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Less Foreclosures, More Homeowners? Collateral Regimes, Non-Performing Loans and Credit Conditions

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Abstract

We show that legal shocks to the collateral value of debt contracts can spill over to other debt portfolios and constrain new debt origination. Using a natural experiment in the Irish mortgage market, we find that lenders responded to an unexpected repossession ruling reducing the value of the collateral on their outstanding mortgages by restricting riskier credit originations. The effect was even stronger when the decision was reversed: when contract enforcement is improved, banks expand their credit risk appetite, and issue loans with substantially weaker credit risk scores, higher loan to value ratios, and higher probabilities of subsequent default or modification. Such cross-portfolio spillovers highlight a trade-off between protecting existing homeowners and allowing new entrants on the mortgage market.

Keywords: Law and Finance, Repossession, Credit Risk, Capital Channel.
JEL Classification: G30

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1 Introduction

In residential mortgage markets, the pledging of the underlying housing asset as collateral acts to alleviate banks' expected losses given default and relaxes credit conditions ex ante (Pence, 2006). The ability to realize the housing collateral is therefore a key factor in determining banks' risk appetite on new lending.

In this paper, we document spillovers from debtor protections on outstanding mortgages to originations. We use a unique unexpected change in banks' ability to enforce contracts in Ireland in 2011, with financial intermediaries' balance sheets serving as transmission channels that amplify the effects of the legal shock, which acts similarly to a capital shock. As financial intermediaries cannot easily offload or reprice their outstanding loans, they adjust their origination policies to manage credit risk.

Measuring the impact of legal institutions on credit access is challenging as they result from long historical and political processes. To overcome this difficulty, we exploit a unique unexpected shock to repossession. In July 2011 in Ireland, the court system identified a loophole in 2009 legislation that meant that, with immediate effect, there was a moratorium on foreclosure for all mortgages issued in Ireland before December 2009 (referred to as the "Dunne judgment"). O'Malley (2020) documents a significant increase in defaults following this ruling, while loss given default also temporarily goes to one hundred percent, weakening lenders' balance sheets. To document spillovers from outstanding loans to originations, we rely on a loan level data set covering two thirds of the Irish mortgage market for the period 2010-2014. The data records conditions at origination, including borrowers' characteristics and updates loan characteristics every six months.

We estimate the spillovers of this legal shock using a difference-in-difference strategy. We build on the strong presence of Republic of Ireland (ROI) banks in Northern Ireland (NI), where they serve borrowers facing the repossession regime of the United Kingdom. We contrast loans from the Border region of the Republic of Ireland (six counties along the border with Northern Ireland) with NI loans. Both areas have similar economic structures and are part of a highly-integrated region with free movement of goods, capital and labour. To further alleviate concerns that we could be capturing events differently affecting both areas, we control for regional unemployment and house prices. We rule out confounding factors on the bank supply side such as funding costs, business models and solvency by sampling only banks lending on both sides of the border.

We start by investigating the "direct" adjustment of banks to valuations of already-outstanding

loans. As they now bear a higher expected loss, lenders might be expected to charge higher rates on affected loans, as highlighted in Cerqueiro et al. (2016) for a Swedish lender after a comparable shock to collateral values. Our evidence suggests this lever was not used by Irish banks as a response to the moratorium. First, banks had pricing discretion only over one type of loan contract, standard variable rates (SVR) loans. For 52% of the outstanding ROI mortgages on banks' balance sheets in July 2011, this adjustment is therefore impossible. Second, when applying our identification strategy to the sample of SVR mortgages originated before December 2009, we find no evidence of rate adjustment following the moratorium. We hypothesize that banks may delay pricing adjustment in order to maintain business volumes, or perhaps to avoid increasing the debt burden and probabilities of default, particularly given the presence of heightened moral hazard during the period as outlined by O'Malley (2020).

We then undertake to trace the effect of this shock onto originations. We investigate whether newly originated loan risk characteristics change after the Dunne judgment on both sides of the border. Our estimates suggest that banks respond to the moratorium on collateral repossession by reducing the risk profile of their new lending in 2011. However, we find even stronger results when estimating the effect of the *removal* of this moratorium: when contract enforcement is improved, banks expand their credit risk appetite, and issue loans with substantially weaker credit risk scores, higher loan to value ratios, and higher probabilities of subsequent default or modification.

Our results contribute to the literature on creditor protection and credit markets (Porta et al., 1998; La Porta et al., 1997). Pence (2006) in the US, Fabbri and Padula (2004) and Jappelli et al. (2005) in Italy, and Ponticelli and Alencar (2016) in Brazil demonstrate how high legal enforcement costs hinder access to finance for households and firms. Degryse et al. (2019) highlights the underlying mechanism works through creditor rights and debt enforcement procedures affecting expected recovery rates. We document spillovers from loans for which a given legal framework is relevant to other loans via the lender's balance sheet they are jointly held on. We are able to give a causal interpretation of this effect by analyzing a unique unexpected shock to a repossession regime.

Our paper also contributes to the growing literature on the importance of non-performing loans (NPL) ratios on bank loan origination. Accornero et al. (2017) have recently shown using matched bank-borrower Italian data that new loan growth is weaker for firms borrowing from banks experiencing an increase in their NPL ratios as part of the ECB's Comprehensive Assessment in 2013. Other studies have shown that countries that actively reduce NPL ratios experience greater investment and GDP growth than countries that allow NPLs to remain on banks' balance sheets (Balgova et al., 2016) and that banks with higher NPL ratios experience a higher cost of capital and market funding, and a

subsequently lower level of liquidity and credit creation (Chiesa and Mansilla-Fernández, 2018). Because the moratorium we study generates non-performing loans while protecting homeowners, it is preventing other households from access credit markets.

The paper proceeds as follows. Section 2 details the institutional framework, our identification strategy and the data we run the analysis on. Section 3 lays out results on the pricing of outstanding mortgages; Section 4 focuses on new lending. Section 5 concludes.

2 Data

2.1 The Dunne Judgment

The shock to collateral values we study originates from the late identification of a legal loophole. On December 1st, 2009, the Irish Parliament passed the Land and Conveyancing Law Reform Act. This Act repealed the 1964 Registration of Title Act, which regulated conveyancing matters crucial to the mortgage market until then. While repealing the 1964 Act, the 2009 Act created a serious legal loophole. Setting out the obligations, powers and rights of mortgages, the 2009 Act sets they apply to *any mortgage created by deed after the commencement of this Chapter*. Loans originated *before* December 1st, 2009 are not regulated by this Act.

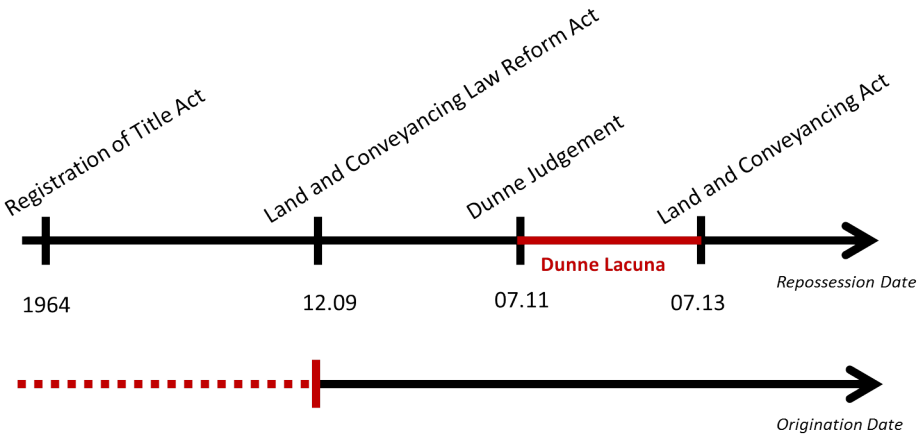

Figure 1: The Dunne Judgment and Affected Loans

Ms Justice Dunne identified the consequences for mortgage repossessions in *Start Mortgages & ors v. Gunn & ors [2011]*, the High Court Judgement she made on July 25th, 2011. Because loans

originated before December 2009 were no longer regulated by the 2009 Land and Conveyancing Law Reform Act, it was no longer obvious the banks could repossess registered land in case of default. Her judgement establishes lenders have acquired the right to start repossession proceedings if two conditions are met. First, the loan was in default before December 1st 2009. Second, the demand for repayment was sent before December 1st 2009 as well. Practically, this judgment prevented banks from repossessing any property acting as security against a loan issued before December 1st 2009. Mid-2011, these loans represented approximately 95 per cent of the mortgage portfolios of Irish banks.

This ruling was highly unexpected. Preventing the repossession of pre-December 2009 loans was never the intention of the legislator when passing the Land and Conveyancing Law Reform Act. At that time, legislators thought the Interpretation Act of 2005 would allow repossessions to continue as usual in spite of the repeal of relevant legal provisions (Mee, 2010). But as ruled by Ms Justice Dunne, the Interpretation Act only provided continuity for loans defaulted and for which repossession proceedings had started *before* December 2009.

This decision amounted to a shock to the value of loans already on the books of Irish lenders. Mortgages are secured by the house they finance. Because repossessing the house securing mortgages issued before December 2009 became impossible, the risk on this portfolio went up significantly. First, mortgage lending was rendered unsecured overnight and the loss given default increased to 100 percent. Further, the ruling introduced substantial moral hazard risks: O'Malley (2020) computes the effect of the judgment on the probability of default of Irish mortgages. Using a difference-in-difference estimator comparing loans issued either side of the 2009 cut-off, and observing their repayment behaviour either side of the judgment, he shows that loans subject to the foreclosure moratorium had a 40 to 60 per cent increase in their quarterly default rate, relative to the counterfactual.

Closing the lacuna was an important part of resolving the Irish arrears crisis. In December 2012, Irish policymakers committed to introduce a new law by March 2013, to enable the repossession of mortgages originated before December 1st 2009 (IMF, 2012). The Land and Conveyancing Law Act was adopted on July 24th 2013. Its objective is *"to provide that certain statutory provisions apply to mortgages of a particular class notwithstanding the repeal and amendment of those statutory provisions by the Land and Conveyancing Law Reform Act 2009"*. The adoption of the Act in July 2013 is when the probability of default and loss given default were reduced for the vast majority of loans outstanding on Irish banks' balance sheets.

As the probability of default and loss given default significantly increased when the lacuna was

discovered, they decreased when it was closed. We can analyze two changes to a legal repossession regime and how lenders adjusted to them: the Dunne judgment in July 2011 and the Land and Conveyancing Act in July 2013. We refer to the period between these two events (July 2011 - July 2013) as the repossession freeze, or moratorium, period. We define a pre-moratorium period from January 2010 to 23 July 2011, and a post-moratorium period from 25 July 2013 to December 2014.

2.2 Empirical Strategy

We want to assess how lenders adjust to these shocks to the repossession regime, through rates charged on loans on books as well as the characteristics of originations. Because the shocks are system-wide, we cannot directly compare rates or characteristics just before and just after the shocks. We would be capturing any other macroeconomic shock affecting the Republic of Ireland economy at the time.

But Republic of Ireland lenders do not serve only households in their jurisdiction. There has been a long tradition of Irish banks lending directly in the UK which pre-dates Irish independence and continued thereafter (McGowan, 1988). This is particularly strong in Northern Ireland with large subsidiaries of Irish banks continuing to operate North of the border. Presently, two main banking groups in Ireland (Bank of Ireland and AIB) have considerable ongoing activities in the UK market. Bank of Ireland have a particularly large presence in the UK. Their acquisition of Bristol and West Building Society in the 1990's gave them a foothold in the market and, currently, they lend directly as Bank of Ireland UK but also provide savings and loans products through their strategic alliance with the UK Post Office. Using data from their Annual Report[1], as of Q4 2016, the total stock of UK mortgage loans outstanding for Bank of Ireland was valued at €23.8bn which is only marginally smaller than their Irish portfolio with €24.4bn outstanding. In fact in the year to end 2016, the value of new mortgage lending was nearly two times larger in the UK at €2.8bn as compared to €1.4bn in ROI. AIB's UK presence is more regionally focused with a majority of activity being worked through First Trust, its wholly owned subsidiary in Northern Ireland. They also lend through AIB UK Group directly into the UK market. In total, AIB held €1.5bn worth of UK mortgages outstanding.

Thanks to the strong presence of Irish lenders in the United Kingdom, we are able to build a control group to analyze the effect of the shocks to the repossession regime. Loans originated in the UK and the Republic of Ireland face similar repossession regimes as they share a common legal origin (DJE, 2013) but the Dunne Judgement only applies to Republic of Ireland loans.

[1] https://investorrelations.bankofireland.com/app/uploads/BOI-Annual-Report-2016.pdf

Our control group only includes Northern Ireland loans. During our estimation period, the physical border between the ROI and UK on the island of Ireland was in effect non-existent.[2] As a within-European Union border, goods, services and people could travel freely across the border, with goods and labour markets highly integrated across the two regions.

To ensure comparability with Northern Ireland, our treatment group zooms in on the Border region of the Republic of Ireland (counties Cavan, Donegal, Leitrim, Louth, Monaghan and Sligo, see Figure 2). Table 2 shows that the industrial structure of the two regions is remarkably similar. The only noticeable difference is the relatively greater importance of agricultural employment in the ROI Border region and of administrative and support service activities in Northern Ireland. This is primarily due to the fact that Northern Ireland includes Belfast, an administrative center and the second-largest city on the island of Ireland, whereas the ROI Border region does not include a large urban center.

Figure 3 displays the evolution of house prices and unemployment in the ROI, ROI Border region and NI. For both these variables, the level difference between outcomes in ROI and NI during the period is worth noting. This is because the period under study incorporates the peak of the Irish financial crisis and beginnings of the subsequent recovery. The Irish banking system during the period was also undergoing the "Financial Measures Program", a program of supervision and restructuring involving the European Commission, European Central Bank and International Monetary Fund, as part of the overall program of financial support to the Irish state during the crisis.

Despite these important level differences across the series, it is notable the evolution of the series over time, particularly between 2010 and 2014, is similar across the regions. All of these facts support the usage of Northern Ireland as a useful control group when thinking about the evolution of risk-taking either side of a legal system shock by Irish banks in the ROI.

The main difference between the Republic of Ireland and Northern Ireland we have to adjust for is the currency. The Republic of Ireland uses the Euro while Northern Ireland is a Pound Sterling area. For this reason, the Euro-Sterling exchange rate may influence credit allocation decisions either side of the border. In our setting, these differences in exchange rates will be collinear with time dummies included in all empirical specifications.

[2]The 1998 "Good Friday Agreement", which brought about a cessation of conflict and the creation of regional power-sharing institutions in Northern Ireland, led to the complete elimination of waiting times and check-points along the border.

2.3 Loan-level Data

We use data from the Central Bank of Ireland's mortgage Loan Level Data (LLD). The LLD were first collected in March 2011 as part of the Prudential Capital Assessment Review (PCAR) assessment of bank solvency which ultimately resulted in State financial support being provided to six domestic Irish banks in the guise of the Financial Measures Programme (FMP). Of these six banks, four remained as going concerns at the end of the FMP: Allied Irish Banks (AIB), EBS, Bank of Ireland (BOI) and Permanent TSB (PTSB), with EBS being subsumed into the AIB group as part of the FMP.

Information on each loan outstanding at December 2010 at the subject banks was provided as part of PCAR. After the PCAR process, an additional dataset was provided pertaining to the December 2011 profile of all outstanding loans at the subject banks, with twelve months of arrears history to December 2010 provided. After December 2011, the Central Bank has received LLD every six months from these banks, with the most recent dataset usable at the time of writing relating to December 2019. During our estimation window, we focus on the lending of AIB-EBS, BOI and PTSB, which together accounts for around two thirds of the Republic of Ireland mortgage market during the period.

Monthly information on loan performance is complemented by time-varying information which is updated every six months on items such as a loan's current outstanding balance, interest rate, interest rate type, payment type, modification status, loan to value ratio (LTV) and loan maturity date. Furthermore, a wide range of time-invariant fields are also observable in the data, for example First Time Buyer status, Buy to Let status, drawn balance at origination, originating borrower income, originating LTV, borrower and collateral location, date of origination. As Irish banks also serve UK customers, we are able to observe Northern Ireland loans using the same data source.

3 Outstanding Loans

We study how lenders adjust to the repossession freeze and its lifting on their stock of loans. One could expect that, as in Cerqueiro et al. (2016), banks respond to the moratorium by increasing rates for the now riskier loans.

In both the ROI and the UK, Irish banks predominantly issue three types of mortgage: (i) a mortgage with an initial fixed-rate period (often 1, 2, 3, or 5 years); (ii) Tracker mortgages, where the loan rate follows a base policy rate with a fixed margin; (iii) a "Standard Variable Rate" (SVR)

mortgage, a floating rate loan without indexation, i.e. the lender has discretion over when the interest rate changes. Lenders can adjust rates on SVRs only. Even if they are the predominant type of outstanding mortgages, they hardly represent about half of the total portfolio (47 per cent of ROI mortgages outstanding and 38 per cent of UK mortgages in our sample as of December 2012). The second-most popular mortgage product in our data is the Tracker mortgage, which accounted for 41 per cent of ROI mortgages and 45 per cent of UK mortgages at the same time. The remaining 11 and 16 per cent of ROI and UK loans, respectively, were on fixed interest rates at the time.

In this section, we study rates adjustments on the sample of SVR mortgages only. We test two hypotheses: (i) banks respond to the ROI moratorium in July 2011 by increasing the interest rate charged on outstanding floating-rate loans (H_1^O) ; (ii) banks respond to lifting of the ROI moratorium in July 2013 by reducing the interest rate charged on outstanding floating-rate loans (H_2^O).

3.1 Specification

We compare interest rates across ROI and NI loans before and after the shock in a difference-in-difference setting. We estimate β in

$$r_{it} = \alpha_i + \beta Moratorium_{On} + \gamma ROI + \delta Post + \lambda_b + X_{it} + \epsilon_{it} \tag{1}$$

r_{it} is the interest rate charged to borrower i in quarter t. $Moratorium_{On}$ is an indicator for the moratorium to be active. Our observation window is the year 2011. $Moratorium_{On}$ takes a zero in all four quarters for Northern Ireland loans, and switches from zero to one for ROI loans in the third and fourth quarters of 2011. We also include a dummy for being in the treated jurisdiction (ROI) and in the post period ($Post$).

Rates charged to borrowers depend on an array of factors on top of the relevant judicial framework. The origination date and borrowers characteristics (whether a first time buyer, their income...) can also drive rates adjustments. Because we repeatedly observe all loans on balance sheets and the rates they are charged, we can control of all such time-invariant characteristics by including a loan fixed effect, α_i.

We further control for shocks that could affect the Border region and Northern Ireland asymmetrically. House prices are highly relevant to the valuation of mortgages, as a driver of the loss given default. And the unemployment rate is highly relevant to the probability of default for this product. To avoid capturing area specific trends in both these variables, we add them as regressors at a region-quarter level (X_{it}).

The magnitude of a lender's adjustment depends on its available buffers. A poorly capitalized bank might be more likely to adjust rates upward when loans become riskier. To the contrary, a well capitalized one might choose not to pass-through the shock to protect its clientele. We include bank fixed effects (λ_b) to compare loans within a single bank, hence facing the exact same trade-offs when deciding on the adjustment.

We use a symmetric set-up to assess the impact of the end of the moratorium (H_2^O). We observe rates charged for the year 2013. $Moratorium_{Off}$ replaces $Moratorium_{On}$ and is equal to 1 for ROI loans in the third and fourth quarter. *Post* is set to one in the second half of 2013.

Our sample for all regressions is limited to SVR loans originated before December 1st, 2009 that are present in the data in all twelve quarters in the years 2011-2013. This is to avoid attrition bias when comparing the introduction and the lifting of the moratorium. This leads to a balanced panel with 25,971 ROI Border and 6,425 Northern Ireland loans each quarter.

3.2 Results

Table 3 lays out results for the introduction of the repossession freeze. We find no evidence that rates charged on mortgages already on books were raised more in the Border region of the Republic of Ireland than in Northern Ireland following the repossession freeze. In column (1), Irish loans are shown to have an interest rate that is 107 basis points higher than UK loans on average throughout the sample, without any change in the slope after June 2011.

One might be worried that we fail to find evidence of a pass-through of heightened risk because we are comparing two jurisdictions. Banks have a home bias and might wish to favor domestic borrowers over foreign ones.[3] If competition is not too stringent, they might smooth out the shock by charging higher rates to both Republic of Ireland and Northern Ireland customers. In that case, our identification strategy will fail to pick up the pass-through as it focuses on the difference between rates across the regions. To alleviate these concerns, we use a triple difference strategy. We further contrast loans originated before and after the December 1st, 2009 cut-off, à la O'Malley (2020). We are now focusing on rates for loans originated before December 1st, 2009 in the Republic of Ireland and how they differ from rates charged for loans on the other side of either the cut-off date or the border. Again, we do not

[3] While there is a long literature on home bias in banking, McCann and O'Toole (2019) show that risk-taking abroad does increase moderately in response to macroprudential lending restrictions at home, looking at Irish banks' UK lending relative to lending by local competitors.

find any significant difference (column (2)). In this setting, we document a 124 basis point differential between Irish and UK loans, and a 32 basis point differential for loans originated before December 2009, but no evidence of any change in loan pricing as a response to the moratorium.

We interpret this absence of pass-through as a consequence of the impossibility to repossess. If the lender raises rates, she increases the borrower's debt burden hence his probability of default. In a set-up with no repossession backstop where default is unconditionally more likely (O'Malley, 2020), raising rates would not help contain risk on the portfolio.

We look into lenders' adjustment to the symmetric shock - the lifting of the moratorium in July 2013 - in Table 4. As lenders maintained rates when risk went up, they are not adjusting them back down. We find a non-significant impact of the lifting of the repossession freeze when using our main difference-in-difference specification (column 1) or the triple difference approach (column 2). The loan pricing margin of adjustment is not part of Irish banks' reactions to either the introduction of removal of the repossession moratorium.

4 New Lending

As lenders do not pass through the additional risk on outstanding loans to these very loans, we investigate if their adjustment strategies involves other portfolios. Within banks, risk is often managed at the line of business level. The mortgage portfolio manager targets a level of risk and makes necessary adjustments to remain within the boundaries agreed upon at the Board level. If the risk of loans already on books turns out bigger than expected, originations are an easy lever to activate. Lowering additional risk taking from newly originated loans helps keeping portfolio risk under control. This is especially relevant for Irish lenders, who "originate and hold".[4]

In this section, we study the pass-through of the repossession freeze shock to credit conditions for originations. We test two hypotheses: (i) banks respond to the ROI moratorium in July 2011 by reducing the risk profile of new lending (H_1^N) ; (ii) banks respond to the lifting of the ROI moratorium in July 2013 by loosening the risk profile of new lending (H_2^N).

[4]Off-balance sheet securitization has historically not been a prominent feature of Irish mortgage lending. In certain cases since the crisis, banks have utilized securitization to transfer Non-Performing Loans risk off their balance sheets. However, newly-issued loans are rarely if ever securitized with risk transfer.

4.1 Specification

We compare credit conditions for loans newly originated around the repossession freeze announcement and its lifting across the Republic of Ireland Border region and Northern Ireland. Over the 2010-2014 period, aggregate levels of originations follow a similar pattern across the two regions (Figures 4 and 5). We estimate β in

$$Y_i = \alpha + \beta Moratorium_{On} + \gamma ROI + \delta Post + X_i + R_i + \lambda_t + \lambda_b + \lambda_{LG} + \epsilon_i \quad (2)$$

Y_i is a measure of credit conditions. We proxy credit conditions by loan characteristics at origination. We use the internal credit score at origination, summarizing all relevant borrower information available to the lender. We include bank fixed effects (λ_b) to get around cross bank score comparison issues.[5] Alternatively, we use the origination loan-to-value. This is an important parameter as it drove differential pricing on floating rate loans.[6] We also leverage ex-post measures of risk and create an indicator of subsequent trouble, set to one if the loan experiences default or is modified.

As in the previous section, $Moratorium_{On}$ is an indicator for the moratorium to be active, γ_{ROI} and $Post$ are dummies for being in the treated jurisdiction and in the post period, respectively. Since credit conditions can change with the macroeconomic environment, we include a set of time fixed effects (λ_t) and control for regional unemployment.

We only observe the origination characteristics of mortgages once in our pooled cross-section of new mortgages. To plausibly purge estimates of β of unobserved heterogeneity, we follow Auer and Ongena (2016), and create loan groups λ_{LG}. Degryse et al. (2018) shows such a strategy performs a similar function to a more fully-saturated set of demand controls using multi-bank, multi-firm data à la Khwaja and Mian (2008). We work with 142 loan groups, the combination of First Time Buyer v. Second Purchase, Property Type (3 types), Borrower Age (3 groups), Fixed v. Variable, Single v. Joint Mortgage, Within-Country-Year house price quintiles. These "loan group fixed effects" saturate the model of any credit demand that is common to borrowers, on either side of the ROI-UK border, that share the set of common characteristics laid out above.

There is potential for borrowers to sort either side of the beginning and end point of the morato-

[5] Due to the lack of an exhaustive credit registry in Ireland at the time underwriting on the basis of external credit scores such as FICO was non-existent.

[6] Gupta and Hansman (2019) have shown there is a relationship between strong positive relationship between origination LTV and subsequent default, with 40 per cent of the effect resulting from leverage itself, and the other 60 per cent resulting from adverse selection of riskier borrowers at higher OLTVs.

rium as a response to the shock. If such sorting existed and was not adequately controlled for, it would present issues for our identification. To address the possibility that substantial shifts in composition may drive our results, we split our sample into six groups: pre-moratorium, during moratorium and post-moratorium, either side of the border. We document the share of First Time Buyers, detached houses, fixed-rate mortgages and single borrowers, along with average borrower age (Table 1). While there are some differences across time periods within each country, broadly there is a reasonably stable sample. We are comfortable using our "loan group fixed effects" as demand-side controls knowing one particular group is unlikely to be highly over or under-represented either side of our cut-offs for identification.

We perform a symmetric analysis around the removal of the repossession freeze to test whether credit conditions were adjusted then (H_2^N).

4.2 Results

Table 5 give results for the internal credit score at origination. Columns (1) and (2) consider the entire period 2010 to 2014, where the periods in which $Moratorium$ is equal to zero straddle either side of the July 2011- July 2013 period, when the moratorium was active. When considering this whole period, we cannot find any effect of the presence of the moratorium on the risk profile of new loans (column 1). Results are similar when further controlling for regional unemployment (column 2).

In columns 3 and 4 we focus solely on the introduction of the moratorium and restrict the sample to January 2010 to July 2013 . We expect that, upon the introduction of the moratorium, Irish banks would tighten their credit standards disproportionately in Ireland relative to the UK. Again, in both cases (with and without a time-varying control for regional unemployment), we find no significant coefficient on $Moratorium_{On}$.

Finally, when focusing on the closing of the loophole in July 2013, using a sample of loans originated between July 2011 and end-2015, we find a significant adjustment. The average credit score decreases by 7-8 points following the lifting of the moratorium, a magnitude of one fifth of a standard deviation. This result is robust across columns 5 and 6 to controlling for regional unemployment. The interpretation of the finding is in line with H_2^N: when the legal loophole was closed, Irish banks provided credit to increasingly riskier borrowers, as per their own internal credit scoring assessment.

Table 6 measures credit conditions using the origination LTV. Consistently with the results using

internal credit scores, when considering the whole period (columns 1 and 2) or the period around which the moratorium is put into effect (columns 3 and 4), we cannot find any effect. But using this other risk measure, we confirm previous results for the period around July 2013. Irish banks granted loans to borrowers with higher LTV once the Dunne judgment loophole was closed. The effect is non-negligible, with loans in the Border region of ROI increasing by 5.8 to 8 points more than the counterfactual loan in NI (relative to a standard deviation of 25 and a mean of 67 across the sample). This again suggests some credit loosening on new loans once the legal uncertainty created by the moratorium is removed from law.

Lenders might consider information other than the credit score and the OLTV when originating these loans, which could bias our estimates. But this information would be revealed by ex-post risk measures. In Table 7 our dependent variable takes a one if the loan experienced modification or default at any point from origination until the end of 2016. We are no longer comparing expected but realized risk, which takes us one step closer to lenders' risk appetite.

In Columns (1) and (2), we now find supporting evidence that, relative to the period where there is no moratorium, subsequent "troubled rate" on new loan issuance is 4.9 to 5.8 points lower for loans issued during the moratorium, suggestive of less risk-taking by banks on their ROI loans. Looking specifically at the initial shock, $Moratorium_{On}$, we estimate that this negative shock to the value of existing loans lowered the subsequent "trouble rate" by 3 to 3.5 percentage points. The previous conclusion of increased risk-taking after the closing of the loophole is confirmed here also (columns 5 and 6): the subsequent default rate is 8.4 to 8.5 percentage points higher on ROI loans issued once the moratorium is lifted.

These are all large effects, given that the rate of subsequent trouble across our entire estimation sample is 7 per cent. The doubling of the coefficient on $Moratorium_{Off}$, when compared to $Moratorium_{On}$, in Table 7, combined with the findings of Tables 5 and 6, all suggests some asymmetry: according to our models, banks' risk taking is more responsive on the upside to the removal of the moratorium in 2013 than on the downside as a response to the initiation of the moratorium in 2011. This may possible reflect time delays in processing news and implications of the judgment in 2011; by 2013, market participants may have been more familiar with the existence of the moratorium and had prior information on the passage of its removal through the courts system.

One noteworthy pattern is the seemingly stronger and more often statistically significant effect of $Moratorium_{Off}$ relative to $Moratorium_{On}$. This relative finding may suggest that banks are sluggish to respond to short-run, unexpected changes to the lending environment. The decision to alter credit policy may not have occurred in the immediate days following the judgment, and the transfer of decision-making may not immediately filter throughout the network of bank lending officers. By

contrast, it is plausible that there was more information available in the run-up to the removal of the moratorium in 2013 which would have allowed banks to be more prepared to loosen lending criteria.

5 Conclusion

Legal frameworks are highly relevant to credit markets development. In this paper, we show that changes to repossession frameworks can spill over to contracts they are irrelevant for. This is because different debt contracts are held on a same balance sheet that acts as a transmission channel. Lenders can adjust to a legal change on part of their portfolio by changing credit conditions on another. We are able to give a causal interpretation of the effect as we analyze a rare unexpected shock to a legal framework. We exploit an exogenous shock to the ability of Irish banks to repossess collateral on home mortgages in the Republic of Ireland in 2011. We benefit from the existence of lending on both sides of the Ireland - United Kingdom border by the same lending institutions to construct a counterfactual group of loans not subject to the 2011 shock.

We find banks respond to the moratorium on collateral repossession by reducing the risk profile of their new lending in 2011. And we find even stronger results when estimating the effect of the *removal* of this moratorium: when contract enforcement is improved, banks expand their credit risk appetite, and issue loans with substantially higher credit risk scores, loan to value ratios, and probabilities of subsequent default or modification.

Our paper also offers valuable lessons for the current European debates on Non-Performing Loan resolution. Vítor Constâncio, the then Vice-President of the European Central Bank, stated that "if the entire amount of capital currently tied up by NPLs is used to support new lending, total credit volume in the euro area may increase, in the most optimistic variant, by about 2.5% and up to 6% in the group of 6 countries with higher NPLs" (Constâncio, 2017). We show there is indeed a direct link between NPLs and new credit provision: when the value of banks' capital suffers a negative shock through the NPL channel, they adopt more conservative lending policies.

A further implication of our finding is that a debtor-friendly legal and institutional environment comes with costs: where banks have difficulty in enforcing contracts, prospective borrowers attempting to enter the housing market may suffer from the tightening of origination credit conditions. The Dunne Judgment itself was not a policy measure aimed at protecting homeownership. Rather, it was a technical legal judgment that had identical effects to deliberate debtor-friendly policies such as foreclosure moratoria. Policies that may at first glance appear desirable from the point of view of

protecting homeownership may have negative spillovers to those who would otherwise use a mortgage to become homeowners.

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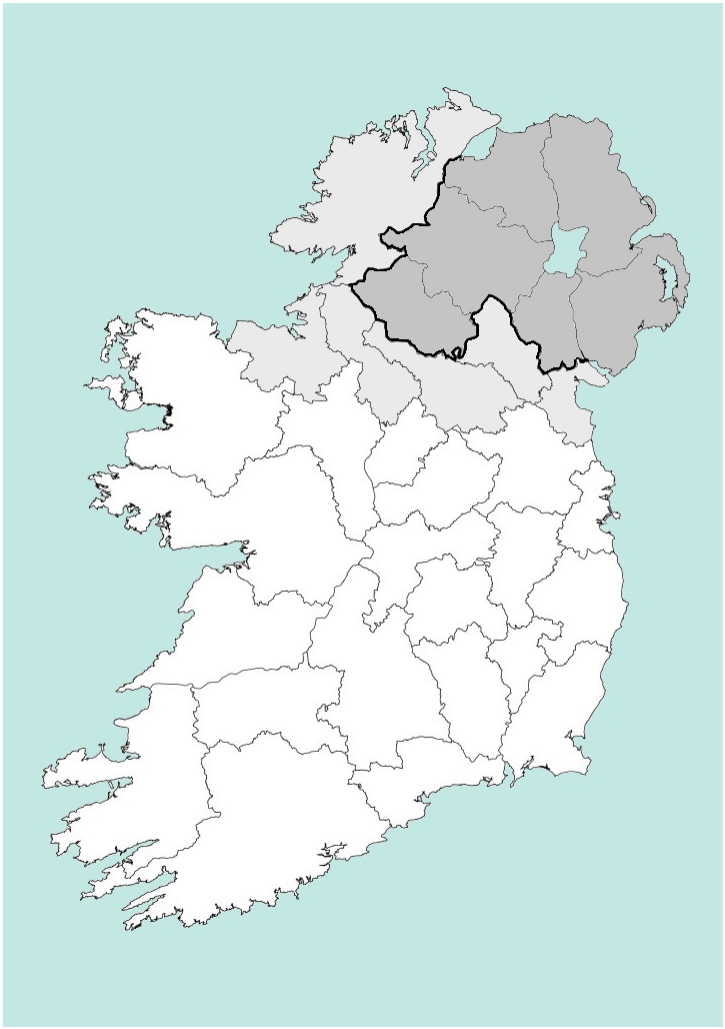


Figure 2: Map of Ireland

Note: The thick black line materializes the border between the Republic of Ireland and Northern Ireland (in dark gray). Counties in light gray are bordering counties from the Republic of Ireland: Cavan, Donegal, Leitrim, Louth, Monaghan and Sligo. The Border Region spans 12,156 km2, 17.3% of the total area of the Republic of Ireland and has a population in excess of 432,500. Northern Ireland spans 14,130 km2 and its population was 1.8 million in 2011 according to the UK census. Note that in 2016, after our estimation window is closed, Louth was removed from the Border region of the Republic of Ireland as part of an administrative review.

Table 1: Sample composition before, during and after the moratorium, across ROI and Northern Ireland lending

	FTB	Detached House	Borrower Age	Fixed Mortgage	Single Borrower
Panel A. Republic of Ireland					
Pre	55.8%	50.6%	35.36	23.5%	44.4%
During	65.8%	68.2%	34.58	17.9%	43.0%
Post	57.5%	48.3%	36.33	28.2%	38.5%
Panel B. Northern Ireland					
Pre	32.9%	29.1%	38.60	15.1%	29.6%
During	33.8%	30.8%	38.66	49.3%	30.3%
Post	31.8%	17.0%	39.46	77.3%	30.3%

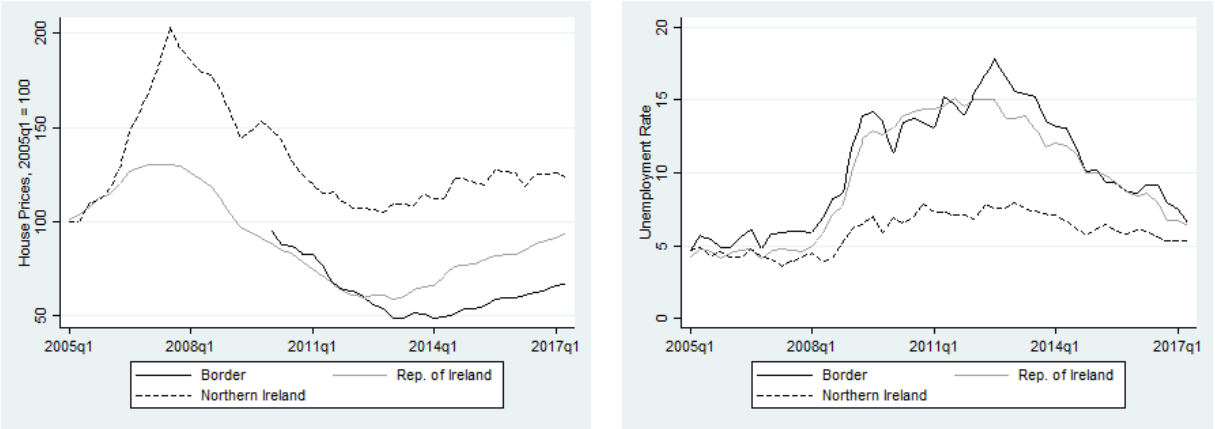
Note: This table reports summary statistics. We report the share of first time buyers (FTB), the share of detached houses, the average age of the borrower, the share of fixed mortgages and the share of single borrowers. Panel A reports these data for the Republic of Ireland subsample. Panel B reports these data for the Northern Ireland sample. For each panel, we provide values for before (January 2010 - 24 July 2011), during (25 July 2011 - 24 July 2013) and after (25 July 2013 - December 2014) the moratorium.

Table 2: Employment Shares in Northern Ireland and the ROI Border region, 2015

Sector	NI	Border
Agriculture, forestry and fishing (A)	4%	11%
Industry (B to E)	12%	14%
Construction (F)	6%	7%
Wholesale and retail trade, repair of motor vehicles and motorcycles (G)	16%	14%
Transportation and storage (H)	4%	4%
Accommodation and food service activities (I)	6%	7%
Information, Financial, Real Estate (J, K, L)	6%	4%
Professional, scientific and technical activities (M)	4%	4%
Administrative and support service activities (N)	7%	2%
Public administration and defence, compulsory social security (O)	6%	5%
Education (P)	9%	8%
Human health and social work activities (Q)	15%	14%
Other NACE activities (R to U)	5%	5%

Source: Office of National Statistics, Central Statistics Office, Authors' calculations

Figure 3: House Prices Indices and Unemployment Rates in Northern Ireland, the Republic of Ireland and its Border Region.



(a) House Prices. **(b) Unemployment Rates.**

Source: Office for National Statistics for UK unemployment, Nationwide for UK house prices and Central Statistics Office for both RoI house prices and RoI unemployment.
Note: The house price index for the Border region is for houses only. House price indices for Northern Ireland and the Republic of Ireland are for all home types (houses and apartments).

Figure 4: New lending across the border, 2010 to 2014.

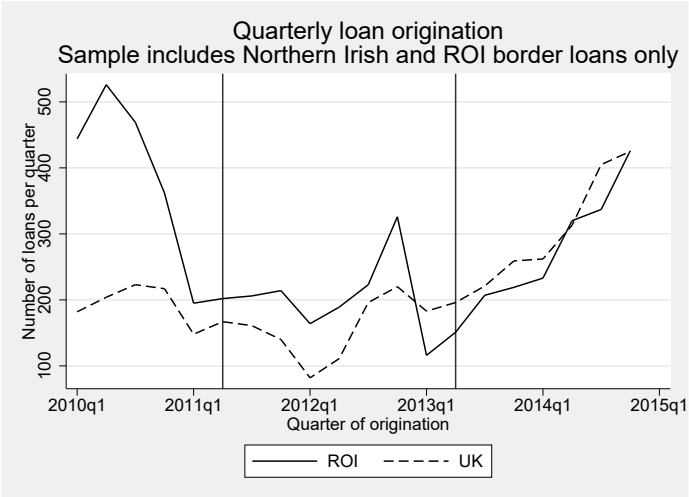


Figure 5: New lending across the border (loan balances), 2010 to 2014.

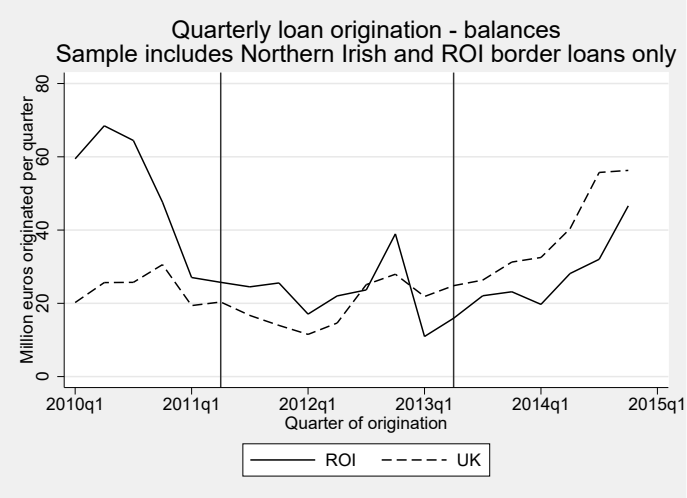


Table 3: Interest Rates around the Introduction of the Repossession Freeze (2011)

	DiD	Triple Diff
Post 2011 Q2	-0.0000871	-0.000252
	-0.00625	-0.0399
Ireland	1.073***	1.237***
	-0.00557	-0.0294
Treatment Effect	-0.000295	
	-0.00638	
Originated Pre Dec 2009		0.321***
		-0.0285
Treatment Effect		-0.00342
		-0.0414
Originated Pre Dec 2009, Post		6.65E-11
		-0.0403
Originated Pre Dec 2009, Irish		-0.172***
		-0.0296
Triple Difference		0.00315
		-0.0419
Constant	2.202***	1.907***
	-0.00653	-0.0286
Observations	130451	138170
R^2	0.79	0.778

Note: The sample includes standard variable rate mortgages observable in all 12 quarters 2011 to 2013 and issued in the Border region of the Republic of Ireland and in Northern Ireland. Our observation period is the year 2011. The dependent variable is the interest rate charged on these loans every quarter. We compare rates charged to mortgages collateralized by homes in the Border region of the Republic of Ireland, before and after the introduction of a moratorium on repossessions in July 2011, using mortgages collateralized by homes in Northern Ireland, with a constant repossession framework over the period, as a control group. In column (1), we include only loans issued before December 1st, 2009, that is loans to which the repossession freeze is relevant. Post 2011 Q2 is a dummy for quarters 2011Q3 and 2011Q4. Ireland is a dummy for the loan being originated in the Border region of the Republic of Ireland. Treatment effect is the interaction of Post 2011 Q2 and Ireland. In column (2), we include loans originated on both sides of the December 1st, 2009 cut-off to conduct a triple-difference strategy. We compare rates charged on loans originated in the Border region of the Republic of Ireland before December 1st, 2009, before and after the introduction of a moratorium on repossessions in July 2011, using loans originated on the other side of the border or the cut-off as a control group. Originated Pre Dec 2009 is a dummy for the loan being originated before December 2009. Originated Pre Dec 2009, Post is the interaction of Originated Pre Dec 2009 and Post 2011 Q2. Originated Pre Dec 2009, Irish is the interaction of Originated Pre Dec 2009 and Ireland. Triple Difference is the interaction of Originated Pre Dec 2009, Ireland and Post 2011 Q2. Regressions include bank dummies, the regional rate of unemployment and regional house prices. Standard errors in parentheses; * $p < .1$, ** $p < .05$, *** $p < .01$.

Table 4: Interest Rates around the Lifting of the Repossession Freeze (2013)

	DiD	Triple Diff
Post 2013 Q2	0.000295	0.0314
	-0.00572	-0.0313
Ireland	-0.0862***	-0.0783***
	-0.00504	-0.0232
Treatment Effect	-0.00218	
	-0.00582	
Originated Pre Dec 2009		0.132***
		-0.0224
Treatment Effect		-0.00993
		-0.0325
Originated Pre Dec 2009, Post		-0.0312
		-0.0317
Originated Pre Dec 2009, Irish		-0.00934
		-0.0235
Triple Difference		0.00774
		-0.033
Constant	4.612***	4.489***
	-0.00591	-0.0226
Observations	143903	154200
R^2	0.038	0.041

Note: The sample includes standard variable rate mortgages observable in all 12 quarters 2011 to 2013 and issued in the Border region of the Republic of Ireland and in Northern Ireland. Our observation period is the year 2013. The dependent variable is the interest rate charged on these loans every quarter. We compare rates charged to mortgages collateralized by homes in the Border region of the Republic of Ireland, before and after the lifting of a moratorium on repossessions in July 2013, using mortgages collateralized by homes in Northern Ireland, with a constant repossession framework over the period as a control group. In column (1), we include only loans issued before December 1st, 2009, that is loans to which the repossession freeze is relevant. Post 2013 Q2 is a dummy for quarters 2013Q3 and 2013Q4. Ireland is a dummy for the loan being originated in the Border region of the Republic of Ireland. Treatment effect is the interaction of Post 2013 Q2 and Ireland. In column (2), we include loans originated on both sides of the December 1st, 2009 cut-off to conduct a triple-difference strategy. We compare rates charged on loans originated in the Border region of the Republic of Ireland before December 1st, 2009, before and after the lifting of a moratorium on repossessions in July 2013, using loans originated on the other side of the border or the cut-off as a control group. Originated Pre Dec 2009 is a dummy for the loan being originated before December 2009. Originated Pre Dec 2009, Post is the interaction of Originated Pre Dec 2009 and Post 2013 Q2. Originated Pre Dec 2009, Irish is the interaction of Originated Pre Dec 2009 and Ireland. Triple Difference is the interaction of Originated Pre Dec 2009, Ireland and Post 2013 Q2. Regressions include bank dummies, the regional rate of unemployment and regional house prices. Standard errors in parentheses; * $p < .1$, ** $p < .05$, *** $p < .01$.

Table 5: Model of Internal Origination Credit Scores

	(1)	(2)	(3)	(4)	(5)	(6)
$Moratorium$	4.086*	3.972				
	(2.235)	(3.200)				
$Moratorium_{On}$			1.300	4.622		
			(3.269)	(3.967)		
$Moratorium_{Off}$					-7.989***	-8.305**
					(2.244)	(3.750)
UK	-5.248***	-4.906	-7.797**	-19.26	-8.305***	-9.421
	(2.027)	(9.027)	(3.094)	(14.39)	(2.051)	(10.46)
Regional Unemployment		0.0548		-1.780		-0.133
		(1.302)		(1.970)		(1.168)
Constant	624.6***	623.9***	629.6***	650.8***	653.9***	655.9***
	(7.739)	(17.31)	(7.745)	(25.26)	(7.130)	(18.90)
Observations	5218	5218	3359	3359	3590	3590
R^2	0.134	0.134	0.120	0.121	0.159	0.159

Note: We compare credit conditions for originations around the introduction (July 2011) and the lifting (July 2013) of a repossession freeze in the Republic of Ireland. We measure credit conditions by the internal origination credit score. We only include one bank in this model. A higher value of the credit score implies a lower credit risk. The average score in the sample is 649, with a standard deviation of 42 points. In columns 1 and 2, we include loans originated over 2010-2014. $Moratorium$ is set to one in the Border region of the Republic of Ireland between 26 July 2011 and 25 July 2013. In column 3 and 4, we restrict the sample to January 2010 to July 2013 to focus on the introduction of the moratorium. $Moratorium_{On}$ is set to one in the Border region of the Republic of Ireland between 26 July 2011 and 25 July 2013. In columns 5 and 6, we restrict the sample to July 2011 to Dec 2014 to focus on the lifting of the moratorium. I $Moratorium_{Off}$ is set to one in the Border region of the Republic of Ireland after 25 July 2013. UK is a dummy for the mortgages originated in Northern Ireland. Regressions include the regional unemployment rate and fixed effects for 142 loan types. Loan types are combinations of First Time Buyer status; Property Type; Fixed versus Variable rate; Borrower Age Group; Single Assessment; Self-Employed.

Table 6: Model of Origination Loan to Value

	(1)	(2)	(3)	(4)	(5)	(6)
$Moratorium$	-2.988***	-2.763*				
	(1.127)	(1.556)				
$Moratorium_{On}$			0.174	0.373		
			(1.352)	(1.831)		
$Moratorium_{Off}$					5.870***	8.191***
					(1.343)	(2.037)
UK	-4.901***	-5.574*	-3.548***	-4.215	-0.535	7.779
	(0.797)	(3.072)	(1.031)	(4.097)	(1.118)	(5.232)
Regional Unemployment		-0.108		-0.104		0.996
		(0.480)		(0.620)		(0.608)
Constant	54.13***	55.38***	51.28***	52.49***	58.45***	43.52***
	(2.669)	(6.196)	(3.075)	(7.881)	(3.649)	(9.843)
Observations	7709	7709	5141	5141	4906	4906
R^2	0.241	0.241	0.252	0.252	0.238	0.239

Note: We compare credit conditions for originations around the introduction (July 2011) and the lifting (July 2013) of a repossession freeze in the Republic of Ireland. We measure credit conditions by the origination loan to value. In columns 1 and 2, we include loans originated over 2010-2014. $Moratorium$ is set to one in the Border region of the Republic of Ireland between 26 July 2011 and 25 July 2013. In column 3 and 4, we restrict the sample to January 2010 to July 2013 to focus on the introduction of the moratorium. $Moratorium_{On}$ is set to one in the Border region of the Republic of Ireland between 26 July 2011 and 25 July 2013. In columns 5 and 6, we restrict the sample to July 2011 to Dec 2014 to focus on the lifting of the moratorium. I $Moratorium_{Off}$ is set to one in the Border region of the Republic of Ireland after 25 July 2013. UK is a dummy for the mortgages originated in Northern Ireland. Regressions include the regional unemployment rate, bank fixed effects and fixed effects for 142 loan types. Loan types are combinations of First Time Buyer status; Property Type; Fixed versus Variable rate; Borrower Age Group; Single Assessment; Self-Employed.

Table 7: Model of Subsequent trouble (Default or Modification)

	(1)	(2)	(3)	(4)	(5)	(6)
$Moratorium$	-0.0577***	-0.0487***				
	(0.00834)	(0.0122)				
$Moratorium_{On}$			-0.0349***	-0.0299**		
			(0.0112)	(0.0151)		
$Moratorium_{Off}$					0.0842***	0.0855***
					(0.00975)	(0.0145)
UK	-0.134***	-0.159***	-0.0835***	-0.0992***	-0.0965***	-0.0919**
	(0.00698)	(0.0261)	(0.00930)	(0.0357)	(0.00803)	(0.0385)
Regional Unemployment		-0.00412		-0.00250		0.000552
		(0.00404)		(0.00533)		(0.00447)
Constant	0.141***	0.189***	0.126***	0.156**	0.125***	0.116
	(0.0203)	(0.0542)	(0.0228)	(0.0706)	(0.0236)	(0.0728)
Observations	9246	9246	5906	5906	6066	6066
R^2	0.177	0.177	0.080	0.080	0.352	0.352

Note: We compare credit conditions for originations around the introduction (July 2011) and the lifting (July 2013) of a repossession freeze in the Republic of Ireland. We measure credit conditions by a trouble dummy set to one if the loan experiences default or is modified. In columns 1 and 2, we include loans originated over 2010-2014. $Moratorium$ is set to one in the Border region of the Republic of Ireland between 26 July 2011 and 25 July 2013. In column 3 and 4, we restrict the sample to January 2010 to July 2013 to focus on the introduction of the moratorium. $Moratorium_{On}$ is set to one in the Border region of the Republic of Ireland between 26 July 2011 and 25 July 2013. In columns 5 and 6, we restrict the sample to July 2011 to Dec 2014 to focus on the lifting of the moratorium. I $Moratorium_{Off}$ is set to one in the Border region of the Republic of Ireland after 25 July 2013. UK is a dummy for the mortgages originated in Northern Ireland. Regressions include the regional unemployment rate, bank fixed effects and fixed effects for 142 loan types. Loan types are combinations of First Time Buyer status; Property Type; Fixed versus Variable rate; Borrower Age Group; Single Assessment; Self-Employed.