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Macroprudential easing and mortgage borrower outcomes: Evidence from Ireland *

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Abstract

We examine key borrower level outcomes transmitted through Ireland's 2023 recalibration of the loan-to-income (LTI) limit for first-time buyers (FTBs), which increased the cap from 3.5 to 4. Employing identifying assumptions and propensity score matching on granular mortgage data, we compare the exposed FTBs (the treatment group) and second/subsequent buyers (SSBs, the control group) using a difference-in-differences design. Our findings show that the LTI easing led to an increase in credit for borrowers who were likely most affected by the limit, but this additional credit was used differently in Greater Dublin Area versus the Rest of the Country. Moreover, the LTI allowances (lending above the LTI limit) played an important role in facilitating access for lower-income borrowers before the easing, and we provide evidence that in the new framework, these borrowers are being facilitated credit as a result of the higher LTI limit, in line with the intended policy outcome.

Keywords: Macroprudential measures, LTI, LTV, mortgage, house price, leverage, borrower liquidity.
JEL codes: G21; G28; G51

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Non-Technical Summary

In January 2023, the Central Bank of Ireland recalibrated its mortgage rules by raising the loan to-income (LTI) limit for first-time buyers (FTBs) from 3.5 to 4. This adjustment was part of a comprehensive review of the mortgage measures framework conducted during the period 2021-2022, which sought to balance the resilience of the financial system with the need for broader access to credit. By increasing the maximum permissible borrowing amount relative to income for FTBs, the Central Bank aimed to maintain lending standards while easing the cost to households that had found it increasingly difficult to access the housing market.

We compare outcomes of this policy change across two borrower groups: FTBs, who saw a higher LTI cap, and second and subsequent buyers (SSBs), whose LTI limit remained fixed at 3.5. Employing a difference-in-differences methodology on rich, loan-level data before and after the policy change allows us to isolate the impact of the recalibration and control for macroeconomic developments. We can then attribute any relative shifts in FTB outcomes specifically to the LTI easing by observing how these two groups diverged in their borrowing and purchasing behaviour.

Our findings suggest that FTBs increased their average loan size by approximately 8.6% compared to levels anticipated under the old cap. This expanded borrowing capacity translated into a roughly a 5% increase in the value of the homes they purchased. When we delved deeper into what drove this rise in housing expense, we found no evidence that FTBs were simply acquiring larger dwellings. Rather, there was a notable 5 percentage point (p.p) increase in the likelihood that these borrowers purchased new builds.

The response of FTBs varied substantially by region. In the Greater Dublin Area (GDA), where housing supply is relatively less responsive, credit-constrained middle-income FTBs show a preference for more expensive homes. However, outside the GDA, middle-income borrowers tended to use their increased borrowing headroom to reduce the size of their upfront deposits, thereby bolstering their financial resilience.

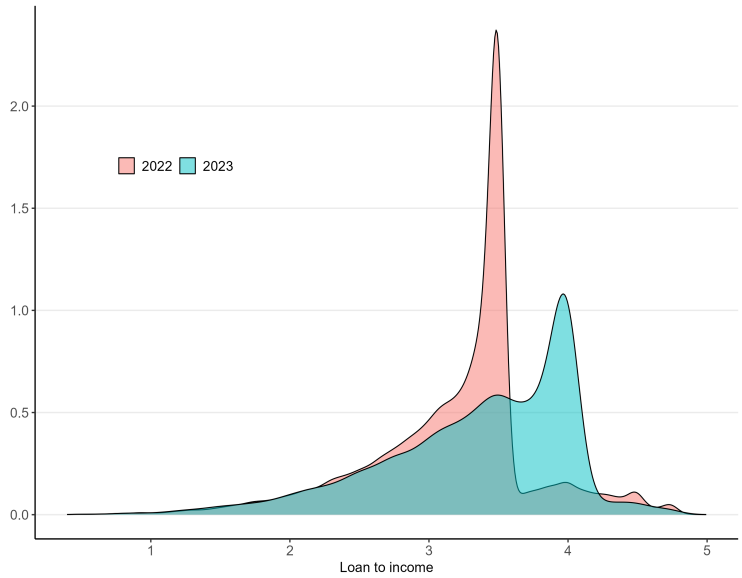
We also documented a shift in the composition of FTBs following the policy change. The share of younger FTBs rose by about 4 p.p., as did the share of those in lower income brackets; conversely, the share of older and higher-income FTBs reduced. Under the previous framework, banks could grant credit allowances permitting some borrowers to exceed the 3.5 LTI cap. With the cap raised to 4 uniformly for all FTBs, many who would have required these allowances could now qualify outright, enhancing the inclusivity of the mortgage market.

As a final check on our results, we compared affected FTBs with data from Northern Ireland, where no change to the LTI rule occurred during this period. Along with other robustness tests that we performed, this served to reinforce our main findings.

1 Introduction

Following the 2008 Global Financial Crisis, mortgage measures, such as loan-to-income (LTI) and loan-to-value (LTV) limits, have become central tools for mitigating systemic risks in housing markets (Alam et al., 2019). While extensive research examines the effects of tightening such measures, the easing of mortgage measures is rare and therefore remains understudied. This paper addresses this gap and examines the transmission of Ireland's 2023 LTI easing on key borrower outcomes, thus enhancing our understanding of the balance between costs and benefits of these measures.

Figure 1. LTI Distribution of FTBs Between 2022 and 2023



In January 2023, the Central Bank of Ireland (the Central Bank hereon) recalibrated its mortgage measures, increasing the LTI limit for first-time buyers (FTBs) from 3.5 to 4 while maintaining the LTV ceiling at 90%. This followed on from an in-depth review of the Mortgage Measures Framework that took place over 2021-22 (MMFR hereon). While MMFR re-affirmed the benefits of the measures, it also found that targeted changes to the framework were appropriate to re-balance the benefits and the costs of the measures.[1] Figure 1 illustrates the shift in the LTI distribution for FTBs before and after the policy change. Pre-reform, the distribution exhibited sharp bunching at the 3.5 threshold, reflecting binding constraints, albeit a proportion of new lending (up to 20%) was allowed

[1]Other changes made at this time include an increase in the LTV limit for SSBs to 80% and changes to the amount of lending allowed above the limits.

above the 3.5 limit as part of mortgage allowances. Post-reform, this bunching shifted markedly to the new 4 limit, indicating that FTBs used the expanded borrowing capacity.

This paper employs a difference-in-differences (DiD) design, exploiting the differential treatment between FTBs (exposed to the LTI recalibration) and second/subsequent buyers (SSBs, unaffected by the LTI change). The policy retained stricter LTI limits (3.5) for SSBs, creating a natural experiment to isolate the effects of LTI easing on FTB outcomes. By comparing trends in outcomes across these groups before and after the reform, the analysis identifies the causal impact of the policy while controlling for macroeconomic factors, such as tightening monetary policy during the same period, which affected both cohorts.

Using this empirical design, we study key questions regarding the impact of LTI easing and its transmission channels through the most affected borrowers. Our findings therefore are the Average Treatment Effect on the Treated (ATT). LTI/LTV caps are not intended to affect all borrowers equally; rather the main group of interest is primarily the borrowers who would otherwise borrow at higher leverage ratios. Therefore, the ATT by estimating the effect on the borrowers who are actually constrained by the policy is the candidate of interest for evaluating the effectiveness, distributional consequences, and calibration of such measures. On average, we find that the LTI easing increased loan size by 8.6% among treated borrowers, which translated into a 5% rise in housing value. We further investigate if this increase in housing value was driven by bigger and/or superior quality homes being traded under the loosened policy. To this, we find no evidence of bigger properties in terms of floor area, but a 5 percentage-point (p.p.) increase in the likelihood of purchasing newly constructed homes, thus indicating a fraction of higher housing value being driven by superior quality of the newly constructed properties transacted under the new policy.

In series of heterogeneity tests, we document stark regional and income differences thus highlighting the importance of using granular data to assess the impact of these changes on different cohorts of borrowers. The preference for more expensive houses is driven by credit-constrained middle-income FTBs in the supply-inelastic Greater Dublin Area (GDA).[2] On the other hand, middle and lower-income FTBs in the Rest of the Country (ROC) reduced deposits to enhance short-term liquidity; exhibiting an 18 p.p. higher likelihood of purchasing newly built homes respectively, partly attributable to the Help-to-Buy subsidy that only allows users to purchase new builds.

[2] CBI (2024) documents that the housing supply has been much weaker in Dublin city and other urban areas, whereby Dublin and its Eastern and Midland regions (including commuter counties of Meath, Kildare and Wicklow) does not currently have adequate volumes of zoned land relative to its population.

With regard to the impact on the market access and extensive margin adjustments, we also investigate the effect of LTI easing on the composition of borrower age and income in the mortgage market. Following the empirical approach by Peydró et al. (2023), we find a 4 p.p. increase in the share of younger treated FTBs and a similar increase in the share of lower-income FTBs after the policy easing.[3] Furthermore, we find that the increase in the proportion of lower-income borrowers is sensitive to the inclusion of allowances (exceeding the LTI cap of 3.5 in our sample) in the pre-LTI recalibration period. This finding highlights the important role played by allowances in the mortgage measures framework, facilitating the entry of borrowers who face affordability issues. The recalibration of the FTB LTI limit shifted the emphasis in the framework from the allowances to lending within the new, higher LTI limit, thus reducing the importance of allowances in overall credit allocation.

An important caveat for our empirical findings is that, by the nature of our research design, we cannot rule out the possible general equilibrium (GE) effects on both treated and control groups through higher demand in the housing market overall. The validity of our DiD design relies on the parallel trends not being violated after the policy change. If the overall demand pressure in the housing market affects both FTBs and SSBs, this may introduce bias to our DiD estimate. To assess the extent of this potential bias introduced by the GE effect, in Section 6.2, we conduct a robustness check using mortgages originated in Northern Ireland as the control group. This allows us to limit any direct spill-over of the policy change from the treated FTBs to the control units since the Irish policy change should not affect the UK housing market. The results from this robustness check confirm positive and significant effects for both loan size and housing value, thus validating our main findings.

Our analysis most closely aligns with research on the effect of mortgage measures in Ireland and the UK. Acharya et al. (2022) examine Irish mortgage data following 2015 LTV/LTI implementation, finding that banks: (i) reallocated portfolios toward high-income borrowers purchasing expensive properties, (ii) increased credit supply to risky firms, and (iii) expanded holdings of risky securities. Higgins (2024) compare LTV and LTI effects on housing choices, showing LTI constraints more strongly transmitted borrowing restrictions into price reductions through purchases of cheaper homes, while LTV-constrained buyers maintained home prices by increasing down payments. Peydró et al. (2023) study UK's 2014 LTI cap, revealing reduced high-LTI mortgage issuance concentrated among low-

[3]This adjustment is balanced with a corresponding decline in the share of older and higher income treated FTBs.

income borrowers through constrained lenders, mirroring Acharya et al. (2022)'s findings on credit reallocation.

The primary contribution of our paper lies in providing novel evidence on distributional effects of policy easing, which are rare so far. Existing literature contains only two studies of LTV easing: McCann and Durante (2022) analyze Ireland's 2016 First-Time Buyer LTV simplification (80-90% sliding scale to flat 90%), finding treated borrowers retained liquidity through reduced down payments rather than purchasing costlier properties. This finding is confirmed by Hodula et al. (2023) studying the effect of LTV easing and abolition of debt-to-income (DTI) as well as debt-servicing-to-income limits in Czech Republic. They find that LTV-constrained borrowers showed signs of cash-retention behavior while DTI- and DSTI-constrained borrowers bought more expensive houses. Tracey and van Horen (2023) examine the UK Help-to-Buy scheme, showing relaxed down payment constraints increased homeownership across income groups but most significantly among higher-income households. To our knowledge, this study constitutes the first systematic evaluation of LTI policy easing and its distributional impacts.

This paper is also broadly related to international studies documenting the trade-offs faced by borrower-based measures (BBM) regulations. On the one hand, Armstrong et al. (2019) find that New Zealand's LTV restrictions slowed house price growth, with policy effectiveness depending critically on initial price growth rates during implementation. Similar dampening effects on the house price growth are documented by Johnson (2020), Chi et al. (2023), and Laufer and Tzur-Ilan (2021). On the other hand, this literature also reveals unintended distributional consequences including delayed homeownership, liquidity constraints, altered location choices, increased commuting costs, and displacement to less advantaged neighborhoods. Van Bekkum et al. (2024) analyze Dutch data to identify a critical trade-off between solvency and liquidity under LTV caps, finding that liquidity-constrained households delay homeownership transitions. Aastveit et al. (2021) demonstrate that Norwegian LTV regulations reduce leverage while amplifying consumption volatility following income shocks. Regarding housing choices, Bolliger et al. (2025) show Swiss LTV caps reduce homeownership rates by 8% for the lowest income quintile while leaving top earners unaffected. Eerola et al. (2023) report 17% reductions in homeownership transitions among low-income Finnish households under LTV restrictions. Tzur-Ilan (2023) employ regression discontinuity analysis to show Israeli households near LTV thresholds purchase smaller or lower-quality homes.[4] In this paper, we provide new

[4]Additional contributions include Abreu et al. (2024), Barmeier and Scheuerer (2024), and Cesnak et al. (2025), among others.

evidence of how the LTI easing in Ireland affected borrowing outcomes by leveraging micro-data to estimate the causal effects of the policy in a partial equilibrium setup. Overall, with this research we highlight the trade-offs faced by the macroprudential authorities as well as provide a complementary piece to a more aggregate GE assessment of economy-wide effects of both LTI and LTV recalibration.[5]

The paper proceeds as follows: section 2 outlines Ireland's macroprudential framework; section 3 details data and methodology, section 4 discusses conceptual framework and empirical model; section 5 presents results; while robustness checks are discussed in section 6. The paper concludes in Section 7 along with policy implications.

2 Context: Macroprudential Mortgage Measures

The Central Bank introduced borrower based macroprudential measures in February 2015. Primarily, the measures aim to ensure sustainable lending standards in the mortgage market. In doing so, the Central Bank aims to prevent the emergence of an unsustainable relationship between credit and house prices and support the resilience of borrowers, lenders, and the broader economy. These measures entailed borrowing limits introduced through both LTI and LTV ratios at mortgage origination, with differential levels across FTBs, SSBs and BTLs respectively.

At the outset, the LTV ratio for FTBs was fixed at a maximum of 90 per cent of the house price for valuations under €220,000; while 80 per cent for all purchases above this threshold. Following a change in January 2017, the LTV ratio for all FTBs was fixed at a maximum of 90 per cent irrespective of the house price. For SSBs, the LTV ratio was introduced at a flat 80 per cent, while for BTLs the LTV ratio was set at a maximum of 70 per cent. With regards to LTI, for both FTBs and SSBs, the ratio was fixed at a maximum of 3.5 of gross annual borrower income, with no limit imposed on the BTL borrowers.

A certain amount of new lending was allowed above these limits (the allowances) each year, and some changes were made to these allowances along with other operational changes arising from the annual reviews from 2016-2021. These allowances were aimed to provide flexibility for individual circumstances (e.g. a single applicant) to be taken into account by lenders and for issues faced in certain segments of the market (e.g. borrower in Dublin) to be addressed. For example, Kelly et al. (2021) show that in 2020 both FTBs and SSBs securing an allowance were more likely to be single applicants, on average

[5]This research focuses only on the LTI easing from 3.5 to 4 targeting FTBs. A more complete assessment, taking into account the LTV recalibration from 80% to 90% for SSBs, would be a worthy candidate for future research.

two to four years younger, and purchasing in Dublin. Within Dublin, it was found that allowance applicants, on average, had higher loan size and purchase price while lower incomes as compared to borrowers without an allowance. This indicates how allowances have been critical in preserving the inclusivity based on regional dynamics and borrower heterogeneity. As part of the framework, the proportion of allowances were determined at the level of individual limits and regarded complex.

Over the course of 2021-22, the Central Bank conducted a comprehensive review of the overall mortgage measures framework, with the objective of ensuring their appropriateness in light of the changing economic landscape and financial developments in the country over the period since they were first introduced in 2015.[6] The review was based on a thorough assessment of available evidence, international comparison and engagement with the public and other stakeholders (CBI, 2022). The MMFR concluded that BBM remained essential part of the Central Bank's macroprudential toolkit and had operated as intended. However, a targeted recalibration to balance the costs and benefits of these measures was deemed appropriate. As a result, the limits on LTI and LTV ratios were amended to re-balance the costs; albeit, in a targeted fashion across the FTBs and SSBs, coming into effect on 1st January, 2023.

Under the re-calibration, the LTI ratio for FTBs was loosened from 3.5 to 4, while the LTV ratio remained fixed at 90 per cent, just as before. On the other hand, the LTV ratio for SSBs was loosened from 80 per cent to 90 per cent, while the LTI remained fixed at 3.5, just as before.[7] For allowances, the MMFR concluded that they remained important and decided to simplify them with a proportion of lending (15 per cent) above the limits (LTI and LTV) at the level of borrower-type (FTBs and SSBs), rather than at the level of individual limits. In this research, we primarily focus on the FTB component of LTI easing from 3.5 to 4, studying a number of borrower level outcomes.

3 Data and Identification

3.1 Data: *Monitoring Templates* of the Central Bank

We use the Monitoring Templates data (MTD) collected bi-annually by the Central Bank. MTD is a detailed cross-section of mortgage data reported by Irish banks and non-banks

[6]Mortgage Measures, available here: https://www.centralbank.ie/financial-system/financial-stability/macro-prudential-policy/mortgage-measures. Accessed on 4th March 2025.

[7]The measures introduced no changes to the LTV for BTL borrowers, remaining unchanged at 70 per cent.

lending over €50 million in a six month period. The dataset holds rich information on loan characteristics such as the loan size, loan term, interest rate, total deposit, the LTI and LTV ratios as well as borrower characteristics such as total income, age and occupational status. Additionally, MTD also provides other relevant information such as the collateral value and location (county), buyer status (FTB or SSB) and property type.

Our analysis uses MTD sample from 2022 to 2024H1, excluding early months of new mortgage measures from Jan-March, 2023. This exclusion removes any cases in our sample where an application was made in 2022 under the old limits, but was approved in 2023. In total, we end up with 12 months of pre-policy change, and 15 months of post-LTI recalibration regime.

3.2 Identification: *Difference-in-difference* method

We aim to estimate the causal effect of LTI easing with the argument that the recalibration created exogenous variation in terms of mortgage availability for FTBs. A simple comparison in key outcomes like mortgage credit, housing value, deposit, etc. between FTBs in the pre and post LTI easing period respectively would suffer from classic micro-econometric research concerns arising from presence of confounding factors due to exposure to structural macroeconomic changes in the housing market in tandem to this policy change. For example, the LTI revision implemented in January 2023 overlaps with several rounds of European Central Bank's (ECB) tightening of key policy rates. As a result, it is rather challenging to isolate the effect of LTI revision on key outcomes from these broader macroeconomic changes.

To address these concerns, we deploy a traditional difference-in-difference (DiD) identification strategy. This is with the crucial assumption that any difference between treated and control buyers across the pre and post LTI easing periods is not attributed to broader macroeconomic changes that coincided with the macroprudential policy revision. Moreover, we observe distinct mortgage transactions in each of our four groups (pre-treated, pre-control, post-treated, and post-control), rather than a panel data setup, using this to our benefit as our principal focus is on distinct FTB responses during their respective mortgage originations across the four groups. In order to meet the standard pre-requisites of employing the DiD, we use judgement in deciding the pre and post periods around the LTI recalibration, as well as impose certain restrictions on the choice of both treatment and control groups. These are discussed in the next sub-section.

3.3 Sample Selection: Period, Treatment and Control

Given, that LTI easing for FTBs was taken into effect after 1st January 2023, we consider all mortgage approvals in 2022 to be covered within the pre-LTI easing period. On the other

hand, for the post-LTI easing period, we consider all mortgage approvals beginning from 2023Q2 to 2024H1. Here, as mentioned earlier, we exclude first quarter of 2023 to allow for policy implementation lag due to difference in mortgage application date and approval date.

For the choice of borrower samples, *as discussed in the introduction, we choose to estimate ATT, which is directly relevant for answering our policy questions*, we employ separate criteria to choose the treatment and control groups. Specifically, in order to identify the 'treated' buyers, we employ certain identifying assumptions. First, we restrict the treatment group to FTBs only, since the easing of LTI ratio from 3.5 to 4 targeted only FTBs. Second, to capture the most policy exposed buyers within the broader set of FTBs, we consider treatment to comprise FTBs who borrowed with 3-3.5 and 3-4 LTI ratio under the pre and post LTI regimes respectively. This is because, outside of allowances at the lender discretion, the LTI ratio was most restrictive to FTBs closer to 3.5 in the pre-LTI easing period, thus making them most affected group to the recalibration of LTI ratio from 3.5 to 4 in the post policy period.

Third, we exclude FTBs with LTV ratio of 90 per cent (or above)[8] across both pre and post-LTI revision periods. We employ this condition to remove borrowers for whom the LTV limit was binding at 90 per cent. This allows us to distil our treatment group, which is more likely to be exposed to LTI ratio induced credit constraints in the pre and post-LTI revision periods. This is an important criterion because FTBs whose credit availability is bounded by the LTV restriction at 90 per cent (or above) would continue to remain unaffected in terms of credit availability despite the easing of the LTI ratio. Fourth, we remove from our treatment FTBs with LTI ratio between 3.49 and 3.51 in the post-LTI revision period to exclude the bunching from mortgage lending that may have happened at the old LTI limit of 3.5. This is an additional layer to minimise any further cases in our sample where an application was made in 2022 under the old limits, but was approved in 2023Q2 onwards.[9] Finally, we exclude any allowances in our sample granted to mortgages that allowed LTI to exceed 3.5 in the pre-LTI easing period. This increases our sample precision by focusing on instances where the LTI limit was binding for FTBs. However, mortgage allowances with

[8]LTV ratio over 90 per cent for FTBs can arise in cases where such an allowance has been provided by individual banks. These allowances are excluded once we restrict the treatment group to include only mortgages below 90 per cent LTV.

[9]The first layer being removal of mortgage applications in 2023Q1, as mentioned earlier.

LTI ratios exceeding 3.5 remained an essential part of mortgage approvals. Therefore, their exclusion is likely to introduce an upward bias in our main results.[10]

Similar to the approach undertaken to identify '*treatment*' borrowers, we once again employ a range of identifying assumptions to obtain a reasonable counterfactual or '*control*' borrowers. Specifically, we restrict the control group to include only SSBs, since the easing of the LTI ratio targeted only FTBs. Therefore, the LTI ratio remained unchanged at 3.5 for SSBs post the implementation of the new mortgage measures in January 2023. Second, to introduce exogenous variation from LTI easing across the treatment group we further restrict our control group to include SSBs with LTI ratio from 3-3.5 across both pre and post-LTI recalibration periods. This also allows us to draw a comparable set of buyers in the control group that remain restricted by LTI cap of 3.5 in both periods, unlike the treatment sample that witnessed mortgage applications with LTI ratios from 3-4 post-LTI revision. Moreover, similar to the treatment group, we exclude any allowances within our control group for lending over LTI ratio of 3.5 in both periods.

Although unaffected by the LTI change, using SSBs as a control group introduces a critical challenge, given that the new mortgage measures simultaneously changed the upper-limit of LTV ratio from 80 to 90 per cent for SSBs.[11] This was in tandem to the LTI revision introduced for FTBs as part of the mortgage measures review, as discussed earlier in section 2. Hence, for us to assess the exogenous variation created only within the treatment group, it is necessary that our control remains free from this parallel LTV policy change targeting the SSBs. We deal with this challenge by excluding all SSB mortgage lending over LTV ratio of 79 per cent from the control group in both pre and post periods. Fundamentally, this makes our control and treatment groups comparable in two ways; first, since the lending in both periods is originated at LTV below 80 per cent, we successfully exclude from our control the borrowers who were exposed to the LTV revision from 80 to 90 per cent in the post period. This artificially generates a control sample, which remains unexposed to the macroprudential LTV recalibration for SSBs, introduced in tandem with the LTI revision for FTBs. Second, by limiting SSB lending below LTV ratio of 80 per cent, we exclude cases where credit in our control group was potentially bound by the LTV limit and not necessarily

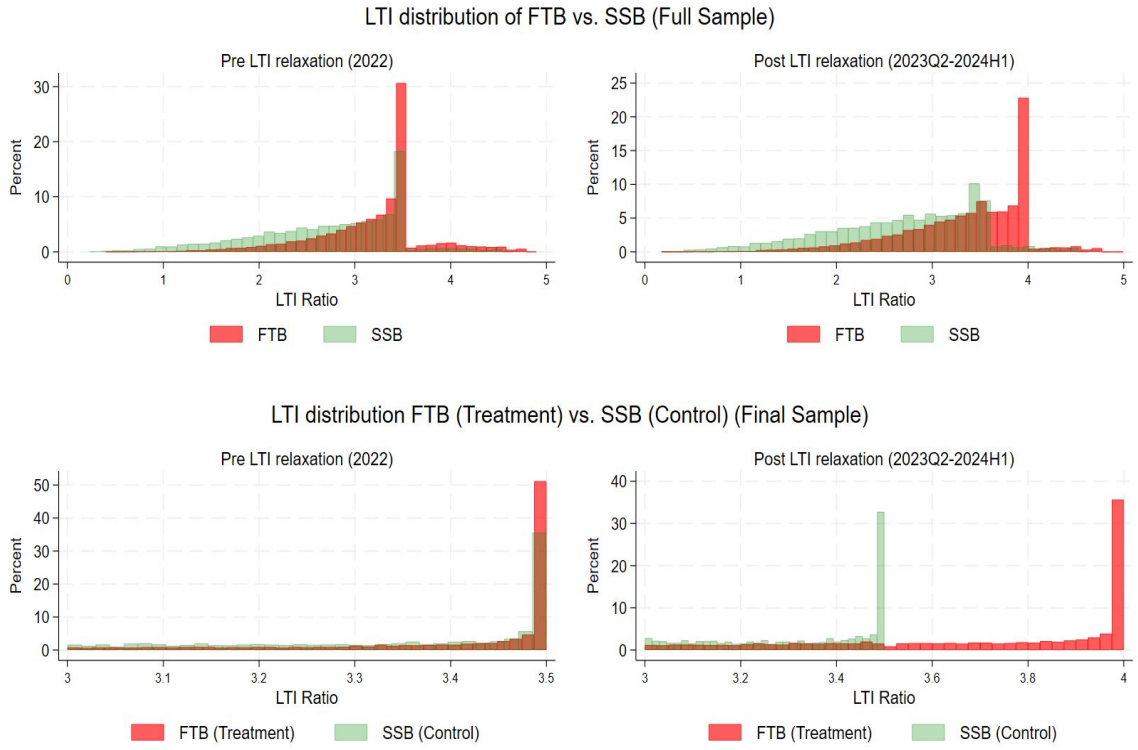
[10] We address the loss in information from excluding the LTI allowances in the pre-period and the bunching around 3.5 by relaxing these assumptions. The respective discussion is presented in main results in section 5 and robustness check discussed in section 6.1.

[11] Using a control group from the same housing market also makes it vulnerable to indirect changes flowing from the treatment group. We address these concerns in robustness check in section 6.2.

by the LTI in the pre period. This is analogous to the restriction imposed in our choice of the treatment group that excludes any lending with LTV ratio at 90 per cent or over.

Figure 2 shows the distribution of LTI ratios across the FTBs and SSBs denoted by red and green bars respectively. In the top panel, the LTI distribution is shown across the full sample, such that we observe bunching at upper LTI limit of 3.5 in pre period for both FTBs and SSBs (top left panel). As expected, with the easing of LTI ratio from 3.5 to 4 for FTBs in the post period, we observe a shift in the bunching across FTBs from 3.5 to 4 (top right panel). Since, this top panel represents the full sample including any allowances made by individual banks; we observe a share of mortgage lending that exceeds the upper cap of LTI ratio for both FTB and SSB groups in both periods.[12]

Figure 2. Distribution of LTI across Treatment and Control in Pre (Left Panel) and Post (Right Panel) before sample restrictions (top) and after sample restrictions (bottom)



The lower panel of Figure 2 shows the LTI distribution of our treatment and control groups derived from the full sample of FTBs and SSBs (top panel). As discussed earlier, we

[12]The allowances cover mortgage lending over LTI ratio of 3.5 for both FTBs and SSBs in the pre-LTI recalibration period, while over 3.5 for SSBs and over 4 for FTBs in the post-LTI easing period.

derive these using several identifying assumptions. Quite clearly, the distribution confirms exclusion of mortgages with allowances over the upper LTI limits, as well as the bunching across treatment group between 3.49 and 3.51 in the post period. More important, the lower panel of Figure 2 also highlights our selection of treatment with LTI ratios from 3-3.5 in the pre period, while 3-4 in the post easing period. For the control, the LTI distribution remains unchanged at 3-3.5 in both periods. Enforcing the identifying restrictions allows us a coverage of 34.4 per cent.[13]

3.4 Descriptive Statistics

In Table 1, we report descriptive statistics for key mortgage and borrower specific characteristics across treatment and control groups in the pre and post-LTI easing periods. This forms the main descriptive evidence used in the analysis, while the broader summary statistics covering the full sample, detailed borrower comparisons, and income distributions are provided in the Appendix (Tables A.1.1, A.1.2, A.1.3, A.1.4).

Table 1. Treatment (FTBs) and Control (SSBs) in Pre (2022) and Post (2023Q2-2024H1)

Variables	Pre (2022)			Post (2023Q2-2024H1)		
	Control N=2,628	Treatment N=9,210	Diff. (T-C)*Pre* Pre	Control N=2,014	Treatment N=10,841	Diff. (T-C)*Post* Post
Housing Value (€)	545,679	348,887.2	-196,792	575,487.4	389,271.5	-186,216
Loan Size(€)	333,832.6	258,012.3	-75,820.3	346,424.1	290,081.1	-56,343
Total Deposit (€)	211,846.4	90,874.9	-120,972	229,063.3	99,190.4	-129,873
LTV (%)	62.8	75	12.2	61.9	75.4	13.5
LTI	3.4	3.4	0	3.3	3.7	0.4
Total HH Income	103,759.3	76,209.6	-27,549.7	107,545.6	78,954.3	-28,591.3
Borrower Age	41.1	35.1	-6	41.2	35.2	-6
House size (sq. m.)	159.3	126	-33.3	156.3	122.1	-34.2
Housing Val./sq. m.	3,838.4	3,106.7	-731.7	4067.2	3,548.7	-518.5
New Prop.	0.3	0.4	0.1	0.2	0.4	0.2

Source: Monitoring Templates Data from Central Bank of Ireland

The comparison in Table 1 suggests that, on average, housing value (purchase price), unit housing value (purchase price/sq. m.), and loan size across the control vis-à-vis treatment group is higher across both periods, with the differential being larger in the pre period. This fall in the differential for housing value (€196,792 in pre vs. €186,216 in post), unit housing value (€731 in pre vs. €518 in post), and loan size (€75,820 in pre vs. €56,343 in post) appears to be driven by average increases noted across treatment FTBs in the post period. This is intuitive given their exposure to higher mortgage availability from the LTI easing. We

[13]We arrive at a final sample of 20,052 in the treatment group and 4,642 in the control group (total of 24,694 buyers) across the pre and post LTI-easing period. This compares to 51,114 FTBs and 19,335 SSBs (a total of 70,449 buyers) in the same period.

confirm this from the LTI differential between treated and control buyers across the two policy regimes (0 in pre vs. 0.4 in post), whereby LTI ratios increase from 3.4 to 3.7 amongst the treated FTBs. Thus, on average, we observe a higher rate of increase for mortgage size, per unit and overall housing outlay across the treatment buyers, narrowing the housing and credit gap with the control group in post-LTI easing period.

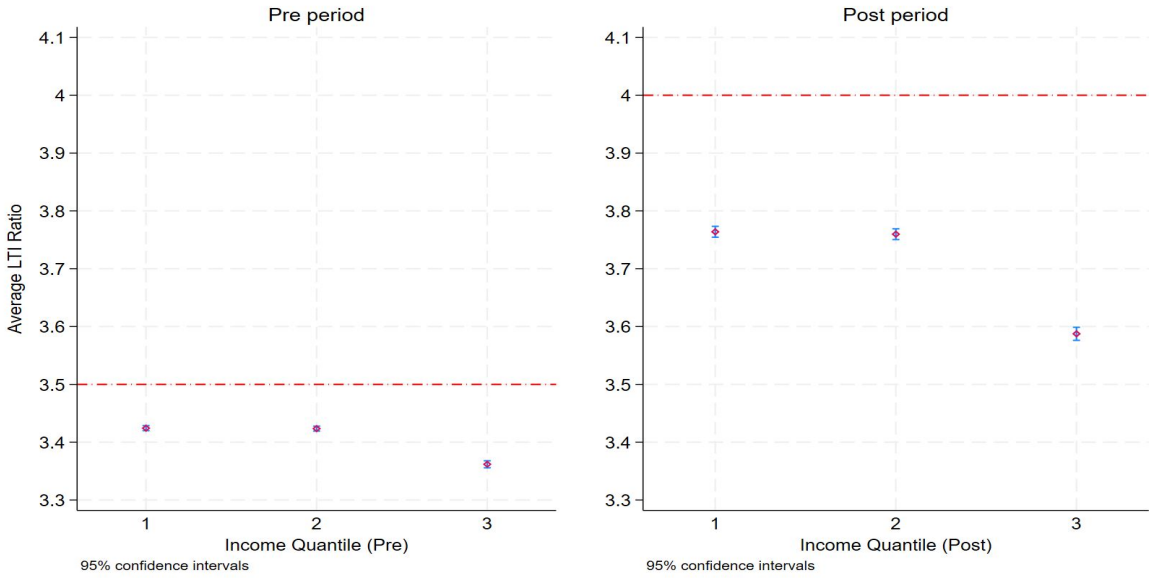
Moreover, in terms of the deposit, the average values are higher across the control group in both periods, with the differential increasing from pre to post-LTI easing period (€120,972 in pre vs. €129,873). Finally, the differential between treatment and control group for other characteristics like LTV, total household income, borrower age, and house size remain stable across two periods.

An important focus of this study is uncovering the heterogeneity across income groups in our sample. We pursue this by dividing our sample into three income quantiles in the pre and post-LTI easing periods respectively. The underlying distribution is reported in Appendix Table A.1.3, while the regional breakdown is shown in Table A.1.4. Importantly, the quantile split considers only the identified sample of the treated (FTBs) and control (SSBs) buyers, as described earlier in section 3.3. GDA being more economically active holds a larger share of higher-income buyers, while the lower-income quantiles are more represented in the ROC.[14]

Finally, in Figure 3 we look at the distribution of average LTI ratio for the treated FTBs across the three income quantiles in both pre and post LTI-easing periods. Given the maximum allowable ratio of 3.5 in the pre-period, the graph clearly captures higher credit utilisation across the lowest and middle-income borrowers with average LTI at 3.42 each. This implies relatively higher degree of credit constraint in this group, relative to the top income quantile. Importantly, following the LTI-easing, we observe maximum response in credit utilisation within these two groups, much in line with the findings of Ortalo-Magne and Rady (2006), Landvoigt et al. (2015), and more recently van der Drift et al. (2023).

[14]We do not obtain income quantiles separately across GDA and ROC, rather work away with the national split, putting them into their respective buckets as per the region of housing transaction, as shown in Table A.1.4. This allows us to explore income dynamics beyond the local context.

Figure 3. Distribution of LTI for Treated FTBs across Income quantiles



4 Transmission Channels, Empirical Model and Parallel Trends

4.1 Transmission Channels

The LTI easing for FTBs created a pseudo-experimental setting to examine borrower responses through a set of interrelated mechanisms. A primary implication of the increase in LTI limit from 3.5 to 4 is availability of higher mortgage credit at the point of origination. This additional headroom may manifest through adjustments in borrower liquidity, changes in housing value and choice, or shifts in the overall composition of mortgage applicants. It should be noted that this likely increase in mortgage credit is conditional on the LTI ratio binding at 3.5 before LTI recalibration and that the LTV ratio remained lower than the 90% limit, thus allowing headroom for more credit.

An immediate response to increased borrowing capacity may be reflected in improved liquidity resilience. Borrowers who continue to purchase properties of similar value under the higher LTI limit can reduce the size of their deposit. This easing of upfront deposit requirement allows such borrowers to retain more liquid resources at the time of purchase, thereby improving financial resilience in the short term. Even in a dynamic housing market where structural factors lead to upward shifts in property values, the easing of LTI limit serves to partially offset the increased deposit burden by enabling larger mortgages within

the allowable LTI upper limit. To assess this channel empirically, we test the following hypothesis:

Hypothesis 1*: The LTI easing increased borrower liquidity by reducing average deposit by treated FTBs, relative to the control SSBs.*

Alternatively, borrowers may choose to maintain their deposit levels and instead allocate the additional mortgage credit towards purchasing more expensive properties. This channel reflects increase in the housing value where this does not reflect underlying change in quality. In line with Greenwald and Guren (2021) this effect is likely to be more pronounced in urban or supply-inelastic areas, where the housing stock is less responsive to short-run demand changes. This leads to our second hypothesis:

Hypothesis 2*: The LTI easing led to an increase in the average house price paid by treated FTBs, relative to the control SSBs.*

This borrower response may also extend to changes in the nature of housing acquired. In particular, higher mortgage capacity may enable FTBs to access larger, better quality and/or better located dwellings. We test this by investigating if the increase in housing value was driven by larger homes being purchased. Moreover, we also test for the purchase of newly constructed houses, which tend to be of higher quality or energy efficiency. Importantly, the purchase of newly constructed dwelling may be reinforced by complementary policies such as the Help-to-Buy (HTB) scheme, which is exclusively applicable to new builds. As a result, the interaction between the LTI easing and targeted subsidies can amplify the uptake of such properties. To examine this mechanism, we test the following hypothesis:

Hypothesis 3*: The LTI easing led to an increase in the average house size and the likelihood to purchase newly constructed homes by treated FTBs, relative to the control SSBs.*

Beyond these channels, the LTI recalibration may also influence the composition of mortgage borrowers entering the market. By expanding credit availability, the LTI easing can reduce the time needed for potential borrowers- especially those with lower incomes or at earlier stages in the life cycle to accumulate the required deposit. This has implications for the extensive margin, where younger and lower-income households, unable to access housing with lower credit under the 3.5 LTI regime, may now increase their mortgage credit under the new loosened limit. Such a change in borrower composition would be reflected in proportional increase in lower income and younger FTBs following the policy change. We test this by assessing the following hypothesis:

Hypothesis 4*: The LTI easing increased the share of lower-income and younger borrowers among treated FTBs relative to control SSBs.*

4.2 Empirical Model and Parallel Trends

As mentioned in section 3.2, our assessment relies on difference-in-difference estimation. Equation 1 shows our regression specification, where dependent variable 'Y_{igt}' captures the key borrower outcome in terms of the loan size, as well as outcomes associated with transmission channels explained in section 4.1 for borrower '*i*' in group '*g*' (treatment or control) in period '*t*' (pre or post). For testing hypothesis 1, 'Y_{igt}' takes individual housing deposit as the main dependent variable, while for hypothesis 2 and 3, the dependent variables include housing value (price paid for the house), house-size, and a dummy variable capturing purchase of a newly constructed house respectively.[15]

$$Y_{igt} = \alpha + \beta(Post)_t + \gamma(Treatment)_g + \theta(Post_t * Treat_g) + (\textbf{\textit{Controls}})_{igt}\delta + \epsilon_{igt} \quad (1)$$

Finally, for hypothesis 4, we run separate regressions across each borrower groups based on income and age to capture distinctively the transmission of LTI easing, following Peydró et al. (2023). Specifically, to capture changes in the composition of borrowers in the lowest income group, we construct a binary dependent variable 'Y_{igt}' that takes the values as 1 if the borrower was categorised into lowest income quantile (denoted by *'i'* here) (and 0 otherwise).[16] The regression setup, as shown in Equation 1, then allows us to model any changes in the borrower composition in this cohort as a result of LTI easing.[17] Using the same setup, we repeat this regression with separate dummy variables in 'Y_{igt}' capturing borrowers in the $i\epsilon(middle, top)$ quantiles respectively. Separately, for the age-composition, we follow the same approach and conduct three regressions modelling dummy variables in 'Y_{igt}' for composition in $i\epsilon(youngest, middle, oldest)$ quantile respectively.[18]

The right hand side variables in Equation 1 include dummy variables '*Post*' capturing the post-LTI easing period (2023Q2-2024H1) and '*Treatment*' capturing the treated FTBs. The key coefficient of interest is 'θ' capturing the '*DiD*' estimate that represents the change in '*Y*' between the treatment and control FTBs across the post and pre-LTI easing periods. The vector '*Controls*' consists set of control variables across borrower characteristics including

[15] We employ a linear probability model to estimate the probability of new-build purchase, which is a binary variable taking the value of 1 and 0 otherwise.

[16] Distribution of borrowers in three income quantiles is shown in Table A.1.3. The allocation of borrowers in each quantile is done separately for the pre and post-LTI easing periods considering distinct income distribution in the two (pre and post) periods.

[17] We employ a linear probability model to estimate the changes in borrower composition (income and age) being a binary variable taking the value of 1 and 0 otherwise for each groups respectively.

[18] The details on distribution of age quantiles is shown in Table A.1.5 in Appendix A.

age, age sq., occupation, household income, bank provider, house type, a dummy for new build and an interaction between house type and new build dummy.[19] Further, the regression controls for county dummies to capture geographical variation, while also clustering the standard errors at this level.

The DiD regression model, as shown in Equation 1, is estimated on a region of common support with the use of weights derived from propensity score matching (PSM) of the treated FTBs and control SSBs separately for pre and post-LTI easing periods. PSM-DiD is employed to alleviate any remaining concerns regarding the comparability of the control and treatment group across the two policy periods. The matching is conducted on individual factors such as borrower age, occupation, income deciles, banking institution, interest rate type and sales channel using kernel type matching algorithm.

Empirical assessments employing DiD must always ensure that the policy unaffected control group represent a reasonable counterfactual for the policy exposed treatment group. This is important as this establishes, with reasonable approximation, for what would have happened to the treated in absence of the policy intervention. We test this assumption by observing the parallel trends that dictate, for the correct identification, the treatment and control should evolve along the same trend during the pre-LTI easing period; albeit, they do not need to be observably identical and therefore can have level differences.

We proceed to conduct a statistical event-study check to validate the parallel trends assumption. These are presented in Figure 4, where we graph point estimates of the regression coefficient on the interaction of treatment dummy with quarters in pre and post-LTI easing period for our key outcome variables pertaining to the hypotheses discussed in section 4.1 These include loan size, house price and deposit, and proportion of new build purchases, with the borrower-composition plots shown in Figure A.1 in Appendix A.[20] Here,

[19] We omit bad controls depending upon the dependent variable for testing each hypothesis. Hence, not all variables listed as part of controls are used for every regressions. We provide detail on the variables included in each model in table of results.

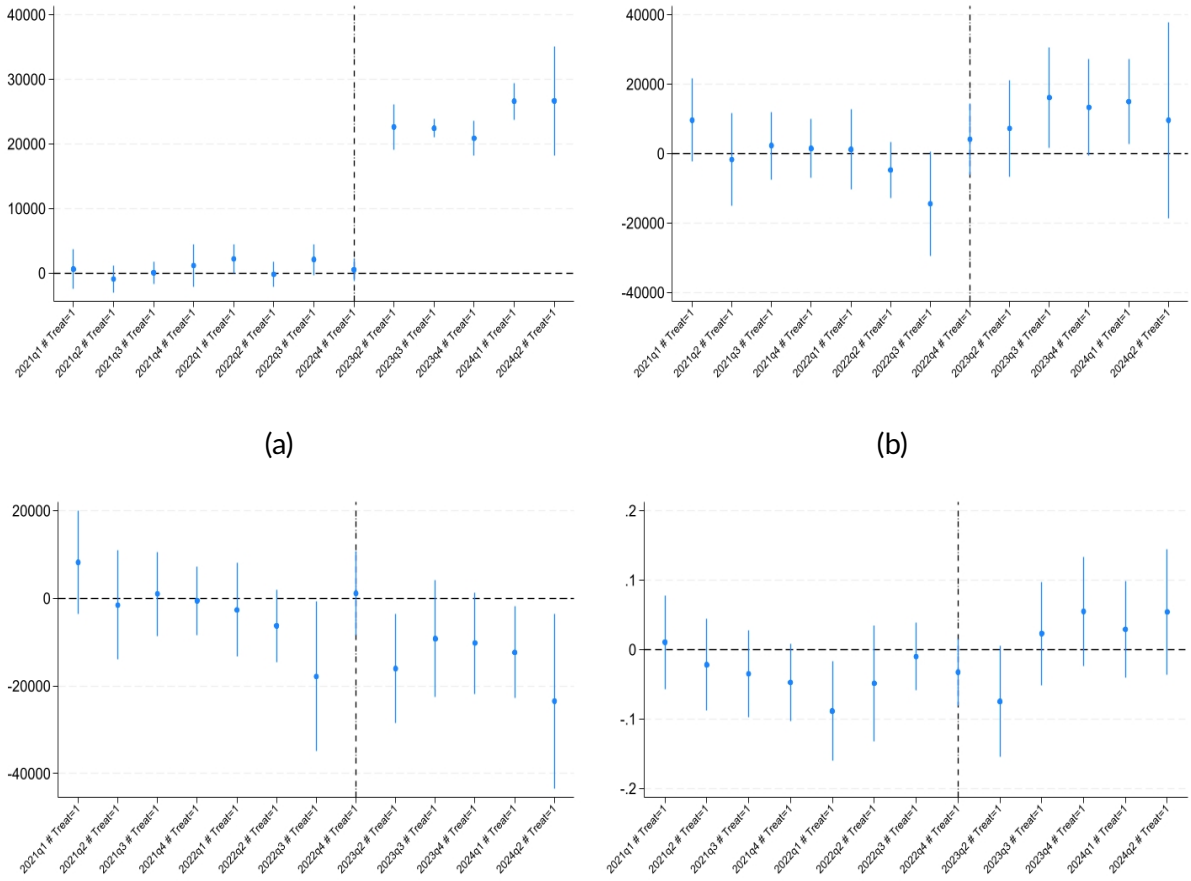
[20] In Appendix A, Figure A.1 presents the event-study plots for dummy variables capturing borrower compositions across income and age categories. We observe no statistical differences between the treatment and the control groups in the pre-LTI easing period for the income and age composition variables, thus confirming the parallel trends assumptions. In the post-LTI recalibration period, the statistical significance of point-estimates across some quarters suggest increasing (reducing) composition of low (high)-income borrowers. For age, we observe patterns suggesting increasing (reducing) proportion of low (high) age borrowers. These patterns; however, are subject to regression assessment to fully validate the effects. Importantly, we do not observe any significant patterns emerging across the composition of borrowers in middle income as well as middle-age groups in the post-LTI easing quarters.

the point estimates are the average mean differences in our outcome variables between the treated and control groups across the pre and post-LTI easing periods.[21]

As shown in Figure 4, there are no statistical differences between the treatment and the control groups in the pre-LTI easing period for the key outcome variables. Notably, we observe statistical differences (significant at 10% level) at several quarters in the post policy periods, barring proportion of new build purchase. The event-study check confirms that the key outcomes before LTI easing for the treatment and control groups follow parallel trends, with the intertemporal variation in the differences being statistically insignificant during the pre-policy LTI regime.

[21]For the purpose of event-study plots, we extend the pre-LTI easing period to include 2021 as well. Moreover, to maintain consistency in our assessment, we employ the same regression specification as presented in Equation 1 to generate the event-study plots.

Figure 4. Event-study coefficient plot (a) Loan Size (b) House Price (c) Deposit (d) Proportion of New Build Purchase



5 Results

In the following sub-sections, we begin by presenting empirical results based on the sample without the allowances, as it gives the most ideal DiD setting for isolating causal effects, described in section 4. In that, we document the estimated impact of LTI easing on key variables at the borrower level, followed by heterogeneous impacts across the income-regional distributions and the change in borrow composition effects due to extensive margin. As allowances are an integral part of our mortgage measures framework, especially relevant for extensive margins, we also present the empirical results based on the sample with allowances.

5.1 LTI easing and borrower-level impacts

Table 2 reports headline results for the impact of LTI easing on borrower-level outcomes, in line with the transmission channels discussed in section 4.1. We start with the loan size (column 1), given that transmission to borrower level outcomes across the treated FTBs would channel through the change in credit. We then present the secondary impacts from the change in loan size on housing value, house size, probability of buying a new build and deposit in column 2–5.

Table 2. Impacts of LTI loosening- *Headline Results*

Variables	(1) **Loan Size**	(2) **Housing Val.**	(3) **House Size**	(4) ***Pr*(New)**	(5) **Deposit**
Post	-3,090.79**	3,323.10	-3.61	-0.01	6,413.89
	(1,230.20)	(7,712.72)	(2.43)	(0.02)	(6,901.56)
Treatment	-3,752.88*	-72,169.14***	-16.30***	0.16***	-68,416.26***
	(1,879.24)	(8,388.18)	(1.86)	(0.02)	(6,691.25)
DiD	23,557.07***	18,833.38**	0.90	0.05**	-4,723.69
	(2,477.04)	(7,697.95)	(2.41)	(0.02)	(5,735.73)
Constant	-2713126***	-2970264***	-469.17***	-3.01***	-257,139*
	(176,026)	(314,504)	(51.30)	(0.86)	(143,321)
Observations	24,653	24,653	24,653	24,653	24,653
R-squared	0.92	0.70	0.61	0.21	0.34
County	Yes	Yes	Yes	Yes	Yes
Bank Dummy	Yes	Yes	Yes	Yes	Yes
Borr. Characteristics	Yes	Yes	Yes	Yes	Yes
Log Total Income	Yes	Yes	Yes	Yes	Yes
House Type	Yes	Yes	Yes	Yes	Yes
New Prop	Yes	Yes	Yes	No	Yes
House Type*New Prop	Yes	Yes	Yes	No	Yes

Clustered SE on county in parenthesis. *** $p<0.01$ ** $p<0.05$ * $p<0.1$. Post indicates all mortgage applications after 31st March 2023. Treatment captures treated FTBs. DiD is the interaction of Post and Treatment (Post$*$Treatment). Borrower characteristics include occupation, age and age square of 1st borrower. House-type includes apartments, detached, semi-detached, terraced and other residential types. New prop is a dummy variable capturing if the house is a new build.

In the first column, we discuss the result on loan size. We note a statistically significant and negative coefficient on '*Post*'. Intuitively, this implies that on average, loan size for unaffected SSBs is significantly less in the post-LTI easing period, having controlled for

income, housing characteristics, and county-level effects. Further, we find a similar negative and significant coefficient on '*Treatment*', implying that loan size across the treated FTBs, on average, is less than the SSBs in the pre-LTI easing period.

The coefficient on '*DiD*' in Column (1) implies, on average, the treatment effect of €23,500 on the loan size. Compared to the average loan size in the baseline (pre-LTI easing) across the full sample, this estimate represents an 8.6% increase in credit at the borrower level.[22] This is an unsurprising result, given that LTI recalibration from 3.5 to 4 eases the borrowing constraint for FTBs,[23] as demonstrated in section 4.1. Moreover, we exploit regional and income heterogeneity in loan size by splitting the sample into GDA and ROC (see Table A.1.4). The DiD results, as shown in Table A.1.6, suggest statistically significant increase in loan size across all income groups in both regions; however, the strength of the effect is primarily driven from the middle and lower income quantiles.[24]

We present results on the housing value in column 2. The coefficient on '*DiD*' is positive and significant suggesting that, on average, transacted housing value increased by circa. €18,800 for the treated FTBs as the result of LTI easing, representing a 5% increase relative to the average housing value in the pre LTI-easing period.[25] In the next two columns, we investigate whether the increased housing value are driven by bigger and/or higher quality home being traded under LTI easing. In column 3, we find no evidence of bigger properties in terms of the size of housing. In column 4, we look at the propensity to purchase newly constructed house as an indicator of the quality of the property. Given the binary nature of this outcome variable, we employ linear probability model (LPM) to conduct DiD

[22] As another measure, we standardise the '*DiD*' coefficients using sample median income (€71,608). This yields standardised coefficient estimates in terms of the loan-to-income ratio. The results show that LTIs increase by 0.33 across the treated FTBs, relative to control SSBs between the two policy regimes.

[23] The borrowing constraint loosens only when the buyer is not at the maximum LTV limit (90%) and has some headroom to increase credit.

[24] The magnitude of increase in loan size relative to the sample average in the baseline (pre period) is 12% (against 11% and 7.4% in low and top income respectively) and 8.8% (against 9.7% and 4.8% in low and top income respectively) for the middle-income borrowers in GDA and ROC counties respectively. Standardised by median incomes (shown in Table A.1.4) in each income quantile, the DiD coefficients are 0.36, 0.41, 0.27 in GDA and 0.31, 0.30, 0.17 in ROC.

[25] We derive the percentage change from the average house-price in pre period for treated FTBs and control SSBs being €392,574, as shown in Table A.1.1.

estimation using model shown in Equation 1.[26] The coefficient on '*DiD*' suggests a 5p.p higher likelihood for the purchase of newly constructed house, indicating a fraction of higher housing value is driven by higher quality of properties being transacted under the policy easing.

Last, we look at the liquidity preference channel in column 5, where the dependent variable is the deposit paid by borrowers. The coefficient on '*DiD*' is negative but is not statistically significant suggesting absence of any meaningful change in the deposits of treated FTBs. Disaggregating this effect across the income quantiles and regions (see Table A.1.7), we find that there is evidence of liquidity resilience across the middle-income group in ROC. We find that the treated FTBs in this cohort (middle-income group in ROC), on average, reduce their housing deposit by circa. €17,700 relative to the control SSBs between the post and pre-LTI easing periods.[27]

The estimation results on the key variables based on an enhanced sample with allowances are presented in Table A.2.1 in Appendix A.2. The sample excluding allowances yields a comparison between treated FTBs and control SSBs where the LTI ratio was most binding. Consequently, these results might overstate the average effects of LTI easing on the outcome variables in the broader population, as the sample does not capture the fact that some borrowers can secure high LTI borrowing under the old LTI regime with allowances. In the enhanced sample, we include FTB allowances from 3.5 to 4 (additional 844 FTBs) in pre-LTI easing period, while SSB allowances from 3.5 to 4 (additional 352 SSBs) in both periods. Similar to the main results (see Table 2), our headline findings (see Table A.2.1) remain robust to the inclusion of borrowers with LTI allowances. Moreover, as expected, the '*DiD*' coefficient estimates are smaller in magnitude than our main results in Table 2, thus adjusting for the anticipated upward bias due to exclusion of borrowers with allowances in our main results.

To summarize, we find that LTI easing led to a range of borrower-level effects. The treated FTBs, following the LTI recalibration, increased their loan size by 8.6%, and at the same time, housing value purchased is also increased by 5%, which is not necessarily suggesting a general 5% increase in the house prices overall, as this is driven by a number of different

[26] Barring inclusion of dummy variable 'new property' as well as its interaction with 'house type' as control variables.

[27] This represents 21% reduction compared to average deposit (within middle-income group across ROC counties) in the pre LTI-easing period. It is also important to note that the fall in housing deposit does not necessarily represents reduction in deposit in absolute euro amounts, instead it is a relative reduction compared to the counterfactual case for deposits paid by an average FTB if the LTI policy remained unchanged.

factors in the economy. Instead, we find the higher housing value being driven, at least in part, by higher quality of properties under transaction as indicated by the 5 pp. increase in the likelihood to purchase a newly constructed house.

5.2 Heterogeneous impacts of LTI easing on Housing Value and Purchase of New Builds

In Table 3, we present results from DiD regressions on housing value across both income and region. Interestingly, we find that the middle-income cohort within the GDA counties solely drives the positive impact on housing expense, observed earlier in baseline regressions (column 2 of Table 2). The '*DiD*' coefficient (column 2 in Table 3) is positive and statistically significant (at 5% level), suggesting that middle-income treated FTBs in GDA counties purchase houses that are €30,200 more expensive as a response to the LTI easing, representing an 8% increase compared to the pre LTI-easing average housing expense in the GDA counties. This estimate is positive but not statistically significant elsewhere in terms of income as well as regional splits in column 1 and 3-6.

Table 3. Heterogeneous Impact of LTI loosening on Housing Value (puchase price) in GDA (left) and ROC (right) by Income Quantiles

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Housing Value (GDA)			Housing Value (ROC)		
	Inc. Quant 1	Inc. Quant 2	Inc. Quant 3	Inc. Quant 1	Inc. Quant 2	Inc. Quant 3
Post	-1,904.77	1,387.16	4,922.29	16,289.57**	23,423.72***	5,674.56
	(13,731.40)	(6,504.46)	(9,310.86)	(7,450.32)	(7,601.47)	(10,608.67)
Treatment	-41,577.84***	-66,132.19***	-99,752.20***	-40,695.25***	-54,124.33***	-68,744.38***
	(5,668.27)	(4,728.58)	(9,012.03)	(5,226.35)	(4,338.80)	(8,714.40)
DiD	9,448.82	30,216.69**	27,296.17	4,527.76	4,471.90	8,040.11
	(12,798.75)	(7,500.42)	(13,256.94)	(8,344.14)	(6,987.89)	(10,303.70)
Constant	-529,415.34*	-1811059.89***	-5857724.59***	-1356058.23***	-2874189.86***	-5312475.94***
	(166,976.86)	(275,962.20)	(109,169.81)	(66,854.14)	(205,051.99)	(210,841.12)
Observations	3,110	4,426	5,705	5,102	3,796	2,506
R-squared	0.40	0.31	0.74	0.48	0.43	0.62
County	Yes	Yes	Yes	Yes	Yes	Yes
Bank Dummy	Yes	Yes	Yes	Yes	Yes	Yes
Borr. Characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Log Total Income	Yes	Yes	Yes	Yes	Yes	Yes
House Type	Yes	Yes	Yes	Yes	Yes	Yes
New Prop	Yes	Yes	Yes	Yes	Yes	Yes
House Type*New Prop	Yes	Yes	Yes	Yes	Yes	Yes

Clustered SE on county in parenthesis *** p<0.01 ** p<0.05* p<0.1. Post indicates all mortgage applications after 31st March 2023. Treatment captures treated FTBs. DiD is the interaction of Post and Treatment (Post∗Treatment). Borrower characteristics include occupation, age and age square of 1st borrower. House-type includes apartments, detached, semi-detached, terraced and other residential types. New prop is a dummy variable capturing if the house is a new build. For brevity, we show only the fully saturated regression across each income quantile and region.

For middle-income FTBs in GDA, the observed increase in housing value aligns well with the relatively larger increase in loan size (see footnote 24 in section 5.1 and Table A.1.6 in Appendix A). Moreover, we find this effect being particularly strong in a relatively inelastic

housing context such as the GDA counties relative to the rest of country.[28] This is in line with Greenwald and Guren (2021) that the extent to which credit expansion translates into housing expense depends on the degree of segmentation or house supply elasticity in the housing markets.

Finally, the pronounced responsiveness observed among middle-income treated FTBs, manifested in significant increases in both loan size and housing value, corresponds closely with the findings and theoretical framework proposed by Ortalo-Magne and Rady (2006), Landvoigt et al. (2015), and van der Drift et al. (2023). These papers suggest credit utilisation by constrained households to be a significant driver of the link between house price and mortgage credit. Given middle-income borrowers in our sample are relatively more credit-constrained (see Figure 3), our empirical findings align well with the theoretical expectation that such households exhibit the greatest sensitivity to credit expansions, translating increased borrowing capacity into higher housing expense.

Table 4. Heterogeneous Impact of LTI loosening on *Pr(New House)* in GDA (left) and ROC (right) by Income Quantiles

	(1)	(2)	(3)	(4)	(5)	(6)
Variables	***Pr(New House)* (GDA)**			***Pr(New House)* (ROC)**		
	Inc. Quant 1	**Inc. Quant 2**	**Inc. Quant 3**	**Inc. Quant 1**	**Inc. Quant 2**	**Inc. Quant 3**
Post	0.04	-0.02	-0.03	-0.09**	0.06	0.01
	(0.05)	(0.05)	(0.03)	(0.04)	(0.05)	(0.04)
Treatment	0.05	0.16**	0.16**	0.04*	0.24***	0.28***
	(0.03)	(0.05)	(0.04)	(0.02)	(0.05)	(0.04)
DiD	0.07**	0.10	-0.03	0.18***	-0.04	-0.01
	(0.02)	(0.07)	(0.03)	(0.05)	(0.06)	(0.06)
Constant	-1.11	-6.71*	0.76	-3.71***	-5.47**	3.83**
	(0.75)	(2.47)	(0.33)	(1.02)	(2.53)	(1.44)
Observations	3,110	4,426	5,705	5,102	3,796	2,506
R-squared	0.18	0.23	0.20	0.17	0.15	0.17
County	Yes	Yes	Yes	Yes	Yes	Yes
Bank Dummy	Yes	Yes	Yes	Yes	Yes	Yes
Borr. Characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Log Total Income	Yes	Yes	Yes	Yes	Yes	Yes
House Type	Yes	Yes	Yes	Yes	Yes	Yes

Clustered SE on county in parenthesis *** p<0.01 ** p<0.05* p<0.1. Post indicates all mortgage applications after 31st March 2023. Treatment captures treated FTBs. DiD is the interaction of Post and Treatment (Post*Treatment). Borrower characteristics include occupation, age and age square of 1st borrower. House-type includes apartments, detached, semi-detached, terraced and other residential types. For brevity, we show only the fully saturated regression across each income quantile and region.

Following from the positive and significant baseline effect of LTI easing on propensity to purchase newly constructed house (column 4 of Table 2), we assess the heterogeneity in

[28] As per the housing report by CBI (2024), house-supply responsiveness in commuter counties (Meath, Kildare and Wicklow) has been much higher in contrast to Dublin; however, taken together (Co. Dublin and commuter counties) there is currently a lower proportion of available zoned and serviced land in comparison to the population of household-formation age.

this outcomes across the three income quantiles and regions. The results in Table 4 suggests that the purchase of newly constructed houses is driven from the lowest income quantile, as shown from the '*DiD*' coefficient. Having controlled for borrower characteristics, income, housing characteristics and county level effects; the '*DiD*' estimates suggest an increase of 7 pp. in the propensity to purchase newly constructed house in GDA and an 18 pp. increase in ROC. The number of HTB recipients were substantially higher across the ROC counties than GDA, potentially due to the supply factor that more HTB qualifying housing available outside the GDA region (Bandoni and Singh, 2024). These results echo a higher utilization of housing assistance subsidy 'Help to Buy' (HTB), where the purchase of a newly constructed house is one of the qualifying condition for FTBs.[29] Together, it is likely that the increase in credit resulting from LTI-easing potentially reinforces the effect of HTB, allowing more lower-income FTBs to access home-ownership.

5.3 Borrower Composition

As discussed in section 4.1, extensive margin is an important channel through which borrowers respond to the LTI easing. We assess this channel by focussing on the changes in FTB composition across different income and age quantiles in pre versus post LTI-easing periods, as shown in Table 5 and Table 6 respectively. First, we present results from the assessment of transition in borrower income groups. In this case, the dependent variable in Equation 1 is a dummy variable for each income quantile.[30] Given the binary nature of this outcome variable, we employ LPM to conduct DiD estimation using model shown in Equation 1- barring the inclusion of borrower income as a control variable.

In the first three columns of Table 5, we show regression results based on the sample without allowances as in the previous sections. However, because allowance policy is specifically designed to affect marginal borrowers, we include them into our empirical investigation, which is shown in the last three columns in the table.

In column (1), we find a positive and statistically significant coefficient on '*DiD*' for the lowest income group with the effect size of around 0.04. This implies that following

[29] HTB is available for tax-compliant FTBs for a purchase of newly built house, to be used as a principal dwelling, worth €500,000 or less, with maximum allowable equity of 30 per cent. In GDA, the HTB recipients increased from 35 to 143 of the total 1,105 and 1,568 FTBs between the pre and post LTI-easing respectively. For ROC, this was substantially higher, increasing from 341 to 514 of the total 2,241 and 2,316 across the pre and post LTI-easing respectively.

[30] For each regression, the dependent variable takes the value 1 if borrower falls in the designated income quantile and zero otherwise. For example, the dependent variable in column 1 of Table 5 takes the value as 1 if borrower was classified in lowest income quantile and zero otherwise.

Table 5. Transmission Channel 3- Borrower composition across Income Quantiles from LTI loosening

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Main Sample			Sample including allowances		
	Inc. Quant 1	Inc. Quant 2	Inc. Quant 3	Inc. Quant 1	Inc. Quant 2	Inc. Quant 3
Post	-0.02	-0.00	0.03**	-0.02	0.00	0.02
	(0.01)	(0.02)	(0.01)	(0.02)	(0.01)	(0.01)
Treat	-0.11***	0.05***	0.06***	-0.11***	0.06***	0.06***
	(0.02)	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)
DiD	0.04**	0.00	-0.04***	0.03	-0.00	-0.03*
	(0.02)	(0.02)	(0.01)	(0.02)	(0.01)	(0.01)
Constant	1.61***	0.37	-0.98***	1.66***	0.29	-0.94***
	(0.16)	(0.28)	(0.24)	(0.15)	(0.25)	(0.23)
Observations	24,653	24,653	24,653	25,845	25,845	25,845
R-squared	0.23	0.03	0.18	0.23	0.03	0.18
County	Yes	Yes	Yes	Yes	Yes	Yes
Bank Dummy	Yes	Yes	Yes	Yes	Yes	Yes
Borr. Characteristics	Yes	Yes	Yes	Yes	Yes	Yes
House Type	Yes	Yes	Yes	Yes	Yes	Yes
New Prop	Yes	Yes	Yes	Yes	Yes	Yes
House Type*New Prop	Yes	Yes	Yes	Yes	Yes	Yes

Clustered SE on county in parenthesis. *** p<0.01 ** p<0.05 * p<0.1. Post indicates all mortgage applications after 31st March 2023. Treatment captures treated FTBs. DiD is the interaction of Post and Treatment (Post*Treatment). Borrower characteristics include occupation of 1st borrower. House-type includes apartments, detached, semi-detached, terraced and other residential types. New prop is a dummy variable capturing if the house is a new build. For brevity, we show the fully controlled specification across each regression for the three income quantiles.

the LTI-easing, the proportion of low-income FTBs increase by 4 pp. in our sample without allowances. This is balanced with the equivalent reduction in the treated FTBs across the top-income quantile post the LTI-easing, as shown by the negative and significant '*DiD*' coefficient of 0.04 in column (3). These results complement the available evidence suggesting that tightening macroprudential-lending measures (without allowing for flexibility to lend above these limits) disproportionally affect low-income borrowers (Acharya et al., 2022; Peydró et al., 2023; Van Bekkum et al., 2024). Peydró et al. (2023), for example, show that constrained lenders issue fewer and more expensive high-LTI mortgages, with stronger effects on low-income borrowers. Similarly, Acharya et al. (2022) show lenders substitute high LTI/LTV low-income borrowers with less credit constrained high-income borrowers.

It is important to note that, given our main analysis excludes borrowers (both FTBs and SSBs) availing LTI allowance exceeding the prescribed limit of 3.5 (see the discussion in section 3.3), results on borrower composition should be interpreted as the comparison between the LTI easing period (post-2022) and a counterfactual scenario where the LTI limit stayed the same at 3.5 and no allowance was in place. If the allowances were already facilitating access by lower-income borrowers, this finding should fall away, and indeed this is the case in column (4), where the '*DiD*' coefficient for the lowest income FTBs is no longer significant. This finding confirms that allowances were already effective in their objective of allocating credit to certain borrowers facing individual constraints. Once we take them into account, there is no significant change in their composition, as noted in

column (4) of Table 5. However, when we exclude allowances from our main sample, we find a significant increase in the proportion of lowest income FTBs, thus demonstrating that in a world without allowances, the LTI easing facilitated entry of lowest income FTBs in the post LTI recalibration period.

Table 6. Transmission Channel 3- Borrower composition across Age Quantiles from LTI loosening

Variables Variables	(1)	(2) Main Sample	(3)	(4)	(5) Sample including allowances	(6)
	Age Quant 1	**Age Quant 2**	**Age Quant 3**	**Age Quant 1**	**Age Quant 2**	**Age Quant 3**
Post	-0.03	-0.05**	0.08***	-0.05*	-0.04*	0.09***
	(0.03)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Treat	0.08***	-0.07***	-0.02	0.08***	-0.07***	-0.01
	(0.02)	(0.02)	(0.01)	(0.02)	(0.02)	(0.01)
DiD	0.05*	-0.01	-0.03*	0.05**	-0.02	-0.03
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Constant	0.33	-0.15	0.82***	0.36	-0.14	0.78***
	(0.26)	(0.13)	(0.19)	(0.23)	(0.11)	(0.19)
Observations	24,653	24,653	24,653	25,845	25,845	25,845
R-squared	0.04	0.02	0.03	0.04	0.02	0.03
County	Yes	Yes	Yes	Yes	Yes	Yes
Bank Dummy	Yes	Yes	Yes	Yes	Yes	Yes
Borr. Characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Log Total Income	Yes	Yes	Yes	Yes	Yes	Yes
House Type	Yes	Yes	Yes	Yes	Yes	Yes
New Prop	Yes	Yes	Yes	Yes	Yes	Yes
House Type*New Prop	Yes	Yes	Yes	Yes	Yes	Yes

Clustered SE on county in parenthesis. *** p<0.01 ** p<0.05 * p<0.1. Post indicates all mortgage applications after 31st March 2023. Treatment captures treated FTBs. DiD is the interaction of Post and Treatment (Post*Treatment). Borrower characteristics include occupation of 1st borrower. House-type includes apartments, detached, semi-detached, terraced and other residential types. New prop is a dummy variable capturing if the house is a new build. For brevity, we show the fully controlled specification across each regression for the three age quantiles.

Second, we examine the change in borrower composition in terms of quantiles of age,[31] as shown in Table 6.[32] The coefficient on the '*DiD*' is statistically significant (at 10% level) and positive in column 1 with effect size of 0.05. Intuitively, this means, that on average, the proportion of treated FTBs in the youngest age quantile increase by 5 p.p, as compared to the control SSBs between the post and pre-LTI easing periods. Equivalently, there is a fall in the proportion of treated FTBs in the oldest age quantile, as shown by the negative and significant '*DiD*' coefficient in column 3. Interestingly, we find a similar effect in the sample including allowances (column 4-6). This finding provides evidence of the positive impact of LTI easing for younger borrowers even beyond the effect of allowances.

Overall, our findings on borrower composition suggest that the easing of LTI for FTBs plays a similar role as the LTI allowances to facilitate entry of borrowers who face affordability issues, as discussed in the transmission channels (see section 4.1). Similar to our results, the Centra Bank's Financial Stability Review (FSR, 2024) shows that the share

[31] The distribution of sample across different age quantiles is shown in Table A.1.5.

[32] Since the outcome variable relate to borrower age, we remove this as well as the age squared from the set of controls in the regression estimation shown in Table 17.

of mortgages using LTI allowance dropped from around 10% in the pre-LTI easing period to about 4% in the post period.

6 Robustness Checks

In the sub-sections below, we describe range of robustness checks conducted to validate our main results discussed in section 5. Primarily, we conduct two robustness checks; first, we re-introduce the treated FTBs with LTI ratio 3.49 to 3.51 in our sample for the post-LTI easing period. Second, we use mortgage originations in Northern Ireland as control group, while FTBs in the border counties of Republic of Ireland (Ireland hereon) as treatment group to validate our key results.

6.1 Including the bunching at LTI 3.49 to 3.51 within *treated FTBs* in the *Post* period

As discussed briefly in section 3.3, there were cases in our sample where mortgage approvals for FTBs in 2023 (starting months) appeared to be under the old LTI limit, most likely as the applications for those approvals were made in 2022 under the old limit.[33] As a result, significant proportion of FTB mortgage applications on MTD report LTI ratio of 3.5 in this period. We address this uncertainty by blanket removal of all observations in 2023Q1 from our post sample. However, as shown in Figure 2 (top-right panel), there is bunching around the old LTI limit of 3.5 across FTBs (red bars), thus indicating potential cases where the old LTI limit was still in place. As a solution, we exclude FTBs with LTI ratio from 3.49 to 3.51 in the post period, to remove this bunching around the old limit in our main analysis. Nonetheless, given that some of these FTB applications may have opted for LTI ratio 3.49 to 3.51 despite the easing of LTI, we include this sample back into our sample as a robustness, thus adding a further 458 FTBs in the post-LTI easing period.

The DiD regression results conducted on this enhanced sample are presented in Table B.1.1 and B.1.2 in Appendix B.1. Similar to the main results, our headline results remain robust to this change, thus validating the increase in loan-size, housing value and purchase of new builds, as well as borrower composition in terms of both significance and magnitude.

[33] We are not able to verify this from data as MTD only records loan aproval and draw-down dates, while mortgage application date should be few months ahead.

6.2 Using mortgage originations in Northern Ireland as control group

Finally, we address the concern in the choice of our control group, whereby change in the LTI ratio for FTBs may have arguably contaminated borrower outcomes across SSBs (being part of the same housing market) through change in overall housing demand. This may weaken the independence of our SSB control units from the easing of LTI intended only for FTBs. Consequently, any changes that we observe as a result of LTI easing would then be biased, given that our assessment shall fail to adjust for the treatment induced changes in the control group.

To mitigate this issue, it is ideal to have a control group with no spill over effects from the policy change. In our case, this would imply use of non-Irish counterfactual borrowers, where the Irish policy change has no housing market effects. This is quite difficult, as we do not have access to such comprehensive housing data in a different jurisdiction. However, similar to McCann and O'Toole (2019), we rely on the Loan Level Data (LLD) of the Central Bank providing a small number of mortgage lending by Irish banks to borrowers in Northern Ireland (NI). For the period of question, we obtain 335 new mortgages issued in NI from LLD and use this data towards a new control group, comparing it with 913 FTB mortgage approvals in the border counties of Ireland (Donegal, Cavan, Sligo, Monaghan, and Leitrim).[34] Given that LLD provides limited information on borrower level outcomes, we conduct this robustness check only to broadly validate our results on change in loan size, housing value, and deposit. We do not conduct use this framework to assess purchase of new house or borrower composition due to unavailability of information and small sample size respectively.

We find that results from this robustness check are broadly in line with our main findings. As shown in Table B.2.1 in Appendix B.2, we find positive and statistically significant '*DiD*' coefficient on loan size and housing value. Additionally, similar to our main results, we do not find any significant change in deposit between treated and control borrowers across the two periods. With the caveat that this sample is no longer representative of the Irish housing market, this check provides basis to trust our identification, given that we find consistency with our main results.

[34] We only consider border counties to induce similarity between the treated Irish FTBs and the control NI FTBs.

7 Conclusion

This study provides a systematic evidence on the effects of LTI easing in Ireland, complementing a literature dominated by analyses of tightening measures. By disentangling intensive margin (credit, housing value) and extensive margin (borrower composition) channels, our analysis reveals nuanced borrower outcomes with significant heterogeneity across income groups and regions.

First, we find that the LTI easing, introduced at the start of 2023, increased the loan size by 8.6% for an average borrower, which led to heterogeneous choices in home purchases: middle-income borrowers in supply-constrained GDA absorbed this additional credit into higher housing expense (8% rise), while middle-income FTBs outside GDA prioritized liquidity by reducing deposits. Second, we provide evidence that the increase in the LTI limit facilitated access to the housing market for younger FTBs. We also show that the LTI allowances (lending above the LTI limit) played an important role in facilitating access for lower-income borrowers, and in the new framework, these borrowers are being facilitated by the higher LTI limit, in line with the intended policy outcomes. Although, this study is conducted in a partial equilibrium setting, our results provide valuable insights on the effects of LTI easing for policymakers, particularly in enhancing our understanding of the balance of costs and benefits of these measures.

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Appendices

A Additional Tables and Charts

A.1 Descriptive Statistics and Heterogeneous Results

Table A.1.1. Descriptive Statistics: Full Sample Pre and Post Periods (2022-2024H1)

Variables	Pre (2022) N=11,838	Post (2023Q2-2024H1) N=12,856
Housing Value (€price)	392,574.4	418,443.8
Loan Size(€)	274,844.2	298,907.7
Total Deposit (€)	117,730.2	119,536.1
LTV (%)	72.3	73.3
LTI	3.4	3.7
Total HH Income	82,325.6	83,433.3
Borrower Age	36.4	36.1
House size (sq. m.)	133.4	127.5
Housing Val./sq. m.	3,269.2	3,630
New Prop.	0.4	0.4

Source: Monitoring Templates Data from Central Bank of Ireland

Table A.1.2. Descriptive Statistics: Sample Treatment and Control across both periods

Variables	Control (SSB) N=4,642	Treatment (FTB) N=20,052
Housing Value (€price)	558,611.8	370,722.8
Loan Size(€)	339,295.6	275,351.7
Total Deposit (€)	219,316.2	95,371.1
LTV (%)	62.4	75.2
LTI	3.3	3.6
Total HH Income	105,402	77,693.6
Borrower Age	41.2	35.1
House size (sq.m.)	158	123.9
Housing Val./sq.m.	3,937.7	3,345.7
New Prop.	0.2	0.4

Source: Monitoring Templates Data from Central Bank of Ireland

Table A.1.3. Income Distribution of Treatment and Control (2022-2024H1)

Income Groups	Sample Size	Mean (€)	Median (€)	Min (€)	Max (€)
Pre Period (2022)					
Quantile 1	3,934	49,890	51,487	22,713	63,334
Quantile 2	3,934	74,957	74,790	63,350	87,460
Quantile 3	3,934	122,241	107,268	87,468	1,073,250
Post Period (2023Q2-2024H1)					
Quantile 1	4,285	52,533	54,440	25,368	66,142
Quantile 2	4,285	77,200	77,104	66,144	89,167
Quantile 3	4,285	120,558	107,596	89,178	586,578

Source: Monitoring Templates Data from Central Bank of Ireland

Table A.1.4. Regional Income Distribution

Income Groups	Sample Size	Mean(€) GDA	Median (€)	Sample Size	Mean(€) ROC	Median (€)
Quantile 1	3,120	52,757	54,644	5,114	50,344	51,810
Quantile 2	4,430	76,543	76,393	3,799	75,616	75,396
Quantile 3	5,714	127,227	111,935	2,517	107,987	100,726

Source: Monitoring Templates Data from Central Bank of Ireland

Table A.1.5. Age Distribution of Treatment and Control (Years) (2022-2024H1)

Age Groups	Sample Size	Mean	Median	Min	Max
Pre Period (2022)					
Quantile 1	4,348	30	31	19	33
Quantile 2	3,924	36	36	34	39
Quantile 3	3,530	44	43	40	60
Post Period (2023Q2-2024H1)					
Quantile 1	5,031	30	30	20	33
Quantile 2	3,614	36	36	34	38
Quantile 3	4,210	44	43	39	63

Source: Monitoring Templates Data from Central Bank of Ireland

Table A.1.6. Loan Size in GDA (left) and ROC (right) by Income Quantiles

Variables	(1)	(2) Loan Size (GDA)	(3)	(4)	(5) Loan Size (ROC)	(6)
	Inc. Quant 1	**Inc. Quant 2**	**Inc. Quant 3**	**Inc. Quant 1**	**Inc. Quant 2**	**Inc. Quant 3**
Post	214.47	-1,844.67	-2,116.36*	-558.40	-1,292.39	-3,182.02
	(629.73)	(1,033.88)	(757.87)	(1,077.14)	(1,886.64)	(2,017.98)
Treatment	1,438.41	2,667.04*	-2,352.73*	1,917.61***	49.82	914.98
	(959.97)	(874.95)	(788.23)	(569.87)	(1,111.44)	(1,953.88)
DiD	19,818.66***	31,348.20***	30,614.15***	16,316.36***	22,227.57***	17,132.33***
	(952.26)	(2,175.05)	(2,047.52)	(1,020.59)	(1,769.68)	(2,364.70)
Constant	-1,657,297.40***	-2,544,381.57***	-4,072,640.29***	-1,538,124.75***	-2,513,872.86***	-3,966,957.04***
	(23,052.74)	(33,362.61)	(20,041.11)	(19,944.44)	(74,104.10)	(74,182.28)
Observations	3,110	4,426	5,705	5,102	3,796	2,506
R-squared	0.92	0.79	0.91	0.91	0.75	0.86
County	Yes	Yes	Yes	Yes	Yes	Yes
Bank Dummy	Yes	Yes	Yes	Yes	Yes	Yes
Borr. Characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Log Total Income	Yes	Yes	Yes	Yes	Yes	Yes
House Type	Yes	Yes	Yes	Yes	Yes	Yes
New Prop	Yes	Yes	Yes	Yes	Yes	Yes
House Type*New Prop	Yes	Yes	Yes	Yes	Yes	Yes

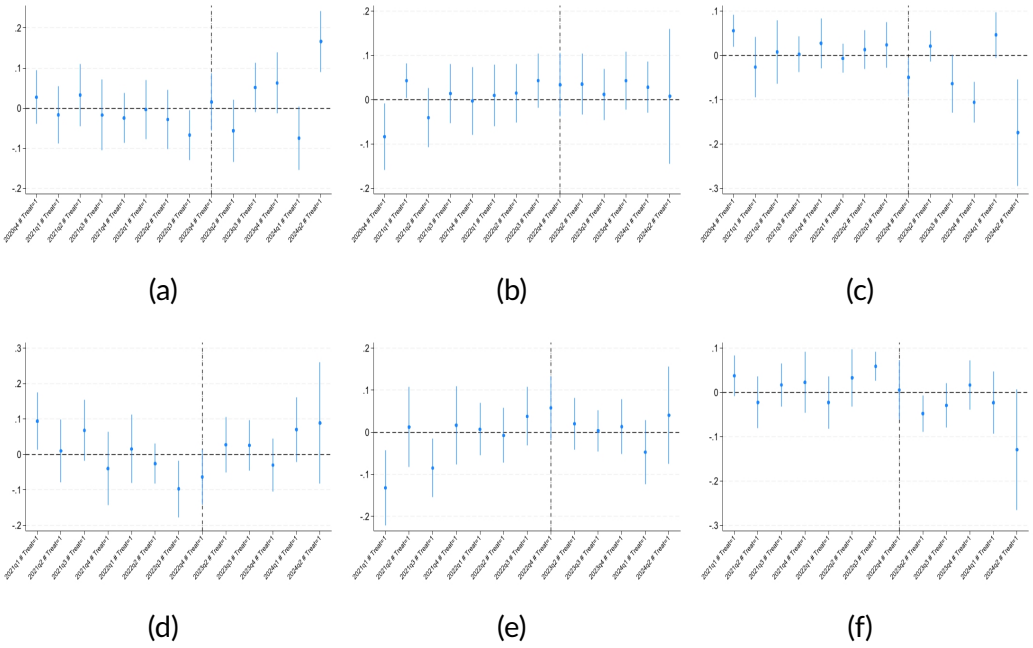
Clustered SE on county in parenthesis *** p<0.01 ** p<0.05* p<0.1. Post indicates all mortgage applications after 31st March 2023. Treatment captures treated FTBs. DiD is the interaction of Post and Treatment (Post∗Treatment). Borrower characteristics include occupation, age and age square of 1st borrower. House-type includes apartments, detached, semi-detached, terraced and other residential types. New prop is a dummy variable capturing if the house is a new build. For brevity, we show only the fully saturated regression across income quantile and region. Standardised by median income in each quantile, the DiD coefficients are 0.36, 0.41, 0.27 in GDA and 0.31, 0.30, 0.17 in ROC.

Table A.1.7. Deposit in GDA (left) and ROC (right) by Income Quantiles

Variables	(1)	(2) Deposit (GDA)	(3)	(4)	(5) Deposit (ROC)	(6)
	Inc. Quant 1	**Inc. Quant 2**	**Inc. Quant 3**	**Inc. Quant 1**	**Inc. Quant 2**	**Inc. Quant 3**
Post	-2,119.24	3,231.83	7,038.65	16,847.96**	24,716.11***	8,856.58
	(13,300.46)	(7,409.47)	(9,571.50)	(7,436.53)	(7,860.67)	(9,625.49)
Treatment	-43,016.24***	-68,799.23***	-97,399.47***	-42,612.86***	-54,174.15***	-69,659.36***
	(5,425.24)	(5,440.21)	(8,324.01)	(5,121.56)	(4,486.56)	(7,662.21)
DiD	-10,369.84	-1,131.52	-3,317.98	-11,788.61	-17,755.67**	-9,092.21
	(12,270.15)	(9,517.76)	(11,306.15)	(8,284.74)	(6,749.54)	(9,054.55)
Constant	1,127,882.05***	733,321.68*	-1785084.30***	182,066.51**	-360,317.01	-1345518.90***
	(149,964.68)	(302,087.42)	(127,462.17)	(71,198.98)	(211,459.39)	(241,376.62)
Observations	3,110	4,426	5,705	5,102	3,796	2,506
R-squared	0.39	0.31	0.43	0.34	0.38	0.36
County	Yes	Yes	Yes	Yes	Yes	Yes
Bank Dummy	Yes	Yes	Yes	Yes	Yes	Yes
Borr. Characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Log Total Income	Yes	Yes	Yes	Yes	Yes	Yes
House Type	Yes	Yes	Yes	Yes	Yes	Yes
New Prop	Yes	Yes	Yes	Yes	Yes	Yes
House Type*New Prop	Yes	Yes	Yes	Yes	Yes	Yes

Clustered SE on county in parenthesis *** p<0.01 ** p<0.05* p<0.1. Post indicates all mortgage applications after 31st March 2023. Treatment captures treated FTBs. DiD is the interaction of Post and Treatment (Post∗Treatment). Borrower characteristics include occupation, age and age square of 1st borrower. House-type includes apartments, detached, semi-detached, terraced and other residential types. New prop is a dummy variable capturing if the house is a new build. For brevity, we show only the fully saturated regression across income quantile and region.

Figure A.1. Event-study coefficient plot (a) Low Income (b) Middle Income (c) High Income (d) Age Quant 1 (e) Age Quant 2 (f) Age Quant 3



(a) (b) (c)

(d) (e) (f)

A.2 Results Including LTI allowances in pre period (3.5<=LTI<=4)

Table A.2.1. Sample Including Allowances: *Headline Results*

Variables	(1) **Loan Size**	(2) **Housing Val.**	(3) **House Size**	(4) ***Pr*(New)**	(5) **Deposit**
Post	-2,684.62*	2,556.43	-2.86	-0.00	5,241.05
	(1,319.46)	(7,100.90)	(2.48)	(0.02)	(6,105.20))
Treatment	-3,655.24*	-75,385.66***	-16.48***	0.17***	-71,730.43***
	(1,928.18)	(9,777.61)	(1.62)	(0.03)	(7,995.10)
DiD	20,593.37***	18,118.98**	-0.03	0.04*	-2,474.39
	(2,102.19)	(6,942.08)	(2.39)	(0.02)	(5,267.94))
Constant	-2767602.11***	-3042422.99***	-467.17***	-1.91**	-274,820.88*
	(181,385.33)	(317,114.79)	(46.59)	(0.90)	(139,986.34)
Observations	25,845	25,845	23,948	25,845	25,845
R-squared	0.92	0.70	0.60	0.20	0.34
County	Yes	Yes	Yes	Yes	Yes
Bank Dummy	Yes	Yes	Yes	Yes	Yes
Borr. Characteristics	Yes	Yes	Yes	Yes	Yes
Total Income	Yes	Yes	Yes	Yes	Yes
House Type	Yes	Yes	Yes	Yes	Yes
New Prop	Yes	Yes	Yes	No	Yes
House Type*New Prop	Yes	Yes	Yes	No	Yes

Clustered SE on county in parenthesis. *** p<0.01 ** p<0.05 * p<0.1. Post indicates all mortgage applications after 31st March 2023. Treatment captures treated FTBs. DiD is the interaction of Post and Treatment (Post*Treatment). Borrower characteristics include occupation of 1st borrower. House-type includes apartments, detached, semi-detached, terraced and other residential types. New prop is a dummy variable capturing if the house is a new build. For brevity, we only present the main results on loan, house price, and purchase of new build to support the main discussion in section 5.1-5.3.

Table A.2.2. Sample Including Allowances: Heterogeneity assessment at Income and Region for House price and New House purchase

Variables	(1) **Housing Val.**	(2) ***Pr(New House)***	(3) **Housing Val.**	(4) ***Pr(New House)***
	GDA		**ROC**	
Post	151.63	0.01	22,059.00***	-0.06
	(9,293.07)	(0.04)	(8,423.44)	(0.05)
Treatment	-69,143.02***	0.05	-56,665.81***	0.06**
	(6,093.39)	(0.03)	(4,791.46)	(0.03)
DiD	29,192.26***	0.09**	4,745.85	0.15***
	(9,300.28)	(0.04)	(8,312.67)	(0.05)
Constant	-2385120.49***	-0.64	-2827582.66***	-4.06***
	(297,493.26)	(0.65)	(255,180.69)	(0.56)
Observations	4,733	3,309	3,889	5,298
R-squared	0.24	0.10	0.38	0.12
County	Yes	Yes	Yes	Yes
Bank Dummy	Yes	Yes	Yes	Yes
Borr. Characteristics	Yes	Yes	Yes	Yes
Total Income	Yes	Yes	Yes	Yes
House Type	Yes	Yes	Yes	Yes
New Prop	Yes	No	Yes	No
House Type*New Prop	Yes	No	Yes	No

Clustered SE on county in parenthesis. *** p<0.01 ** p<0.05 * p<0.1. Post indicates all mortgage applications after 31st March 2023. Treatment captures treated FTBs. DiD is the interaction of Post and Treatment (Post*Treatment). Borrower characteristics include occupation, age and age square of 1st borrower. House-type includes apartments, detached, semi-detached, terraced and other residential types. New prop is a dummy variable capturing if the house is a new build. For brevity, we show only the fully saturated regression across second income quantile for house price and first income quantile for purchase of new house to support the main discussion in Section 5.2

B Robustness Checks

B.1 Including FTBs with LTI ratio 3.49 to 3.51 in post period

Table B.1.1. Robustness Check 1 Main Results

Variables	(1) **Loan Size**	(2) **Housing Val.**	(3) ***Pr*(New)**	(4) **Deposit**	(5) **Low Inc.**	(6) **Top Inc.**	(7) **Age Q1**	(8) **AgeQ3**
Post	-3,181.65**	3,418.02	-0.01	6,599.67	-0.02	0.03**	-0.04	0.09***
	(1,245.31)	(7,648.32)	(0.02)	(6,815.64)	(0.01)	(0.01)	(0.03)	(0.02)
Treatment	-3,785.29*	-72,237.20***	0.16***	-68,451.91***	-0.11***	0.06***	0.08***	-0.02
	(1,875.72)	(8,364.54)	(0.02)	(6,669.86)	(0.02)	(0.01)	(0.02)	(0.01)
DiD	23,128.99***	18,336.95**	0.05**	-4,792.05	0.03**	-0.04***	0.05*	-0.04*
	(2,476.27)	(7,611.99)	(0.02)	(5,644.67)	(0.02)	(0.01)	(0.02)	(0.02)
Constant	-2713075.26***	-2970380.56***	-2.00**	-257,305.30*	1.63***	-0.98***	0.32	0.86***
	(176,585.34)	(316,335.08)	(0.86)	(144,594.45)	(0.16)	(0.25)	(0.26)	(0.19)
Observations	25,111	25,111	25,111	25,111	25,111	25,111	25,111	25,111
R-squared	0.92	0.70	0.21	0.34	0.23	0.18	0.04	0.03
County	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank Dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Borr. Characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Total Income	Yes	Yes	Yes	Yes	No	No	Yes	Yes
House Type	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
New Prop	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
House Type*New Prop	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes

Clustered SE on county in parenthesis. *** p<0.01 ** p<0.05 * p<0.1. Post indicates all mortgage applications after 31st March 2023. Treatment captures treated FTBs. DiD is the interaction of Post and Treatment (Post*Treatment). Borrower characteristics include occupation of 1st borrower. House-type includes apartments, detached, semi-detached, terraced and other residential types. New prop is a dummy variable capturing if the house is a new build. For brevity, we only present the main results on loan, housing value and preference, and borrowers composition changes across lowest/highest and youngest/oldest borrowers to support main discussion in section 5.1 and 5.3.

Table B.1.2. Robustness Check 1 Heterogeneity assessment at Income and Region for House price and New House purchase

Variables	(1) **Housing Val.**	(2) ***Pr(New House)***	(3) **Housing Val.**	(4) ***Pr(New House)***
	GDA		**ROC**	
Post	1,110.81	0.03	22,633.51***	-0.08*
	(9,909.93)	(0.04)	(8,646.85)	(0.05)
Treatment	-70,949.02***	0.06*	-54,669.07***	0.05
	(6,245.18)	(0.03)	(4,840.30)	(0.03)
DiD	31,809.16***	0.08*	4,745.05	0.17***
	(9,754.08)	(0.04)	(8,483.37)	(0.05)
Constant	-2111649.18***	-1.01	-2750287.47***	-3.66***
	(319,959.20)	(0.68)	(273,583.25)	(0.56)
Observations	4,478	3,164	3,899	5,199
R-squared	0.24	0.12	0.39	0.12
County	Yes	Yes	Yes	Yes
Bank Dummy	Yes	Yes	Yes	Yes
Borr. Characteristics	Yes	Yes	Yes	Yes
Total Income	Yes	Yes	Yes	Yes
House Type	Yes	Yes	Yes	Yes
New Prop	Yes	No	Yes	No
House Type*New Prop	Yes	No	Yes	No

Clustered SE on county in parenthesis. *** p<0.01 ** p<0.05 * p<0.1. Post indicates all mortgage applications after 31st March 2023. Treatment captures treated FTBs. DiD is the interaction of Post and Treatment (Post*Treatment). Borrower characteristics include occupation, age and age square of 1st borrower. House-type includes apartments, detached, semi-detached, terraced and other residential types. New prop is a dummy variable capturing if the house is a new build. For brevity, we show only the fully saturated regression across second income quantile for house price and first income quantile for purchase of new house to support the main discussion in Section 5.2

B.2 Using Northern Ireland mortgages as Control

Table B.2.1. Robustness 2: Using Northern Ireland Mortgage Originations as Control

Variables	(1) **Loan Size**	(2) **Housing Val.**	(3) **Deposit**
Post	-6,814.99	-6,151.04	1,925.50
	(7,084.10)	(14,432.87)	(20,717.64)
Treatment	46,288.08***	75,616.12***	24,171.89**
	(5,646.19)	(10,202.42)	(9,414.61)
DiD	29,944.89***	30,956.29*	5,752.92
	(5,705.43)	(15,928.03)	(21,281.88)
Constant	-1045334.34***	30,397.33	-14,717.70
	(290,112.08)	(118,892.36)	(87,379.10)
Observations	1,160	1,160	1,160
R-squared	0.68	0.76	0.31
County	Yes	Yes	Yes
Borr. Characteristics	Yes	Yes	Yes
Total Income	Yes	Yes	Yes

Clustered SE on county in parenthesis. *** p<0.01 ** p<0.05 * p<0.1. Treatment captures FTBs in border counties of Republic of Ireland (Co. Donegal, Co. Cavan, Co. Sligo, Co. Monaghan, and Co. Leitrim). Control borrowers include mortgage lending by Bank of Ireland in Northern Ireland (NI). DiD is the interaction of Post and Treatment (Post*Treatment). Post indicates all mortgage applications after 31st March 2023 in ROI. For NI, we only observe loan origination date; hence, to estimate mortgage approval date, we deduct 71 days from mortgage origination date (71 being the average number of days between mortgage approval and origination). Borrower characteristics include occupation, age and age square of 1st borrower. Due to limited information and small sample, we only focus on three fundamental borrower outcomes; loan size, house price and deposit.

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