Astana and Almaty: o 25 million tenge • Cities of Aktau, Atyrau, and Shymkent: o 25 million tenge • City of Karaganda: o 20 million tenge • Other localities: o 15 million tenge

Appendix A2. Detailed information on the timeline of measures related to the early pension savings withdrawals program.

Important dates	Description of the measure
September 1, 2020	Announcement of plans to introduce the early pension savings withdrawal measure within President of Kazakhstan State of the Nation Address.
December 23, 2020	the Parliament passed a law aimed at restoring economic growth, which included provisions for the use of pension savings for housing, medical treatment, or transfer to financial management organizations.
January 2, 2021	The President of Kazakhstan signed the Law of the Republic of Kazakhstan On Amendments and Additions to Certain Legislative Acts of the Republic of Kazakhstan on the Recovery of Economic Growth. Withdrawal of pension savings exceeding the "sufficiency thresholds" has become available.
January 6, 2021	JSC "Otbasy Bank" has been designated as an authorized operator for the targeted use of pension savings withdrawals.
January 14, 2021	UAPF published the "sufficiency thresholds" for 2021.
December 2, 2021	The law "On the Republican Budget for 2022–2024" has been signed, according to which the minimum wage and minimum pension will increase starting from January 1, 2022. Given changes to these two economic indicators, the minimum sufficiency thresholds have been re-estimated.
December 3, 2021	Announcement on the raise of the "sufficiency thresholds" starting from January 1, 2022.
December 9, 2021	Due to numerous citizen requests, the President has instructed the Government to postpone the raise of sufficiency thresholds until April 1, 2022.
December 13, 2021	Following the instructions of the President, by Decree of the Government of the Republic of Kazakhstan dated December 13, 2021 No. 875, the validity period of the minimum sufficiency thresholds, calculated for 2021, was extended until April 1, 2022.
April 1, 2022	Significant raise of the "sufficiency thresholds"

Appendix A3. Information on the level of minimal sufficiency thresholds by age of the UAPF contributor.

Age, years	From January 2, 2021 until March 31, 2022		From April 1, 2022 until December 1, 2022	
	Tenge	US Dollars[i]	Tenge	US Dollars
20	1 710 000	3 957	3 140 000	6 798
21	1 780 000	4 119	3 250 000	7 036
22	1 860 000	4 305	3 370 000	7 296
23	1 930 000	4 467	3 490 000	7 556
24	2 010 000	4 652	3 610 000	7 816
25	2 090 000	4 837	3 730 000	8 075
26	2 170 000	5 022	3 860 000	8 357
27	2 250 000	5 207	3 980 000	8 617
28	2 330 000	5 392	4 110 000	8 898
29	2 420 000	5 601	4 370 000	9 461
30	2 500 000	5 786	4 370 000	9 461
31	2 590 000	5 994	4 510 000	9 764
32	2 670 000	6 179	4 640 000	10 045
33	2 760 000	6 387	4 780 000	10 349
34	2 850 000	6 596	4 920 000	10 652
35	2 940 000	6 804	5 060 000	10 955
36	3 030 000	7 012	5 200 000	11 258
37	3 130 000	7 244	5 350 000	11 583
38	3 220 000	7 452	5 490 000	11 886
39	3 320 000	7 683	5 640 000	12 210
40	3 420 000	7 915	5 790 000	12 535
41	3 520 000	8 146	5 950 000	12 882
42	3 620 000	8 378	6 100 000	13 206
43	3 720 000	8 609	6 260 000	13 553
44	3 820 000	8 841	6 420 000	13 899
45	3 930 000	9 095	6 580 000	14 246
46	4 030 000	9 327	6 750 000	14 614
47	4 140 000	9 581	6 920 000	14 982
48	4 250 000	9 836	7 090 000	15 350
49	4 360 000	10 090	7 260 000	15 718
50	4 470 000	10 345	7 430 000	16 086
51	4 590 000	10 623	7 610 000	16 475
52	4 700 000	10 877	7 790 000	16 865
53	4 820 000	11 155	7 970 000	17 255
54	4 940 000	11 433	8 150 000	17 645
55	5 060 000	11 710	8 340 000	18 056
56	5 180 000	11 988	8 530 000	18 467
57	5 300 000	12 266	8 720 000	18 879
58	5 430 000	12 567	8 920 000	19 312
59-62	5 560 000	12 867	9 120 000	19 745

[i] For estimation of thresholds in US dollars, we used average exchange rate over the specified period.