

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

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Abstract

We assess the costs of an inefficient repossession regime on mortgage credit supply. We quantify the effects of a legal moratorium, which unexpectedly froze repossessions in Ireland from July 2011 to July 2013, on the provision of credit. Our identification strategy builds on the strong presence of Republic of Ireland banks in Northern Ireland, where they serve borrowers facing the repossession regime of the United Kingdom, which is unaffected by the shock. We document a change in risk taking behavior in reaction to this shock, consistent with banks shifting the probability of default (PD) on new loans in reaction to exogenous changes in both PD and loss given default (LGD) on their outstanding stock of loans. When the legal shock increases PD and LGD in Ireland, PDs on new loans fall; analogously, new loan PDs rise when outstanding loan PDs and LGDs are reduced through the ending of the foreclosure moratorium. We explain our results through a framework where banks shift the risk profile of new lending so as to balance the overall risk level on their portfolio.

Keywords: Law and Finance, credit risk, Loss Given Default, Probability of Default.

JEL Classification: G30

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1 Introduction

What determines banks' credit risk appetite? Convincing answers to this question are fundamental to an understanding of how banks operate and their role in the economic and financial cycle. In this paper we exploit an unexpected change in the legal environment around collateral repossession in the Republic of Ireland (ROI) in 2011 to provide causal evidence on the role of two factors previously shown to be important in the literature: a country's legal and institutional environment, and the credit quality of a bank's loan portfolio.

The link between legal institutions that protect creditors and investors in stimulating credit markets, firms' external financing, and ultimately investment and economic growth is long established [Porta et al. \(1998\)](#); [La Porta et al. \(1997\)](#). The primary mechanism underlying this link relates to the certainty and protections that these institutions provide, ensuring investors that contracts will be enforced in the event of breaches such as loan default. Given that legal institutions are deep-rooted in culture and history, the majority of studies in the literature do not isolate the causal role of institutions on external financing from other omitted factors such as risk aversion, political preferences and investment appetite.

Our study provides an opportunity to move beyond correlations between law and finance, in that we exploit the emergence of an *unexpected change* in the ability of banks to enforce loan contracts on their risk-taking appetite when issuing new loans. 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"). This led to the erosion of the certainty that investors normally require when issuing loan contracts, as well as to a substantial shock to the effective value of lenders' mortgage portfolios, given that both the Probability of Default (PD) and the Loss Given Default (LGD) on existing loans rose overnight and without warning.

Our econometric identification strategy builds on the strong presence of Republic of Ireland banks in Northern Ireland (NI), where they serve borrowers facing the repossession regime of the United Kingdom. Using the NI mortgage market as a control group, and using only the set of banks that lend in both the ROI and NI, we carry out difference-in-difference estimations. Our estimations rely on the assumption that the Dunne judgment is the only feature that would have led to changes in Irish banks' lending strategies across the ROI and NI either side of the July 2011 cut-off.¹

¹We argue that our choice of the Border region of ROI (similar in economic structure to NI, and being

We look at two levers banks can activate to adjust to this balance sheet shock. The first adjustment margin is to reprice loans whose value is affected by the repossession moratorium. As they now bear a higher expected loss, banks could require higher interest rates on affected loans, as shown in Sweden by Cerqueiro et al. (2016). Our evidence suggests that this lever was not used by Irish banks as a response to the moratorium. First, banks have pricing discretion only over standard variable rates (SVR) loans. For 52% of the outstanding ROI mortgages on banks' balance sheets in July 2011, this adjustment is impossible. Second, when applying our identification strategy to the sample of SVR mortgages originated before December 2009, we find no evidence of rates adjustment following the moratorium.

We then estimate the effect of the legal shock on new credit provision, by testing how newly originated loan risk characteristics change after the Dunne judgment on both sides of the border. When the foreclosure moratorium is introduced in July 2011, the probability of default (PD) on new loans in ROI, as measured by internal credit scores, origination Loan to Value ratios (OLTV) and ex-post default and modification propensity, falls, consistent with lower-risk lending as a result of increases in PD and LGD on the outstanding portfolio. Analogously, and indicative of a symmetry in the way banks make such decisions, the closing of the foreclosure moratorium in July 2013 leads to higher-risk lending in the ROI relative to the NI counterfactual.

Along with the literature on law and finance, our findings are of relevance to ongoing debates on the resolution of Non-Performing Loan (NPL) crises in many European countries. European institutions have placed great emphasis on the harmful effects of high NPL ratios on bank capital and funding costs, and banks' ability to originate new loans.² Our paper shows that 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 become more conservative in their new lending.

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. Policies

part of a highly-integrated region with free movement of goods, capital and labour across the ROI-NI border), along with the inclusion of a rich set of loan level controls and regional unemployment and house price indices, allows us to interpret the DiD parameter as being the causal effect of the legal shock on credit outcomes. Furthermore, the usage of the same set of lending banks either side of the border allows us to immediately rule out confounding factors on the bank supply side such as shocks to funding costs or bank capital.

²Vitor Constancio, then Vice-President of the European Central Bank, has for example 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." (Speech, February 2017, REFERENCE)

that may at first glance appear desirable from the point of view of protecting homeownership may have negative spillovers to those who would otherwise enter the housing market with a mortgage.

The paper proceeds as follows. Section 2 reviews the relevant literature. Section 3 provides details on the Dunne judgment, the construction of our control and test groups and the data we run the analysis on. Section 4 describes the empirics on the pricing of the stock of outstanding mortgages; Section 5 describes the empirics on new lending. Section 6 concludes.

2 Literature Review

At a cross-country level, a large literature has followed in the footsteps of [Porta et al. \(1998\)](#) and [La Porta et al. \(1997\)](#), showing how a link exists between effective legal systems, which provide protections for investors and creditors, and credit provision and economic growth.³

The United States has provided the backdrop for much study in this area, due in part to the within-country, cross-state variation that exists in collateral enforcement regimes. States have been delineated by previous research into “judicial” and “non-judicial” states, referring to whether foreclosure proceedings operate through the court system, and between “recourse” and “non-recourse” states, referring to the ability of banks to pursue debtors for resources outside of the residential collateral where losses accrue during foreclosure. REFERENCE HERE FROM BIAS PAPER. There is some disagreement in the literature on the direct effects of these legal regimes on outcomes for defaulted borrowers: while [Mian et al. \(2015\)](#) document that loan servicers in “non-judicial” states were twice as likely to foreclose on delinquent homeowners between 2007 and 2009, [Gerardi et al. \(2013\)](#) show that these protections merely delay but do not prevent foreclosures.

The most relevant example of this within-country methodology from the United States for our paper is [Pence \(2006\)](#), who shows that debtor protections impose material costs on borrowers at the time of loan origination, in the form of average loan sizes that are 3-7 per cent smaller than in “judicial” states without these protections. This suggest that laws that have the direct effect of protecting those currently in homeownership may in fact be creating frictions and side-effects that lead to adverse outcomes for those aiming to access homeownership through new mortgage lending.

Outside the United States, [Fabbri and Padula \(2004\)](#) analyse how legal enforcement costs affect household credit in Italy, combining survey data on households balance sheets and data on judicial districts. They rely on variations in the efficiency of judicial districts within the same legal framework.

³Developments in this literature up to 2008 are summarized in [Shleifer et al. \(2008\)](#).

Households living in judicial districts where the quality of legal enforcement is poorer have a higher probability of being denied loans. [Ponticelli and Alencar \(2016\)](#) estimate the effect of enforcement on firm access to finance, investment and size. They show differences in court enforcement across Brazilian civil courts affects the impact of financial reform on access to finance, investment and firm sizes. [Jappelli et al. \(2005\)](#) combine theory and empirics, showing that the cost of enforcing contracts is a key determinant of market performance, in a model of opportunistic debtors and inefficient courts. According to the model, improvements in judicial efficiency should reduce credit constraints and increase lending, with an ambiguous effect on interest rates that depends on banking competition and on the type of judicial reform. These predictions are supported by panel data on Italian provinces. In provinces with longer trials or large backlogs of pending trials, credit is less widely available.

The aforementioned studies, both across and within countries, look at the relationship between a *time-invariant* factor such as the quality of a nation's legal system or the collateral enforcement regime across US states, and credit market outcomes. From an econometric point of view, relationships estimated in such a way are potentially plagued by classic omitted variable bias; there may be many deep, structural unobserved factors, such as cultural origin, risk aversion, investment appetite, that are correlated with the quality of a legal system, and also play a role in explaining variation in credit market outcomes. One exception using cross-country data is [Haselmann et al. \(2010\)](#), who look at how changes in collateral and bankruptcy laws across Eastern Europe and Central Asia affect bank-level lending. They show that improvements in collateral enforceability are a powerful mechanism to boost lending.

One paper in this literature that looks at intertemporal changes in the legal environment, within an individual country's credit market is [Cerqueiro et al. \(2016\)](#), who study a change in Swedish law that exogenously reduced the value of a type of collateral that is comparable to the floating lien. Combining within-country data, so as to avoid the critique that country-level confounding factors may be omitted and biasing results, with an exogenous legal change, leads to a more plausibly clean identification of the causal effect of the legal system on the credit market. Using a differences-in-differences approach, they find that following the change in the law and the loss in collateral value borrowers pay a higher interest rate on their loans, receive a worse quality assessment by their bank, and experience a substantial reduction in the supply of credit by their bank. Consistent with theories that consider collateral and monitoring to be complements, the reduction in collateral also leads a decrease in bank monitoring intensity and frequency of both collateral and borrower assessment. In this paper, we take a similar approach to [Cerqueiro et al. \(2016\)](#), exploiting an unexpected change in the repossession regime in the Republic of Ireland in 2011 to observed how changes in the legal system affect banks' lending decisions.

Our paper is also closely related to the growing literature on the importance of balance sheet health, and NPL ratios in particular, 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 2013.⁴ 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 (?)balg 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](#)).

Finally, the literature on “zombie lending” is also of relevance. This literature ([Peek and Rosengren, 2005](#); [Caballero et al., 2008](#)) has highlighted the harmful effects that sustained weakness in bank and borrower balance sheets, caused by long-term forbearance of poorly-performing loans, had on the Japanese economy since the 1990s. Our work provides an alternative channel through which the performance of outstanding loans spills over to new loan origination.

3 Setting and Data

3.1 The Dunne judgment

On December 1st, 2009, the Irish Parliament passed the Land and Conveyancing Law Reform Act.⁵ 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 crated by deed after the commencement of this Chapter*. Loans originated *before* December 1st, 2009 are not regulated by this Act.

Ms Justice Dunne shed light on 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, before

⁴The paper shows conflicting results depending on measurement and whether an IV is used... worth explaining details here

⁵A thorough description of the house repossession process in the Republic of Ireland can be found in [DJE \(2013\)](#).

December 1st 2009, both the loan is in default and demand for repayment has been made.

This judgment prevented banks from repossessing any property acting as security against a loan issued before December 1st 2009 - the bulk of loans outstanding on Irish banks' balance sheets in mid-2011. 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, the legislator thought the Interpretation Act of 2005 would allow repossessions to continue as usual in spite of the repeal of relevant legal provisions. The Interpretation Act only provided continuity for loans defaulted and for which repossession proceedings had started *before* December 2009 (see [Mee \(2010\)](#) for a discussion of these Acts).

This unexpected change in the Republic of Ireland repossession system is a shock to the balance sheet health of its banks. At the time of the judgment, loans originated before December 2009 represented xx% of their mortgage portfolios.

The absence of repossession option immediately increased the loss given default on these loans all the way to one hundred percent. Further, it introduced substantial moral hazard risks: [O'Malley \(2018\)](#) looks at the effect of the judgment on the Probability of Default *PD* 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 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 2009.⁶ The Land and Conveyancing Law Act was adopted on July 24th 2013. Its preamble sets its objective as *"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"*. We interpret the adopting of the Act in July 2013 to be the point at which *LGD* was reduced for the vast majority of loans outstanding on Irish banks' balance sheets.

To sum up, we define two separate exogenous events which we hypothesize had an effect on credit allocation decisions of Irish banks:

1. The Dunne judgment decision in July 2011, after which a foreclosure moratorium is in place for

⁶For discussion of this commitment, see for example the eighth IMF review of their extended arrangement ([IMF \(2012\)](#)).

the majority of loans outstanding in Ireland, with expected LGD and PD increasing. We refer to this event as $Moratorium_{On}$ in our empirical analysis.

2. The Land and Conveyancing Act in July 2013, after which the foreclosure moratorium is removed, with the likely implication of a lowering of LGD and PD. We refer to this event as $Moratorium_{Off}$.

Our sample covers loans originated from January 2010 to December 2014. The Dunne judgment was decided on 24 July 2011 and the loophole was closed on 24 July 2013. We designate July 2011 - July 2013 period as the repossession freeze period. We separately compare the active period to January 2010 to 23 July 2011 on the one hand and 25 July 2013 to December 2014 on the other hand. As the Irish economy goes through a crisis from 2010 to 2014, we do not want to assume that the pre-July 2011 and post-July 2013 periods are comparable ones and consider them together.

3.2 Treatment and Control Groups

We use the two above mentioned exogenous shocks to the environment in which bank lending decisions are made in the Republic of Ireland, to test two pairs of hypotheses:

- H_{1a} : banks respond to an effective increase in PD and LGD in July 2011 by increasing the interest rate charged on outstanding floating-rate loans.
- H_{1b} : banks respond to an effective reduction in PD and LGD in July 2013 by reducing the interest rate charged on outstanding floating-rate loans.
- H_{2a} : banks respond to an effective increase in PD and LGD on their outstanding mortgage portfolio in July 2011 by reducing the risk profile of new lending.
- H_{2b} : banks respond to an effective reduction in PD and LGD on their outstanding mortgage portfolio in July 2013 by loosening the risk profile of new lending.

Both the $Moratorium_{On}$ and $Moratorium_{Off}$ events are shocks to the value of ROI loans. We hypothesise that banks respond to these shocks, either through the pricing channel on already-issued loans, or through the PD channel on newly-issued loans. The most naive model one could run to test, for example, H_{2a} would take the form $Y_i = \alpha + \beta_1 Moratorium_{On} + \epsilon_i$, where Y_i is the PD of loan i , issued by an Irish bank in the ROI mortgage market, and $Moratorium_{On}$ is a dummy variable taking a zero before July 2011 and a one after July 2011. The pitfalls of such an approach are immediately obvious: because our exogenous shock is a system-wide one, it is correlated with a vector of time dummies, meaning that any macroeconomic variation in the Irish economy correlated with $Moratorium_{On}$, and also potentially having an influence on the lending profile of newly-issued

mortgages will confound our estimate of β_1 .⁷ While one could include a set of loan-level controls X_i , and a set of regionally-varying measures of economic performance such as unemployment rates and house price indices, it is unlikely to convince most readers that the estimate of β_1 from such a model is indeed an estimate of banks' supply response to an exogenous shock to their *PD* and *LGD*.

In order to respond to the above concerns, one would need a plausible estimate of a counterfactual risk profile of new mortgage lending: in the absence of the introduction of the Dunne judgment, what would the *PD* of newly-issued mortgages in the ROI have looked like in the second half of 2011? To get at this counterfactual, we exploit the fact that our loan level data cover all loans issued by Irish banks, regardless of jurisdiction, and build a control group of loans issued by Irish banks in the UK mortgage market. We compare loans issued by Irish banks in the Border region of the ROI (comprising the counties Cavan, Donegal, Leitrim, Louth, Monaghan and Sligo) with loans issued in Northern Ireland.⁸

During our estimation period, the physical border between the ROI and UK on the island of Ireland was in effect non-existent.⁹ As an intra-European Union border, goods, services and people could travel freely across the border, with goods and labour markets highly integrated across the two regions. The existence of currency differences (the ROI Border region using Euro, with Northern Ireland using Sterling), further allows for shock-smoothing through cross-border pricing arbitrage.

Table 1 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 1 shows the evolution of house prices and unemployment in the ROI, ROI Border region and NI. While there are important level differences across the series, with unemployment rates being always higher in the Border than in NI throughout the period, it is notable there the evolution of the

⁷Note that when testing hypotheses 2a and 2b we do not have any subscript *it* on the parameters; this is because the new mortgage database is a pooled cross-section in which each newly-issued mortgage is observed once. When testing hypotheses 1a and 1b however we can include subscripts *it*, and loan fixed effects α_i , as we will track the interest rate charged on a panel of existing loans.

⁸The 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. See Appendix Figure 4 for a map.

⁹This has been particularly the case since the 1998 "Good Friday Agreement", which brought about a cessation of conflict and the creation of regional power-sharing institutions in Northern Ireland, and led to the complete elimination of waiting times and check-points along the border.

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.

Finally, the origin of law is the same in Northern Ireland and the Republic of Ireland. Repossession procedures are broadly similar. [DJE \(2013\)](#) states procedures in Northern Ireland are '*[...] broadly similar to those that apply in this jurisdiction, in particular that an order for possession must be obtained from the relevant court and execution of the order of possession may follow.*'¹⁰

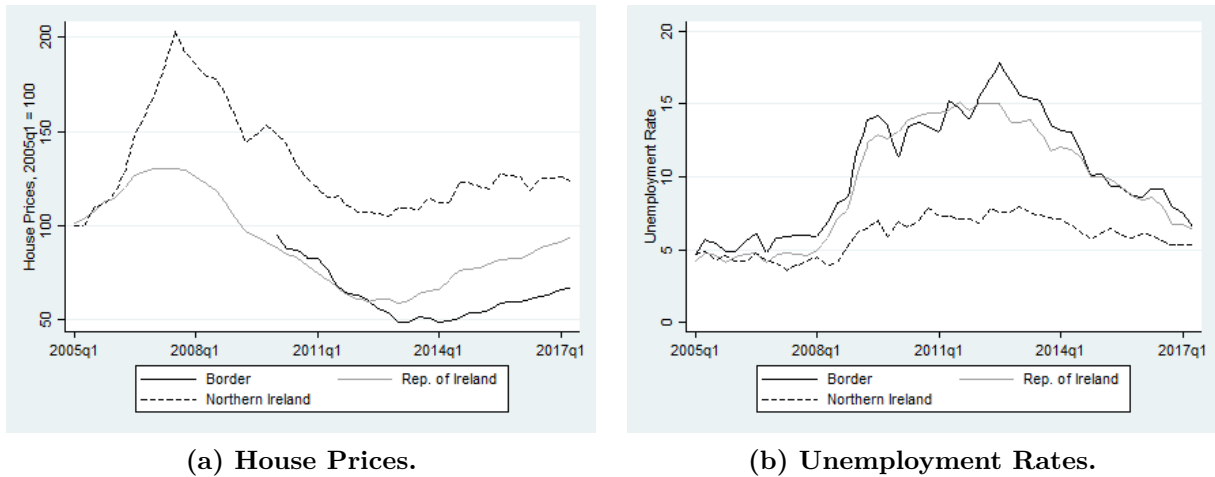
¹⁰The main differences noted are the standard documentation requirements in repossession and the requirement to furnish certain particulars at the first hearing before the judge in Northern Ireland.

Table 1: 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 1: House Prices Indices and Unemployment Rates in Northern Ireland, the Republic of Ireland and its Border Region.



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).

3.3 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 2016.

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.

4 Empirics: Stock of Loans

We study how banks adjust to the repossession freeze on their stock of loans. Following this negative shock to collateral values (with commensurate increases in PD and LGD on a large share of their outstanding stock), banks can increase loan rates on the outstanding stock of mortgages to compensate (à la [Fabbri and Padula \(2004\)](#)).

4.1 Specification

We test H_{1a} , that is whether banks respond to an effective increase in PD and LGD in July 2011 by increasing the interest rate charged on outstanding floating-rate loans. Our econometric specification is a classic difference-in-difference model, where we compare interest rates between ROI and NI loans before and after the shock:

$$r_{it} = \alpha_i + \beta_1 \text{Moratorium}_{On} + \beta_2 \text{ROI} + \beta_3 \text{Post}_{July2011} + \beta_4 R_{it} + \epsilon_{it} \quad (1)$$

The frequency of observation t is quarterly, with four observations during 2011. α_i is an individual loan fixed effect, which can be included in estimation due to the panel nature of the data: we observe the rate charged on each outstanding loan in each quarter. Moratorium_{On} takes a zero in all periods for UK loans, and switches from zero to one for ROI loans in the third and fourth quarters of 2011. ROI is a dummy for Irish loans. $\text{Post}_{July2011}$ is a dummy taking a one in the second half of 2011 for all loans regardless of jurisdiction. To avoid the influence of confounders to the greatest extent possible given the data at hand, we also include R_{it} , controls varying at the region-quarter level (house prices and unemployment rates).

In both ROI and 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, which is a floating rate loan without indexation, i.e. the lender has discretion over when the interest rate changes. Given that we are interested in banks’ pricing responses in the immediate aftermath of an exogenous PD and LGD shock, we restrict all analysis in this paper to SVR mortgages.¹¹ Our sample for all regressions is limited to those loans that are present in the data in all twelve quarters in the years 2011-2013, and were on an SVR contract. This leads to a balanced sample with 25,971 ROI

¹¹SVR mortgages represented 47 per cent of ROI mortgages outstanding and 38 per cent of UK mortgages in our sample at 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.

Border and 6,425 Northern Ireland loans in each quarter in the panel.

We then test H_{1b} , whether banks respond to an effective reduction in PD and LGD in July 2013 by reducing the interest rate charged on outstanding floating-rate loans, using an analogous set-up. The sample restricted to the four quarters of 2013. $Moratorium_{Off}$ replaces $Moratorium_{On}$ and is equal to 1 for ROI loans in the third and fourth quarter. $Post_{July2013}$ replaces $Post_{July2011}$.

4.2 Results

The expected sign when testing H_{1a} is that banks will increase the interest rate on ROI SVR mortgages after July 2011 as a response to the exogenous increase in LGD and PD that results from the Dunne judgment. Analogously, our expectation when testing H_{1b} is that the resolution of the foreclosure moratorium in July 2013 will result in a lowering of loan rates for ROI SVRs.

We do not find any evidence of banks adjusting rates on their stock of loans, either at the start (Table 2) or the end (Table 3) of the repossession freeze.

Beginning with the introduction of the repossession moratorium in 2011, Table 2 runs two regressions: firstly a fixed-effects DiD model in Column (1) where all SVR loans in Ireland are considered as the “treated” group; secondly, a triple-difference model which distinguishes loans in Ireland originated before December 2009 from those issued afterward, to test whether banks may have actively changed loan pricing only on those mortgages that were subject to the repossession moratorium, rather than in the Irish mortgage market more widely. In both cases, we find no evidence of any differential change in loan pricing in Ireland after the moratorium comes into effect. 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. Similarly in Column (2), there is 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.

In Table 3, we implement an identical specification in 2013, focusing on the July 2013 removal of the repossession moratorium. The expectation from H_{1b} is that, if lenders observe this legal event as a lowering of the PD and LGD on their existing stock of loans, they will reduce the interest rate on their ROI loans to account for the lowering of credit risk. Again, we find no effect in either Column (1) or Column (2), suggesting that the loan pricing margin of adjustment is not part of Irish banks’ reactions to either the introduction of removal of the repossession moratorium.

Table 2: Loan Pricing in 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: Standard errors in parentheses; * $p < .1$, ** $p < .05$, *** $p < .01$

Note: In order to be included in regression sample, loan must be present in all 12 quarters 2011 to 2013

Note: Only loans originated before December 1st 2009 are included in Column (1)

Note: Standard Variable Rate mortgages in Border and NI only. Bank dummies included

Table 3: Loan Pricing in 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: Standard errors in parentheses; * $p < .1$, ** $p < .05$, *** $p < .01$

Note: In order to be included in regression sample, loan must be present in all 12 quarters 2011 to 2013

Note: Only loans originated before December 1st 2009 are included in Column (1)

Note: Standard Variable Rate mortgages in Border and NI only. Bank dummies included

5 Empirics: New Loans

Do banks respond to shocks to the PD and LGD parameters on a large subset of their stock of outstanding loans by shifting the PD on new loans? Such a reaction would be in line with a framework whereby banks have an overall portfolio target level of risk, which is altered by an exogenous legal shock, increasing PD and LGD . Even though the Dunne judgment explicitly does not apply to loans originated during our sample period, it is plausible that the uncertainty around the legal environment for mortgage lending in Ireland, in general, may have changed banks' risk-taking attitude in ROI relative to the UK. In response, banks could lower the risk profile of their new lending, thereby shifting the overall risk profile of the portfolio toward the target level (H_{2a}). Analogously, a reduction in PD and LGD following the elimination of the repossession moratorium should be expected to lead banks to loosen the risk profile of their new lending (H_{2b}).

5.1 Specification

We estimate the following equation twice, once when considering the introduction of the moratorium in 2011, and secondly when considering its removal in 2013:

$$Y_i = \alpha + \beta_1 \text{Moratorium} + \beta_2 \text{ROI} + \beta_3 \text{Post}_{July2011} + \beta_4 X_i + \beta_5 R_i + \lambda_t + \lambda_b + \lambda_{LG} + \epsilon_i \quad (2)$$

The key difference between Equation 2 and 1 is the removal of the i subscript on the intercept adjustment α and of the t subscript on all loan-level controls, due to the pooled cross-sectional nature of the new mortgage issuance data. By their very nature, we only observe the origination characteristics of mortgages once, a feature which presents challenges when estimating Equation 2 while aiming to plausibly purge estimates of β_3 of unobserved heterogeneity. Our approach to deal with this challenge is to follow the approach of [Auer and Ongena \(2016\)](#), and create 142 different loan groups λ_{LG} for each 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 quintile. 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. Our identification rests on the assumption that these fixed effects, along with regional controls, act to purge the model of as much demand-side variation in Y_i as is possible given our dataset.

We also include bank fixed effects λ_b , which purge the model of many bank-side confounders such as funding cost shocks or changes in capital adequacy. Given that all banks in our model lend in

both jurisdictions, the inclusion of λ_b eliminates the possibility that bank balance sheet variation can explain cross-country divergences in our outcome variable. λ_t is a set of time (origination date) fixed effects.

Figure 2 reports the number of newly-originated loans quarterly from 2010Q1 to 2014Q4 across the two regions. Figure 3 reports the loan-balance-weighted equivalent. It is evident from the two graphs that new lending patterns at the aggregate level, for these banks, follow a reasonably similar pattern across the two regions.

Figure 2: New lending across the border, 2010 to 2014.

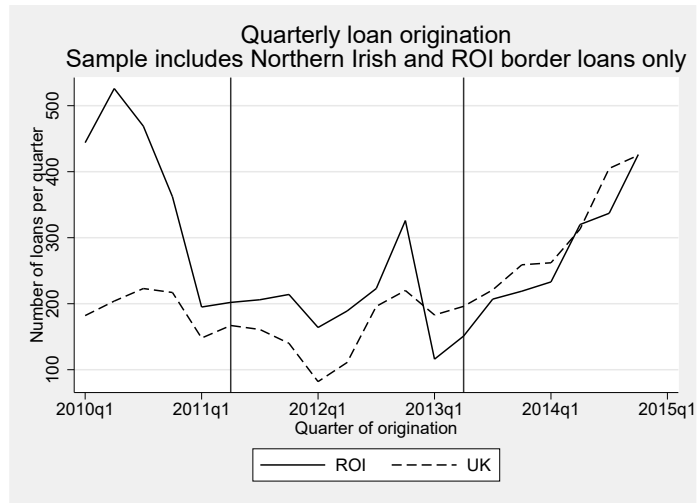
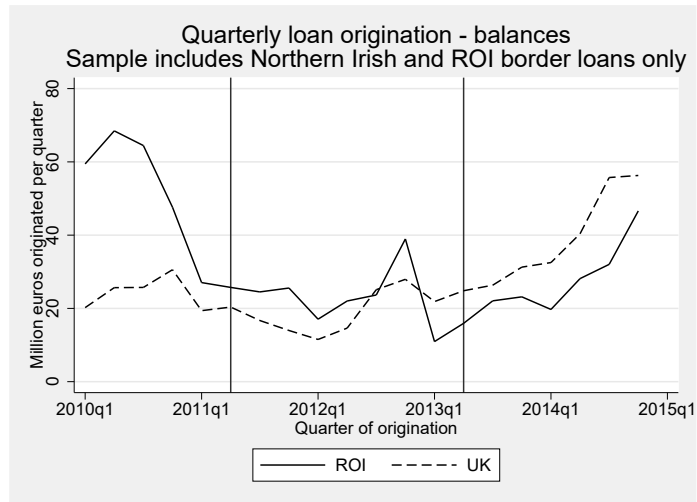


Figure 3: New lending across the border (loan balances), 2010 to 2014.



5.2 Results

We present results in Tables 4 to 6. Table 4 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 period in which the moratorium was in place. When considering this whole period (columns 1 and 2), we cannot find any effect of the presence of the moratorium on the risk profile of new loans. In columns 3 and 4 we focus solely on the introduction of the moratorium. According to *H2a*, 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 around the closing of the loophole in July 2013, we find that it reduced the average credit score by 7-8 points, 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 *H2b*: when the legal loophole was closed, Irish banks provided credit to increasingly riskier borrowers, as per their own internal credit scoring assessment.

Table 5 uses the originating LTV as a proxy for the riskiness of borrowers. Numerous papers have shown that loans originating with higher LTVs have a greater propensity to subsequently default (??). Again, 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 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 large, 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 XX and a mean of XX across the sample). This suggests substantial credit loosening on new loans once the legal uncertainty created by the moratorium is removed from law.

Finally, we turn to the ex-post risk measure in Table 6. Here our dependent variable takes a one if the loan experienced modification or default at any point from origination until the end of 2016. 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 XX. The doubling of the coefficient on $Moratorium_{Off}$, when compared to $Moratorium_{On}$, in Table 6, combined with the findings of Tables 4 and 5, 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.

Table 4: 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: Only one bank included 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.

Note: 142 Loan Type Fixed Effects included for combinations of First Time Buyer status; Property Type; Fixed versus Variable rate; Borrower Age Group; Single Assessment; Self-Employed.

Table 5: Model of Origination Loan to Value

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

Note: 142 Loan Type Fixed Effects included for combinations of First Time Buyer status; Property Type; Fixed versus Variable rate; Borrower Age Group; Single Assessment; Self-Employed.

Table 6: Model of Subsequent trouble (Default or Modification)

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

Note: 142 Loan Type Fixed Effects included for combinations of First Time Buyer status; Property Type; Fixed versus Variable rate; Borrower Age Group; Single Assessment; Self-Employed.

6 Conclusion

While the association between legal institutions, investor protection and financial market development is long-established, the literature assigned a causal interpretation from better institutions to greater provision of finance to the real economy is less populated. In this paper we have exploited an exogenous shock to the ability of Irish banks to repossess collateral on home mortgages in the Republic of Ireland in 2011 as a natural experiment to answer this question. 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.

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 higher credit risk scores, loan to value ratios, and probabilities of subsequent default or modification.

Our paper also offers valuable lessons for the current debates in Europe regarding Non-Performing Loan resolution. Institutional arrangements that protect existing debtors may have important spillover effects, through new mortgage origination policy of banks, on households' ability to accede to home-ownership.

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Appendix



Figure 4: Map of Ireland

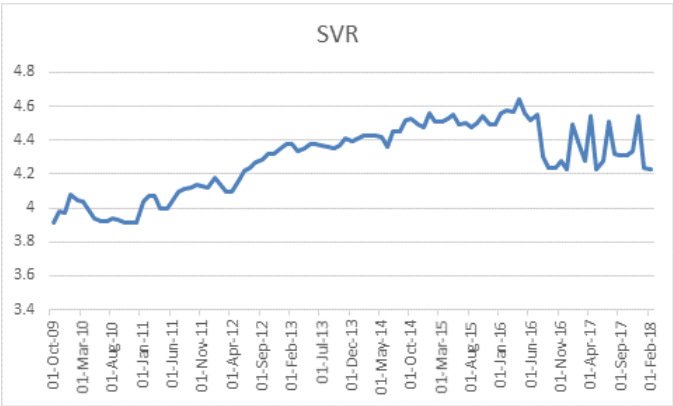


Figure 5: Average SVR Mortgage rates in the UK, 2009-2018 - Source: BoE