Judicial Quality and the Credit Market: The Case of Spanish Mortgages[1]

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Abstract: We study the impact of the quality of the Spanish judicial system on access for mortgage credit (its volume and capitalization). Following Posner (2000) we proxy the quality of judicial decisions by the proportion of judgements and orders by trial courts in civil matters that are reversed by appellate courts for a sample of 50 provinces during the 2007-2019 period. Our estimates show that for a 1 percentage point increase in the revocation rate there is a drop of 0.35 percentage points in the size of the mortgage market. Our specification is robust to time and province fixed effects. This relationship still holds if we add as a control a measure of the efficiency or expediency of the court system (measured by the congestion rate at trial courts in civil matters) what leads us to conclude that the quality of the judicial system matters itself regardless of how clogged or expeditious the judicial system is.

Keywords: mortgage market; judicial quality; efficiency of courts; court decisions; appeals.

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1. Introduction

Over time, evidence of the importance of law and legal institutions for access to credit and the terms thereof piles up. Legal rules governing credit arrangements, the substantive positions of creditors and debtors in bankruptcy and outside insolvency appear to affect the supply of finance and credit in an economy.[2]

In particular, the functioning of the judicial system and how effectively and timely the rights and legal entitlements are actually protected and enforced, has been shown to play a major role in the provision of credit in societies.[3] This paper aims at contributing and refining this body of evidence by showing how the quality of the court system matters for credit supply. Thus, not only the efficiency and speed of the judicial response is relevant for prospective creditors to provide financing to business ventures and households, but also the quality of courts' decisions plays a positive role in the availability and the volume of credit.

In this paper we show that judicial quality does matter for access to the mortgage market using Spanish data on confirmation and reversal of decisions by civil courts as well as data on access and volume of mortgage financing of home-buying. We find that a 1 percentage point increase in the revocation rate of decisions issued by trial courts in civil matters dampens the density of mortgage finance by 0.17 percentage points, and in some specifications of our empirical model, we show that a 1 percentage point higher revocation rate translates into 0.44 percentage point reduction in households' access to mortgage credit.

Moreover, we also find that the variation in the revocation rate seems more important for outcomes in the mortgage market than changes in the confirmation rate. The credit market appears more reactive to the deterioration of the judicial quality (as measured by increases in the reversal rate) than to improvements in quality (as measured by increases in the confirmation

[2] See among others, La Porta, Lopez-de-Silanes, Shleifer and Vishny (1998), Beck, Demirgüç-Kunt and Levine (2003), Claessens and Laeven (2003), Beck, Demirgüç-Kunt and Levine (2005), Djankov, Mc Liesh and Schleifer (2007), Laeven and Woodruff (2007), La Porta, Lopez-de-Silanes and Shleifer (2008) and Japelli et al (2013).

[3] See for instance, Pinheiro and Cabral (1998), Fabbri (2001), Fabbri and Padula (2002), Beck and Levine (2003), Djankov *et al.* (2005), Japelli, Pagano and Bianco (2005), Laeven and Majnoni (2005), Fabbri (2010), Shah (2011), Jappelli, Pagano and Di Maggio (2013), Ipolliti and Melcarne (2015), Shah and Khan (2016), Mora-Sanguinetti, J. S., Martínez-Matute, M., & García-Posada, M. (2017), Shah, Shah, Smith and Labianca (2017), Schiantarelli, Stacchini and Strahan (2020), Božović (2021).

rate). The evidence we produce unequivocally suggests that a deterioration of judicial quality leads to more restrictive access to credit secured by mortgages over homes.

The majority of the literature interested in the legal determinants of the volume and features of credit supply has focused on firm financing.[4] We have opted to concentrate on mortgage credit to prospective homebuyers.[5] Thus, the focus of our research lies in the relationship between the judicial system and the allocation of credit to households.[6]

We specifically address how the quality of the court system, measured by the fraction of decisions by the lower courts in civil matters -courts who are entrusted with general mortgage litigation and enforcement, together with other various matters- affect mortgage credit. This is, we believe, relevant for a number of reasons. On the one hand, the mortgage market is an extremely important institution for financial stability and economic welfare, including phenomena such as homeownership (most households cannot purchase a home without a mortgage), and the supply and prices in the rental housing sector.[7]

The question is also worth exploring for reasons linked to the broad effects of judicial quality on the economy and society. Court performance can be measured along a number of dimensions (cost, delay, congestion, time to deliver a decision). Quality as to the substantive solution reached is surely not a minor one among them. Looking into the relevance of this

[4] As an illustration, Fabbri (2010) finds that, in Spanish and Italian judicial districts where trials last longer, bank financing is costlier and firms are smaller. The study showed that a stronger enforcement level not only improves credit conditions but also leads to a higher rate of individual capital accumulation. Chemin (2020), shows that externally financed comprehensive judicial reforms improve perceptions of judicial efficiency (for all firms) and firm productivity (for sectors relying on relationship-specific investments).

[5] There are other contributions looking into how specific legal variables affect various features of mortgage credit. For instance, Li, White and Zu (2011), and Morgan, Iverson and Botsch (2012) analyze how a relevant change in US personal bankruptcy law (the Bankruptcy Abuse Prevention and Consumer Protection Act (BAPCPA) in force since October 2005) affected mortgage defaults and subprime mortgage foreclosures, respectively. Li, Tewari and White (2019) analyze the impact of the residential mortgage strip down on availability of mortgage credit and interest rates.

[6] In this vein, we mention Fabbri and Padula (2004), who studied the impact of legal enforcement of loan contracts on the allocation of credit. They showed for Italy that districts with a higher degree of legal enforcement are those in which households have a lower probability of being credit-constrained. Along similar lines, Jappelli et al. (2005) showed that, for a model of opportunistic debtors, improvements in judicial efficiency can lead to reductions in credit constraints and increases in the amount of lending. Those theoretical predictions are confirmed with panel data on Italian provinces. In provinces with large backlogs of pending trials credit is less widely available.

[7] See, Gete and Reher (2018). The housing market, in turn, has important implications for macroprudential financial policy and macroeconomic outcomes more generally.

dimension for important economic outcomes, such as the ones in the mortgage market, provides an interesting field of inquiry.

We use data on civil courts because they are the ones who hold jurisdiction over the interpretation and construction of mortgage contracts, apply contract and consumer law rules and doctrines that govern mortgage credit agreements, and are in charge of the judicial foreclosure proceedings to enforce the mortgage in the event of the borrower's default. We rely on the estimates available on the orders ("*autos*" in Spanish) and judgements ("*sentencias*" in Spanish) confirmed (or reversed) by the Appellate Provincial Courts. Throughout the paper we use these measures (decisions confirmed on appeal, on the one side, and decisions reversed on appeal, on the other) as proxies for good substantive performance or quality of the judicial system.

As previously mentioned, we study the contribution of the levels of confirmation and revocation rates affecting Spanish civil courts to the availability and volume of mortgage credit. Our dataset comprises the 50 Spanish provinces over the 2007-2019 period. Our sample period starts with the final stages of the growth and then, abruptly, the burst of the housing and mortgage bubble in Spain, proceeds through the bottom of the financial and mortgage crisis and, ultimately, the recovery in the economy, comprising financial and housing markets after 2014. It ends in 2019, before the Covid-19 crisis erupted.

Even though there is economically-oriented literature looking into the economic and credit consequences of judicial efficiency in Spain, or into the Spanish institutional environment of mortgage credit (García-Posada and Mora-Sanguinetti, 2015; Mora-Sanguinetti, Martínez-Matute and García-Posada, 2017) to the best of our knowledge, our paper is the first to analyze how revocation and confirmation rates –as proxies for quality in the outcomes of the court system- affect availability and the magnitude of mortgage credit to households. Performance, efficiency and efficacy are not perfect substitutes (Marciano et al. 2019) when it comes to the justice system. We contribute to this distinction by assessing the relevance of each of these factors into the mortgage credit market.

We use as an identification strategy a dynamic fixed-effects models that accounts for the relationship between the two main variables of interest. Our results show that a deterioration

of judicial quality (proxied by an increase in the revocation rate) translates into a decrease in both the volume and capitalization of the mortgage market. This effect is statistically and economically significant and robust to different specifications.

Our work expands and complements Gómez-Pomar et al. (2022), in the sense that both papers study the determinants of mortgage-credit availability and volume in Spain. The previous study, however, focuses on factors related to the effective functioning of the justice system, and more specifically, litigation rates and congestion rates in civil courts. The current paper addresses the quality of judicial decisions proxied by the rate of judgements that are either confirmed or revoked at second instance civil courts. Hence, the present contribution is not about how clogging and congestion in the courts affect the supply of credit, but how the accuracy of courts in providing decisions -as judged by the higher courts in the judicial hierarchy- matters for credit availability.

The paper is structured as follows: In section 2, we provide an overview of the relevant Spanish legal and institutional background, particularly on the appeals that provide our proxies for quality of the court system. Section 3 provides an outlook to the main literature on these topics. Section 4 defines the identification strategy used for our empirical exercise. Section 5 presents the dataset. Section 6 discusses the results and the last section, briefly concludes.

2. Legal and Institutional Background

2.1. The Spanish Court System: An Introduction

The Spanish court system is governed by the General Council of the Judiciary (*Consejo General del Poder Judicial*), conceived in the 1978 Spanish Constitution, as an independent power from the legislative and executive branches of Government.

For the purposes of the administration of justice, the State is divided territorially, for judicial purposes, into municipalities, districts (*partidos judiciales*), provinces and autonomous communities, with jurisdiction over them being exercised by a number of courts. In civil and commercial matters, they are: justice of the peace courts (*Juzgados de Paz*), courts of first instance (*Juzgados de Primera Instancia*), commercial courts (*Juzgados de lo Mercantil*). Despite these territorial divisions, the court system and jurisdiction is unique for the whole territory[8].

The Spanish Court system is hierarchical. Courts are structured from the highest to the lowest level. At the peak, we find the Spanish Supreme Court as the highest court in all legal fields except with regard to constitutional guarantees and constitutional interpretation[9]. It comprises five divisions, each of them with its own separate Chamber: civil/commercial, criminal, administrative, labor, and military. It hears all cases where a cassation appeal (on matters of law) is available, regardless of the nature of the field or the jurisdictional division involved[10]. The Supreme Court also hears review appeals against final judgements (e.g., where new evidence, or proof of fraud emerges).[11]

By Constitutional design, there is a Constitutional Court separate from the Supreme Court.[12] The Spanish Constitutional Court exercises jurisdiction over the whole country and hears cases on the conformity with the Constitution of acts and statutes, individual appeals for protection against the violation of constitutional rights and freedoms contained in section 53(2) of the Spanish Constitution, conflicts of jurisdiction between the State and the Autonomous

[8] Article 117 of the Spanish Constitution and article 3.1 of the Organic Law 6/1985 of July 1985 on the Judiciary.
[9] Article 53 of the Organic Law 6/1985 of July 1985 on the Judiciary.
[10] Article 5.4 of the Organic Law 6/1985 of July 1985 on the Judiciary.
[11] Article 5 bis of the Organic Law 6/1985 of July 1985 on the Judiciary
[12] Section 161 of the Spanish Constitution.

Communities, and other matters assigned to this body directly by the Constitution[13]. Despite the importance of its overall role, the link of the Constitutional Court with credit litigation is remote, although on occasion arguments concerning the infringement of constitutional rights of defense in court have been raised in connection with the enforcement of consumer mortgages.

2.1.1. Civil Courts

The scope and limits of the jurisdiction of Spanish civil courts is defined in Spanish law essentially by default: Civil courts are competent to deal with any issue that is not especially attributed to any other jurisdiction.[14] Among the matters belonging to their jurisdiction one may find contracts and credit, together with the enforcement of the securities (such as the mortgage) granted to creditors.

The first echelon (trial courts) in the Spanish Civil court hierarchy is composed by a number of courts: Peace Courts, First Instance Courts, Commercial Courts. Above this level, Provincial Appeal Courts hear and resolve the bulk of appeals. In provinces with larger populations the Appeal Courts may be composed of more than one section.

Regional High Courts (one per Region or Autonomous Community) deal with a very limited number of civil matters, none of them linked to contracting and credit, except in a number of regions with distinctive civil laws: Cataluña, Navarra, Aragón, Galicia, País Vasco, Baleares[15].

Finally, at the apex of the structure, the First (or Civil) Chamber of the Supreme Court. All courts in the system are organized as either single-member (*juzgado*) or collegiate (*audiencia or tribunal*) courts.

All courts hearing appeals of any kind at the Provincial level or above are collegiate, and may decide in panels of 3 or 5 judges, or *en banc*.

Peace Courts are competent to hear, in first instance, civil matters of any amount not exceeding 90 euros and are not assigned to other courts by reason of the subject matter[16]. First Instance

[13] The specific functioning of the Spanish Constitutional Court is regulated by the Organic Law 2/1979 on the Constitutional Court, of 3 October 1979.

[14] Articles 36 and 37 of the Law 1/2000, of 7 January 2000.

[15] Their involvement in issues of credit contracts, and especially of mortgage credit, where legislation comes from the State and not the Regions) has been historically minimal, and continues to be like this at the moment.

[16] Paragraph 1 of the Article 250 of the Law 1/2000, of 7 January 2000.

Courts have general jurisdiction in civil and commercial matters, regardless of the amount in dispute, unless other courts have special jurisdiction[17].

Commercial courts hear all questions that arise in relation to bankruptcy, claims related to unfair competition, industrial and intellectual property, advertising, shipping and maritime law, and collective actions based on unfair standard contract terms legislation, among others[18].

Provincial Appeal Courts will hear mainly the appeals raised against orders and decisions by First Instance Courts and Commercial Courts[19].

The civil chamber of the Regional High Courts of Justice will essentially hear the cassation and extraordinary review appeals established by Law against resolutions passed by civil judicial bodies located in the territory of the region provided that the grounds for appeal are based on the infringement of rules belonging to the special civil laws of that particular Region[20]. Legal rules and principles on mortgage contracts and consumer protection in financing arrangements are national, and not regional, with very minor exceptions.

The First Chamber of the Supreme Court hears cassation (or second) appeals solely on points of law (both substantive and procedural) against decisions from the Provincial Appeals Courts. It also hears certain special tort cases against high-ranking officials in Government or against Members of Parliament.[21]

There are three main types of judicial civil proceedings before Spanish civil courts:

1) Declarative procedures,[22] the purpose of which is the judicial grant or denial of a claim in a dispute against another party. In credit cases, the goal is basically for the creditor to obtain a judicial decision declaring the existence and amount of credit that is owed to the creditor.

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[17] They will also hear act, issues and appeals assigned directly to hem under the judiciary Act and they will deal with the insolvency of individuals who are not entrepreneurs (article 45 of the Law 1/2000, of 7 January 2000).
[18] Article 86 *ter* of the Organic Law 6/1985 of 1 July 1985 on the Judiciary.
[19] Article 455 of the Law 1/2000, of 7 January 2000. Only in Madrid and Barcelona the appeals against orders and decisions of Commercial Courts are separate from those arising from Courts of First Instance. Both in Madrid and Barcelona, the Provincial Appeals Court has one specialized section for appeals in commercial matters.
[20] Article 72 of the Organic Law 6/1985 of 1 July 1985 on the Judiciary.
[21] Article 56 of the Organic Law 6/1985 of 1 July 1985 on the Judiciary.
[22] Article 248 et *seq* of the Law 1/2000, of 7 January 2000.

2) Special procedures[23] whose purpose is to offer an "express trial" to quickly recognize the claimant's right to a payment of a credit. Those types of procedures do not have a declarative phase and are aimed at obtaining immediate payment.
3) Executive or enforcement procedures[24] to enforce an executive title (a previous decision by the court in declaratory proceedings, or a non-judicial executory title, like some forms of notarial deed) in which the credit right of a creditor against the debtor is already acknowledged. The main goal of those procedures is to immediately enforce the right contained in the executive title over specific assets (as in a mortgage) or against all assets belonging to the debtor.

2.1.2. Civil Appeals

There are different types of judicial resolutions by civil courts: providences (*providencias*), orders (*autos*) and judgements (*sentencias*)[25]. The type of resolution may vary depending on whether the resolution refers to procedural matters or entail a final decision on the merits. The former will imply the adoption of the form of a providence if an order is not explicitly required by law.

Final decisions on the merits in declaratory proceedings (the general form of resolving a dispute before the courts) require the form of a judgement ("*sentencia*").

For each kind of ruling different types of appeals are available. All of them are designed as tools by which the legal system provides the parties in a court the dispute the ability to request the modification or annulment of a particular court resolution[26].

In particular, and with respect to the judgments and orders adopted by first instance civil courts it must be highlighted that appeals are feasible against all judgements ("*sentencias*")[27] and also against all orders ("*autos*") when the orders are final and definitive. The admission of the appeal produces two different effects. One refers to the fact that the case is sent for a decision by a

[23] In this category we find the small claim procedure and the negotiable instruments procedure regulated in article 812 et *seq* of the Law 1/2000, of 7 January 2000.
[24] Article 517 *et seq* of the Law 1/2000, of 7 January 2000.
[25] Article 206 of the Law 1/2000, of 7 January 2000.
[26] This possibility is directly related to the right granted by the article 24 of the Spanish Constitution, according to which all citizens have the right to obtain effective judicial protection from judges and courts in the exercise of their rights.

[27] With the exception of those judgements arising from a verbal judgment which quantity is below 3.000 euros (article 455.1 of the Law 1/2000, of 7 January 2000).

hierarchically higher court (Provincial Appeal Court) and the other, refers to the fact that the appealed judgement, while the appeal is pending, does not produce immediate effects.

The content of the appeal varies depending on the grounds and arguments raised by the appellant (one or both parties, since both may appeal): If the claim in the appeal is the revocation of the judgment or the issuance of a new one, the court will produce a decision that may either confirm or revoke (partially or totally) the points of the appealed decision that were challenged by the appellant/s. When all claims alleged are rejected, legal fees will be imposed on the party that has seen its claims rejected, unless the court appreciates that the case presented serious doubts of facts or law. In the event of total or partial estimation of the appeal, none of the parties will be ordered to pay the other side's fees[28].

2.2. The Spanish Mortgage Credit Market and litigation

The recent mortgage credit history of Spain is one of booms and busts. During the early years of the first decade of the 21st century the economy experienced an extraordinary housing boom[29] followed by abundant domestic credit to consumers and corporations and by international credit to Spanish financial institutions (both banks and savings banks -c*ajas de ahorro*- in Spanish). All of this was financed, to a significant extent, through the securitization of mortgage loans funding Spanish households and firms. This ended abruptly with the global crisis that first erupted in the U.S.

The Spanish real estate market collapsed in 2008 and hit severely the Spanish economy. This was the beginning of the worst economic recession in half a century. GDP fell sharply since the third quarter of 2008 and this severe deterioration, coupled with a substantive increase in unemployment and the worsening of other macroeconomic variables paved the way for mass mortgage foreclosures. The first goal of the Spanish Government was to secure financial stability and to preserve the resilience of the banking sector. Thus, measures to help families and firms facing financial problems were not an initial priority.

Those measures started to appear in 2012, when a Law was passed with the aim of protecting mortgage-loan borrowers who were in risk of "social and economic exclusion". This legislative

[28] Article 398 of the Law 1/2000, of 7 January 2000.
[29] See Figure 1 for the evolution.

measure included a Code of Good Practices that encouraged the restructuring of debt (combining a reduction of interest rate and an extension of repayment terms) rather than mortgage foreclosure. Although the adoption of the Code was not mandatory, it helped to relax the pressure of borrowers in urge of financial aid.

At that time, Spanish law did not allow debtors to oppose foreclosure proceedings on the basis of the existence of unfair terms in the mortgage loan contract. Legal claims challenging unfair terms had to be filed after foreclosure as an independent claim. This was the case until CJEU decided in *Aziz*[30] that the applicable Spanish procedural rules was contrary to the effective protection granted by the Directive 93/13, on unfair terms in consumer contracts.

After *Aziz*, several reforms were passed affecting both the Spanish Mortgage Law and the Code of Civil Procedure, in order to strengthen the consumer protection in Spanish law in compliance with the requirements established by the CJEU.

In 2015, the Royal Decree-Law 1/2015 and, subsequently, Law 25/2015, introduced a general debt-discharge framework for individual debtors in bankruptcy proceedings. Although mortgage discharge was not available, debtors were -under certain conditions- protected from having to face the outstanding debt after the mortgage has been enforced.

There have been many types of clauses in mortgage loans for which litigation has been an issue. This was particularly intense after May 2013 when the Spanish Supreme Court held floor clauses to be unfair on the basis of a lack of transparency. This led to an avalanche of lawsuits pursuing restitution claims. Altogether, pressured the Spanish Government to design new specialized courts to exclusively handle these kinds of cases. During 2017, 54 courts specialized in unfair contractual terms in mortgage contracts were created, with 60 judges assigned to them.

Nowadays, this situation is still present and explains –at least in part- the important level of stress experienced by Spanish civil courts from 2009 onwards, and especially after 2013.

30 Judgment of the Court (First Chamber), 14 March 2013. Mohamed Aziz v Caixa d´Estalvis de Catalunya, Tarragona i Manresa (Catalunyacaixa). Case C-415/11.

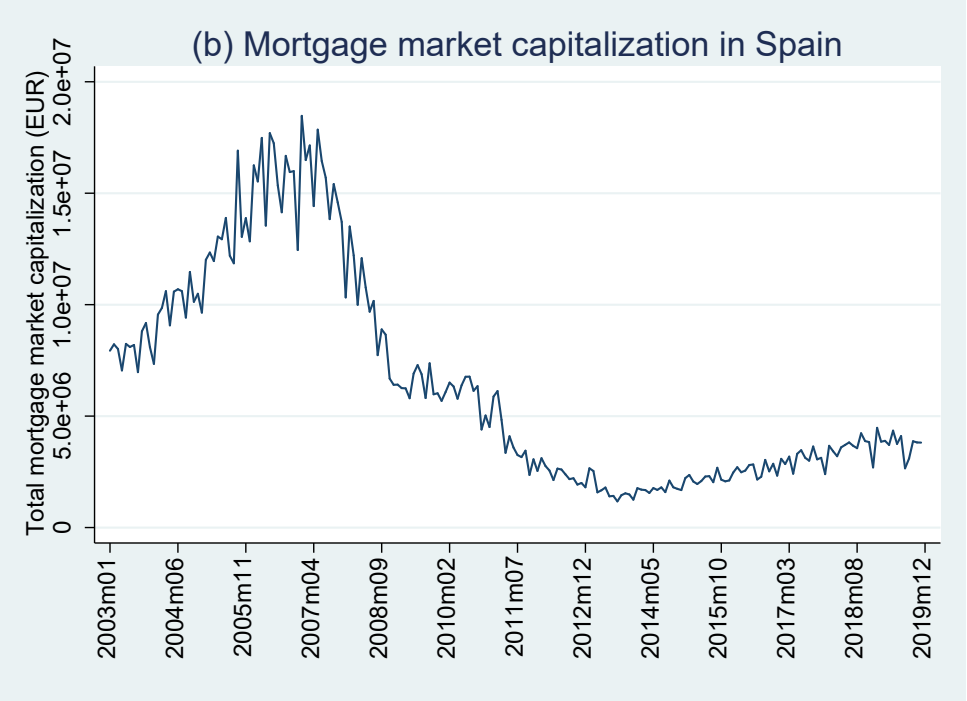


Figure 1: Mortgage market capitalization in Spain.

2. Literature Review

Since North (1990) seminal contribution, there is a growing body of literature analysing the effects of legal and judicial institutions on economic activity and the development of financial markets. In this section we will present a brief review of the literature, its background and some relevant empirical findings.

According to Beck et al (2003), in law and finance, the development of financial markets depends on two fundamental aspects. On the one hand, a legal system that effectively guarantees private property rights, enforces contracts and protects creditors' legal rights is necessary. On the other, one must bear in mind that, for historical reasons, countries around the world have developed different legal systems and traditions, which explains the variance in terms of protection of property rights and contract enforcement observed across legal systems.

La Porta et al (1997), have argued that countries where investor protection is lower, both in the books and in practive, have smaller capital markets. These findings apply either the equity and debt markets. La Porta et al (1998) present evidence about how the laws and the quality of their enforcement are determinants of the effective rights that investors have, as well as the degree

of protection of those rights. Claessens and Laeven (2003), Beck et al (2005), Djankov et al (2007), Laeven and Woodruff (2007), La Porta (2008) and Japelli et al (2013) among others, expand this body of empirical evidence.

These contributions study the relationship between legal framework and financial markets using cross-country analysis. However, it is clear that inside a given country or legal system, there may be important differences in the quality and efficiency of law enforcement. One of the first studies focusing on such disparities was conducted in Brazil, where these types of differences allowed Pinheiro and Cabral (1998) to empirically evaluate the effect of judicial efficiency on the credit market development among different Brazilian states. Empirical evidence showed that the northern region of the country presented the highest rates of judicial inefficiency, and at the same time, had the lowest credit activity. The opposite occurred in the south of Brazil, which had the lowest judicial inefficiency index and the highest level of credit activity in the country. Pinheiro and Cabral (1998) found that judicial inefficiency has a significant negative effect on the volume of credit granted by financial institutions. Thus, a one standard deviation increase in the judicial inefficiency index reduces the total credit/GDP ratio by 8.5 percentage points.

Other authors have followed this line of inquiry. Japelli et al. (2005) explored the effect of judicial efficiency on the lending/GDP ratio, finding that judicial inefficiency has a high economic cost in the credit market, concluding that improvements in judicial efficiency reduces credit rationing and increases the volume of loans.

As described above, empirical evidence for Italy and Brazil shows that judicial efficiency affects the volume of credit granted by province or state. But how are companies affected by judicial inefficiency? Fabbri (2002) analysed the relationship between application of the law by courts and availability of external financing for companies, as well as firm size. In this case, Fabbri (2002) looked for the effect of judicial efficiency on the financing and production of companies in Spain and Italy. The empirical evidence for the Spanish case shows that if we move from the Spanish region with the highest average duration of civil trials to the region where the average duration is lowest, the amount of external financing of companies increases by approximately 35%, and the size (approximated by the number of employees) increases by approximately 18%.[31] At the same time, the study shows the importance of the efficiency of

[31] Similar results were obtained in Fabbri (2010).

legal institutions for the level of aggregate activity: Italian regions that have a more efficient judicial system obtain a higher level of product and present a higher capital stock.

The negative effect of judicial inefficiency on the allocation of credit to households by provinces has also been studied. In Fabbri and Padula (2004) it is shown that the judicial system's performance has a significant effect both on the probability that a household suffers from credit restrictions, and the amount of the loan granted. Applying econometric techniques, they found that households located in judicial districts where courts performance is worse are more likely to see a loan denied.

Similar results to Fabbri (2002) and Fabbri and Padula (2004) were found by Japelli et al (2005) for Italy, by Chemin (2009) for India, by Mora-Sanguinetti et al (2015) for Spain, Schiantarelli (2020) also for Italy, and Božović (2021) for Serbia. For the case of Pakistan, Shah and Khan (2016) show that under inefficient judicial system creditors reduce their lending to small firms and increase it to large firms. On the contrary, Horioka and Sekita (2011) conducted an empirical study for the case of Japan, and their results were not consistent with the previous literature in the sense that they find that better judicial enforcement decreases loan size.

Besides credit rationing, poor judicial performance can increase credit costs, since lenders could ask for higher interest rates in those countries or regions with worse judicial performance. In this sense, Laeven and Majnoni (2005), in a cross country analysis, found that improvements in judicial efficiency are critical in reducing the cost of financial intermediation. Their results show that an improvement in judicial efficiency of one standard deviation can reduce the banks' lending spreads in about 2.3–2.6% points on average.

Even though there is a vast and growing literature looking into the economic and credit consequences of judicial efficiency in several countries, our paper is, to the best of our knowledge, the first to analyze how revocation and confirmation rates –as proxies for quality in the outcomes of a court system- affect availability and the magnitude of mortgage credit to households.[32]

[32] Following Posner (2000) we decided to use the revocation rate as proxy for the quality of judicial decisions. At the same time, in line with Moral et al (2021) we also use the confirmation rate. For more details about the variables, see section 4.

This implies a shift in the empirical literature on the topic, since the most widely used judicial performance indicators in the literature just reviewed have been the clearance rate (i.e Mora-Sanguinetti et al 2017), the length of judicial procedures (i.e. Fabbri, 2002; Chemin, 2009), backlogs of pending cases (i.e. Fabbri and Padula, 2004; Japelli et al 2005) or synthetic indicators such as the rule of law index or a judicial efficiency index used, for example, by La Porta et al (1998) among others. Concerning courts and their impact, performance, efficiency and efficacy are not perfect substitutes (Marciano et al. 2018), and they may influence outcomes in different, perhaps even opposite, ways. We contribute to this debate by assessing the relevance of each of these factors in the mortgage credit market.

3. Identification Strategy

We set to examine the relationship between judicial quality and access to the mortgage market and its capitalization. That is, the main question we ask is whether changes in judicial quality affect access to the mortgage market. To this end, we estimate the following dynamic fixed-effects specification:

$$M_{c,t} = \delta_0 + \sum_{k=1}^{K} \mu_k \cdot M_{i,t-k} + \lambda_0 \cdot Q_{i,t} + \sum_{k=1}^{K} \lambda_k \cdot Q_{i,t-k} + \mathbf{X}'_{i,t}\beta + \theta_i + \gamma_t + \epsilon_{i,t} \qquad (1)$$

Where M is either the number of mortgages per capita or the mortgage market capitalization observed in province $i = 1,2 \ldots N$ for the period $t = 1,2, \ldots T$ where $t \in \{2007, 2019\}$, Q is the measure of judicial quality proxied by the rate of confirmation or revocation of judicial decisions by first instance (i.e., trial) civil courts (not commercial courts)[33]. Q is our key explanatory variable of interest. The vector **X** captures the set of time-varying control variables, which exhibit non-zero correlation with M and could potentially pose the source of omitted variable bias. Our model specification also accommodates time-invariant province-level heterogeneity bias captured by the full set of province-fixed effects denoted by θ, and time-varying mortgage market shocks common to all provinces captured by the full set of time-fixed effects denoted by γ. By default, both sets of fixed effects are unobserved to the econometrician and may taint the judicial quality coefficient with either upward or downward biases. Stochastic disturbances capture idiosyncratic shocks designated as ϵ where we assume that $\epsilon \sim (0, \sigma^2)$.

One potential challenge in identifying the effect of judicial quality on the mortgage market outcomes arises from the endogeneity of judicial quality. As such, pre-existing trends in the judicial quality may exhibit a persistent effect on the mortgage market and may introduce both spatial and temporal dependence reflected in the judicial quality coefficient which may render the structural coefficient questionable. Given that plausible instrumental variable with time-varying properties that mutually satisfy the criteria of exogeneity and relevance are difficult to find (Helland, 2016; Helland and Klick, 2011), our approach is to augment the standard fixed-

[33] As has been mentioned above, legal disputes about loan contracts, with or without a mortgage, between lenders and borrowers (both consumers and non-consumers) are decided by civil courts. The exception is collective or class actions brought by consumer associations or public interest groups challenging standard terms in loan contracts (again, both in secured and unsecured loans), where borrowers are consumers. These suits are to be filed before commercial courts.

effects specification with a dynamic structure of judicial quality by adding $k = 1$ lags[34] to the contemporaneous judicial quality variable. Deploying a dynamic structure seems to be plausible given that some time takes place between the hearing of the case at the first instance civil court and the admission of the appeal and the ruling of the case by the competent Province Appeals Court. Despite the relatively short time span, such approach allows us to disentangle the long-run effect of judicial quality from its short-run effect on the mortgage market outcomes. Since judicial quality is very likely correlated with province-fixed effects through the variables omitted from our specification, we also apply first-difference transformation to remove the unobserved component and use instruments to form the necessary moment conditions (Holtz-Eakin et. al., 1988; Arellano and Bond, 1991). A dynamic mortgage market model specification laid out in Eq. (1) may thus provide plausible evidence on the overall effect of our measures of judicial quality on mortgage market outcomes given that it can be broken down into short-run and long-run components. Since the endogeneity of judicial quality mutually reinforces persistent and time contingency, our expectation is that the coefficients on lagged judicial quality variable are statistically significant different from zero.

One potential caveat against the dynamic panel-level specification laid out in Eq. (1) arises from the effect disparity at different levels of the mortgage market outcomes. In particular, whilst the dynamic panel-level specification may plausibly address the endogeneity of judicial quality, the underlying relationship between judicial quality and mortgage market outcomes merely captures the average effect while it neglects other tails of the conditional distribution of the outcome variables. Thus, the estimated parameter relies on the conditional mean function, which implies that the relationship at different points of the distribution is neglected. We address this particular discrepancy between the average effect and the full-distribution effect by composing a conditional function of the mortgage market variables across different tails of the empirical distribution. For the sake of simplicity, let $q \in \{0,1\}$ denote a percentile of the empirical distribution function that splits the data into q proportions below and $1 - q$ proportions above the conditional percentile function. Hence, we construct the percentile-specific estimates of the judicial quality on mortgage market outcomes by estimating the following objective non-differential function:

[34] By taking into account this lag we capture the fact that there is a time lapse between the admission of an appeal and the ruling by the Provincial Appeals Court on that case. The latest data available from the Council of the General Judiciary show that, for 2020, on average there was a 9.7 months lapse before the ruling of the Provincial Appeals Court is rendered.

$$Q(\lambda_1) = \sum_{i:M \geq \mathbf{X}'_{i,t}\beta}^{N} q\left|M_{i,t} - \mathbf{X}'_{i,t}\beta - \theta_i - \gamma_t\right| + \sum_{i:M \geq \mathbf{X}'_{i,t}\beta}^{N} (1-q)\left|M_{i,t} - \mathbf{X}'_{i,t}\beta - \theta_i - \gamma_t\right|$$

Where $Q(\lambda_1)$ denotes quantile-specific effects of judicial quality on mortgage market outcomes per $Q(\cdot)$ quantile while $\mathbf{X}'$ represents the full set of covariates. For each percentile in the empirical distribution function, the effect of judicial quality on the mortgage market outcomes is obtained through a simple substitution of the linear dynamic panel model into Eq. (2) for the percentile-based model allowing for the varying coefficient at the respective proportion of the outcome distribution. The major threat to the valid inference on $Q(\lambda_1)$ arises from the potential non-zero intra-province residual correlation which might yield inconsistent estimates of the percentile-specific effect of judicial quality on the mortgage market. We partially mitigate these concerns related to heteroskedastic residual distribution and serially correlated stochastic disturbances and tackle the effect heterogeneity across percentiles using robust variance-covariance matrix (Parente and Santos Silva, 2016). This allows for the adjustment of standard errors for serially correlated disturbances at various layers of the panel dimension. Hence, let $h = 1,2, \ldots H$ denote the number of clusters each containing $n_g = n$ elements. By allowing λ_1 to differ across percentile-based proportions in the presence of non-zero intra-cluster residual correlation, the judicial quality parameter is estimated through the following objective minimization problem:

$$\tilde{\lambda}_1^q = \underset{q}{\operatorname{argmin}} \frac{1}{G} \sum_{g=1}^{G} \left\{ \sum_{i:M \geq \mathbf{X}'_{i,t}\beta} q\left|M_{g,i} - \mathbf{X}'_{i,g,t}\beta_q\right| + \sum_{i:M \geq \mathbf{X}'_{i,t}\beta} (1-q)\left|M_{g,i} - \mathbf{X}'_{i,g,t}\beta_q\right| \right\}$$

where $\tilde{\lambda}_1^q$ denotes the full distributional effect of judicial quality on mortgage market estimated using the Parente-Santos Silva robust variance-covariance matrix estimator, and G denotes the number of sample clusters. When the residuals follow i.i.d distribution, in the absence of non-zero intra-cluster residual correlation, the underlying estimator is the equivalent of Koenker and Bassett (1978) q-regression estimator, and standard heteroskedasticity-robust estimator (Powell, 1984; Chamberlain, 1994; Kim and White, 2003). To provide asymptotically valid standard errors robust to both heteroskedasticity and model misspecification, we test and adjust for standard errors for non-zero residual covariance using the moment and regularity conditions for valid inference advocated by Parente and Santos Silva (2016) and Machado and Santos Silva (2019).

4. Data and Sample

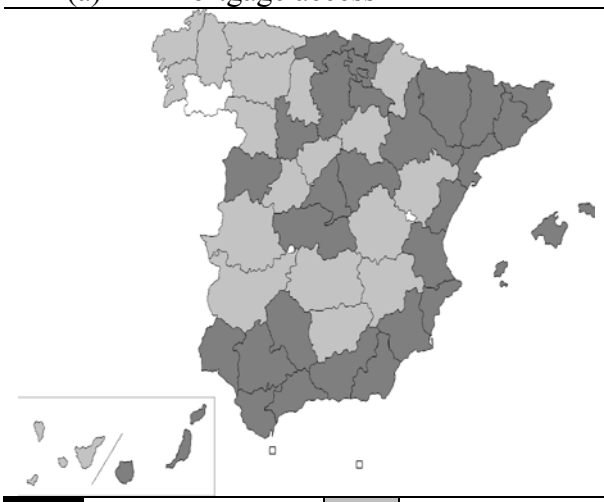
Dependent variables

Our two dependent variables reflect the evolution of the Spanish real estate credit market. In particular, we highlight the total number of mortgage loans financing the purchases of residential property by households and their capitalized value. To compress large absolute values without losing the variation, we compute the total number of residential mortgages financing a home purchase per 100,000 residents of the province, which serves as a plausible proxy for the accessibility of the mortgage market per province. Figure 1 depicts the spatial differences in mortgage market access and capitalization across provinces for the period 2007-2019 by exhibiting the total number of mortgages for purchase per 100,000 residents and the overall market capitalization. Both the mortgage density per capita and the capitalization of the mortgage market are denoted in natural log. The density of mortgages ranges from 204 per 100,000 inhabitants in Ourense up to 5431 per 100,000 inhabitants in Almería (a Mediterranean coastal province with many seaside second homes). In a similar vein, large differences can be found in mortgage market capitalization with the lowest levels found in Teruel and Ávila and the highest ones found in Barcelona and Málaga. The data on the mortgage density and market capitalization are from the Spanish National Statistics Institute (*Instituto Nacional de Estadística* or INE).

The covariates included into the set of independent variables include the level of GDP per capita, average resident age, population density, firm density and sectoral shares of GDP. The data on covariates were also obtained from INE. All variables are transformed into natural log. In total our sample consists of 50 Spanish provinces for the period 2007-2019 which yields a fully balanced panel of 650 observations.

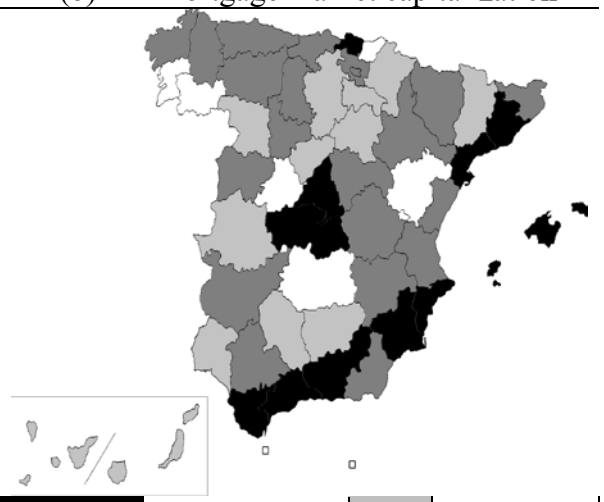
Figure 1: Mortgage market develop across Spanish provinces, 2007-2019

(a) Mortgage access



Very high	Low		
High	Very low		

(b) Mortgage market capitalization



Very high	Low		
High	Very low		

Judicial quality variables

The data used to measure judicial quality were obtained from two sources: the information related to the functioning of the administration of justice were obtained from the database hosted by the General Council of the Judiciary (*Consejo General del Poder Judicial* or CGPJ). We approximate judicial quality by the confirmation rate and revocation rate. More specifically, the confirmation rate captures the fraction of judgements and final judicial orders (*sentencias* and *autos definitivos*) affirmed in full by Provincial Appeals Courts on appeal relative to the total number of judgements and final judicial orders rendered by first-instance civil courts. Thus, a higher rate of confirmation can arguably be linked with better province-level judicial quality (at least in the eyes of the judges sitting on appeal, clearly more experienced and reputed judges on average than those in trial courts). In more quantitative terms, the confirmation rate for *i*-th province at time *t* is computed as follows:

$$CR_{i,t} = \frac{(\#judgements\ confirmed)_{i,t} + (\#orders\ confirmed)}{(\sum_{i=1}^{N} \#judgements\ )_{i,t} + (\sum_{i=1}^{N} \#orders\ )_{i,t}}$$

where $\sum_{i=1}^{N} \#judgements\ confirmed$ denotes the overall number of judgements confirmed at first-instance courts and $\sum_{i=1}^{N} \#orders\ confirmed$ corresponds to the overall number of orders confirmed at the courts of first instance. A higher rate of confirmation is thus indicative

of the better functioning of the administration of justice and better judicial quality of first instance civil courts[35], at least judging by the output of those courts. By contrast, a lower rate of confirmation by the appeals courts reveals a larger amount of substantive or procedural irregularities that make it harder for the appeals courts to fully affirm the appealed judgement or final order. This seems broadly consistent with worse judicial quality at the level of first instance courts, at least from the perspective of Provincial Appeals Courts, where judges have more seniority and, thus, one would expect higher average judicial quality, as already mentioned.

In a similar perspective, we also look into the variation in the revocation rate. This denotes the fraction of judgements and orders issued by first instance civil courts reversed (in full or in part) on appeal by a higher court. Specifically, the revocation rate in *i*-th province at time *t* is computed as:

$$RR_{i,t} = \frac{(\#judgements\ and\ orders\ fully\ revoked\ )_{i,t} + (\#judgements\ and\ orders\ partially\ revoked\ )_{i,t}}{(\sum_{i=1}^{N} \#judgements\ )_{i,t} + (\sum_{i=1}^{N} \#orders\ )_{i,t}}$$

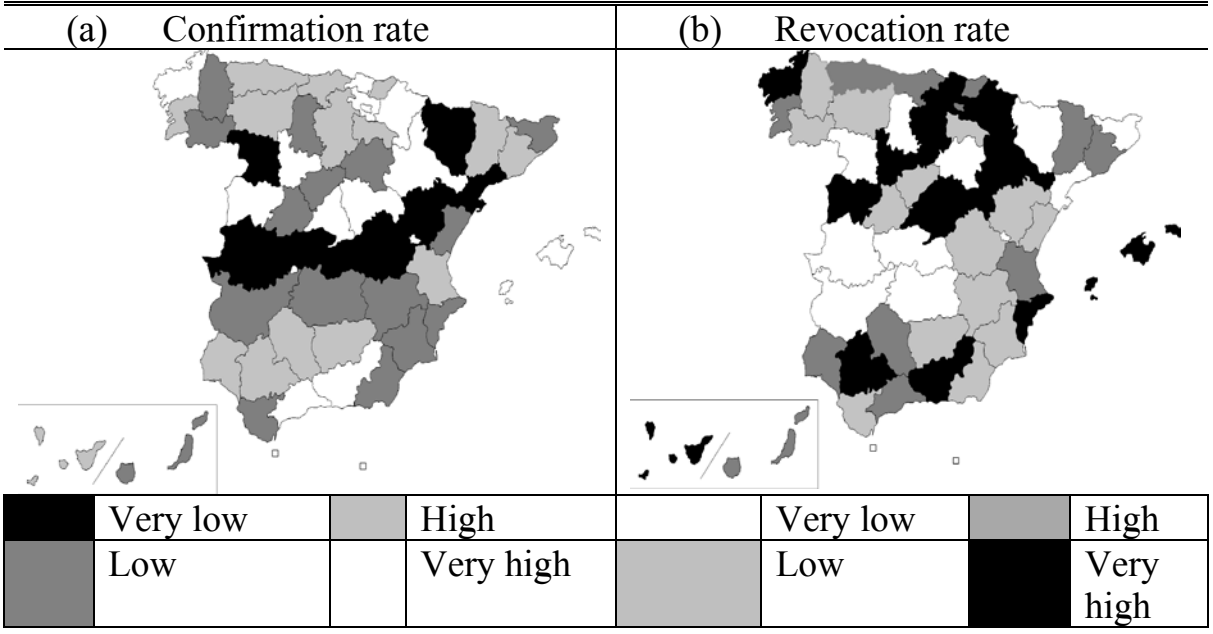
where $\#judgements\ fully\ revoked$ denotes the number of fully reversed judgements, $\#judgements\ partially\ revoked$ denotes the number of partially reversed judgements, and $\sum_{i=1}^{N} \#judgements\ confirmed$ indicates the number of judgements at the courts of first instance. An increase in the fraction of fully and partially revoked judgements from *i*-th provinces is indicative of lower judicial quality given the higher likelihood of substantive or procedural errors in how the case was handled at trial. Figure 2 plots the spatial distribution of the revocation and confirmation rate whence important differences are found across Spain. For instance, the lowest confirmation rates are found in Toledo and Huesca whilst the highest confirmation rates are observed in Álava and Valladolid. In Figure 3, we compute the confidence bounds on the average confirmation rate during the sample period, which uncovers important and discernible differences in judicial quality across Spanish provinces. Similarly, Figure 4 lays out the computed revocation rate across the provinces and sheds important differences in the level of judicial quality across the provinces.

[35] Filing an appeal in Spain is costly especially for the appellant. This is so even if there is a reversal of the first-instance judgement, because revocation or reversal does not imply the imposition of the second-instance legal fees to the losing party on appeal (the winning party at trial). Although a complete reversal at the appeals' level may imply that the allocation of the first-instance fees decided by the trial court will be reversed, even when the appellant wins, the appellant legal costs of the appeal will not be borne by the losing appellee.

In Spain there is a single justice system[36] for the entire country and courts are staffed by judges chosen -through a national examination- and trained in a homogeneous way at the national level. There are some factors that may introduce heterogeneity, however. Legal education in universities differs -within certain extensive common guidelines and content- from one university to the other, and in fact from region to region, given the regional governance and funding of public universities, still the majority in Spain. Also, judicial salaries are homogeneous, but funding for support staff, infrastructure and technology in the court system varies regionally, and with some regions investing more than others on these matters.

Thus, relevant differences by region and province as to the courts' quality are clearly discernible.

Figure 2: Spatial distribution of judicial quality across Spain, 2007-2019



[36]See art. 117 of the Spanish Constitution.

Figure 3: Confirmation rate across Spanish provinces, 2008-2019

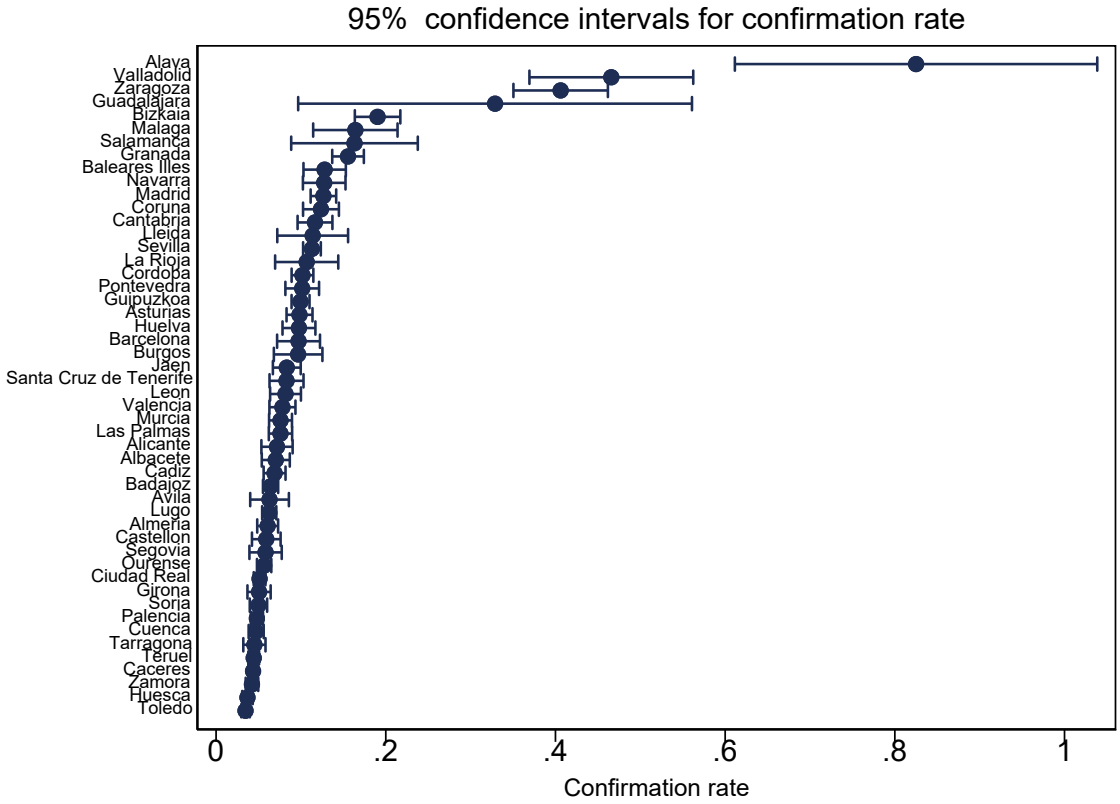
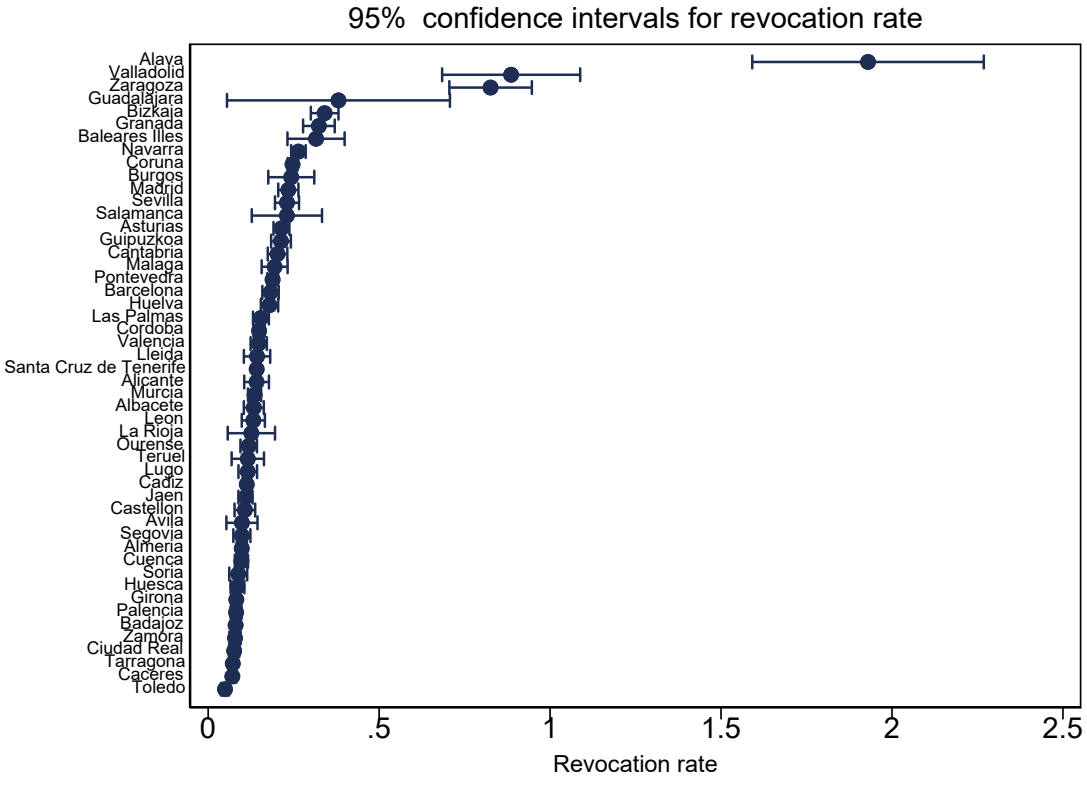


Figure 4: Revocation rate across Spanish provinces, 2008-2019



5. Results

6.1. Fixed-effects estimates

Table 1 presents the fixed-effects estimates of the relationship between judicial quality and mortgage market outcomes for the full sample of Spanish provinces in the period 2007-2019. Columns (1) through (4) exhibit the effect of judicial quality on mortgage market access whilst the corresponding estimates across columns (5) through (8) show the estimates of judicial quality on mortgage market capitalization. Using fixed-effects, the empirical strategy allows us to incorporate both the unobserved heterogeneity bias, idiosyncratic shocks and the time-varying mortgage market shocks common to all provinces in the sample. At the same time, both mortgage market outcomes at a differential rate across provinces and over time, which implies that potential improvements in access and market value attributed to judicial quality may be driven by the unobserved province-specific time trends. To this end, each specification includes the full set of province-fixed effects, time-fixed effects as well as province-specific time trends to parse out the unobserved heterogeneity inasmuch as possible.

Columns (1) through (4) examine the relationship between judicial quality and mortgage market access. The evidence suggests that judicial quality matters for access to the mortgage market. Point estimates based on full-sample specification in column (3) suggest that 1 percentage point increase the revocation rate dampens the mortgage density by 0.17 percentage points [=exp(-.189)-1], respectively, which appears to be large and statistically significant at 10 percent. In column (4), splitting high-leverage observations off the full sample, yields an increase in the coefficient of the revocation rate from -.189 to -.509. This implies that 1 percentage point higher revocation rate translates into 0.44 percentage point reduction [=exp(-.509)-1], in the mortgage market access rate. The evidence unequivocally suggests that a deterioration of judicial quality leads to more restrictive access to the mortgage market through the reduction of new mortgages relative to the number of inhabitants. The negative effect of increasing the revocation rate is robust to the confounding influence of province-fixed effects, time-fixed effects and also does not seem to be driven by province-level specific time trends in the mortgage market. Compared to the variation in the confirmation rate, the variation in the revocation rate appears to be relatively more important for explaining the contrasts in the mortgage market access across provinces, which implies that mortgage market seems to be

somewhat more reactive to the deterioration of the quality of justice compared to perceptible improvements in the substantive performance of the judiciary.

Columns (5) through (8) examine the effect of judicial quality on mortgage market capitalization. Similar to the earlier estimates, we find evidence in support of the negative effect of the revocation rate on the value of the mortgage market. Given relatively large and amplified differences in the capitalization of the mortgage market, our preferred specification entails the absence of high-leverage observations, which could taint the relationship with omitted variable bias, or specific provincial idiosyncratic shocks that are not observed to the econometrician. Hence, our preferred specification without Álava as a high-leverage observation set, implies that a 1 percentage point increase in the revocation rate leads to 0.35 percentage point drop in the overall capitalization of the province-level mortgage market. The point estimate is statistically significant at 10 percent, is robust to the entire set of province and time-fixed effects, and does not appear to be driven by differential province-specific time trends in the mortgage market. Compared to the estimates in columns (5) and (6), the negative effect of an increasing rate of revocation seems to be statistically significant, by contrast with the insignificant coefficients on the confirmation rate. This implies that in the presence of fixed effects, the density of mortgages and the overall mortgage market value appear to be somewhat more responsive to the deterioration of judicial quality whilst an increasing confirmation rate does not entail an equally large response in the mortgage market variables.[37]

There are various avenues to try to make sense of this observation. One may resort to behavioral economics, and to consider this an additional expression of the asymmetry in the weights of negative and positive news or departures from the *statu quo* (viewed then as losses and gains, and not neutrally by their magnitude): Tversky and Kahneman (1991). Economic agents would perceive as more serious the deterioration of the justice system expressed in larger reversal rates rather than the improvements reflected in rising confirmation rates.

Moreover, even outside a behavioral economics framework, the larger impact from increasing reversals compared to increasing confirmations may be explained by the fact that the latter may be just a product of increased backlog in appellate courts, or a sense of conformity or inertia

[37] It should be noted that the estimated effects of judicial quality on mortgage market outcomes are robust to the inclusion of partially revoked judgements and orders in the revocation rate. More detailed results are available upon request.

with a certain degree of errors in populating lower courts. Increasing reversal rates, given that they entail more work for the appellate courts, as well as some degree of unpopularity of the appellate judges among the lower civil courts in their province[38], may be perceived as a more serious and credible signal about deteriorating judicial quality.

Table 1: Fixed-Effects Estimated Effect of Judicial Quality on Mortgage Market Across Spanish Provinces, 2007-2019

	Mortgage Market Access				Mortgage Market Capitalization			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Judicial quality measure	Confirmation Rate		Revocation Rate		Confirmation Rate		Revocation Rate	
	Full Sample	w/o Aláva	Full Sample	w/o Aláva	Full Sample	w/o Aláva	Full Sample	w/o Aláva
Judicial quality variable	-.069	-.394	-.189*	-.509**	-.071	-.449	-.099	-.442*
	(.289)	(.408)	(.112)	(.213)	(.333)	(.451)	(.119)	(.280)
# observations	500	490	500	490	500	490	500	490
# covariates	9	9	9	9	9	9	9	9
Overall R2	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Province-fixed effects (p-value)	YES (0.000)	YES (0.000)	YES (0.000)	YES (0.000)	YES (0.000)	YES (0.000)	YES (0.000)	YES (0.000)
Time-fixed effects (p-value)	YES (0.000)	YES (0.000)	YES (0.000)	YES (0.000)	YES (0.000)	YES (0.000)	YES (0.000)	YES (0.000)
Province-specific time trends	YES (0.000)	YES (0.000)	YES (0.000)	YES (0.000)	YES (0.000)	YES (0.000)	YES (0.000)	YES (0.000)

Notes: Notes: the dependent variable is the per capita number of mortgages in columns (1) through (4), and the natural log of the market value of mortgages in columns (5) and (8). Standard errors are adjusted for serially correlated stochastic disturbances across and within provinces using finite-sample empirical distribution function to adjust for the non-zero spatial and temporal covariance of the random error term. Robust standard errors are denoted in parentheses. Asterisks denote statistically significant coefficients at 10% (*), 5% (**), and 1% (***), respectively.

5.2.Dynamic fixed-effects estimates

In Table 2, we estimate the relationship between judicial quality and judicial efficiency by adding the lagged levels of the mortgage market variables to the model whilst adapting Arellano and Bond (1991) dynamic panel-level estimator to identify the structural relationship between quality of the judiciary and mortgage market outcomes. Two key advantages emanate from the dynamic panel-level estimator compared to the static fixed-effects estimator. First, the potential state-dependence of the mortgage market is controlled for, which partially nets out the pre-existing trends that could exhibit non-zero covariance between mortgage market variables and judicial quality. Second, accommodating the lags into the mortgage market model also allows us to tackle the potential endogeneity of judicial quality given that time-varying instrumental variables for institutional quality variables are subject to significant constraints (Helland and Klick, 2011; Helland 2016). An additional question arises from the effect dominance given that including each judicial quality variable into the model specification may

[38] It must be borne in mind that the Spanish judiciary, similarly to other Continental European countries, is a specialized, separate bureaucracy, whose members are selected and trained fresh from law school to become judges and only judges. Thus, reputation and image among their peers inside the judicial career would appear to be powerful motivators of judicial behavior and decisions.

not inform the reader whether confirmation rates or revocation rates appear to dominate in explaining the between- and within-province variation in the mortgage market outcomes. At the same time, judicial quality may exhibit systematic correlation with the rate of litigation (Hanssen, 1999; Melcarne et. al. 2021; Gómez-Pomar et. al. 2022). To address these concerns, we expand panel-level specification with the rate of litigation, rate of confirmation and rate of revocation in the panel-level specification to determine whether the effect is dominated by judicial quality or merely reflects the influence of the volume of litigation.

Table 2 reports Arellano-Bond dynamic estimates of the judicial quality on mortgage market outcomes. Columns (1) through (2) exhibit the relationship between judicial quality, litigation and mortgage market access. The evidence suggests that the variation in judicial quality across both space and time dominates the effect of the rate of litigation on the mortgage market. Column (1) reports full-sample estimated specification. The evidence suggests that judicial quality appears to be somewhat more important than litigation in explaining mortgage market outcomes across and within provinces. In particular, the point estimates imply that a 1 percentage point increase in the confirmation rate leads to a 0.56 percent increase in mortgage density. The estimated short-run dynamic coefficient is statistically significant at 1%. The estimated magnitude of the short-run coefficient translates into 0.83 percent increase in mortgage density in the long-run (i.e. p-value = 0.017). These estimates are clearly indicative of the sizeable improvement in mortgage market access as response to the improvement in judicial quality, whilst the long-run impact is slightly greater. Column (2) splits high-leverage observations[39] off the full sample to check for the sensitivity of the baseline estimates to the potential outliers. The evidence further reiterates our theoretical notions and shows that provinces with a deteriorating quality in the output of civil courts tend to have more restricted access to the mortgage market. In particular, our point estimates show that 1 percentage point increases in the revocation rate translate into -0.28 percent drops in the density of mortgages per capita, ceteris paribus. Computing the long-run coefficient through non-linear Wald restriction yields a -0.35 percent drop in mortgage access (i.e. p-value = 0.119). This implies that the long-run impact of deteriorating quality of justice is slightly higher than its short-run counterpart, and suggests that worsening judicial quality has far-reaching implications for the mortgage market that tend to persist over time. It should be noted that our estimates convey a

[39] In particular, the provinces with a disproportionately high rate of confirmation that may pose a source of outlying influence are discarded from the sample. The excluded provinces are Álava, Valladolid, Zaragoza and Guadalajara.

pattern where judicial quality is somewhat more important than the litigation rate in shaping the functioning of the mortgage market.

Columns (3) and (4) set out to investigate the relationship between judicial quality and capitalization of the mortgage market. Our preferred full-sample specification in column (3) confirms the importance of judicial quality for the mortgage market capitalization. In particular, our estimates show that increasing the confirmation rate by 1 percentage point tends to increase the mortgage market capitalization by 0.53 percent, respectively. The estimated coefficient is statistically significant at 5% and appears to be large. In addition, Wald-restricted long-run coefficient recovered from a non-linear dynamic model is around 0.639 (i.e. p-value = 0.051), which implies that 1 percentage point improvement in judicial quality translates into 0.89 [=exp(0.639)-1] percent increase in the mortgage market capitalization. Perhaps it should be noted that such improvement is close to 1-to-1 pass-through of judicial quality improvements into increased mortgage market values. The point estimates also highlight an important insight. The improvement in judicial quality tends to foster both short-run and long-run increases in the mortgage market capitalization whilst the long-run effect outperforms its short-run counterpart.

On balance, this implies that provinces with continually rising confirmation rates may experience sizeable rises in the mortgage market capitalization beyond the short-term effects. By contrast, provinces undergoing continued deterioration in the quality of the civil justice system are set to undergo both more constrained access to mortgage financing and a dampening mortgage market capitalization. Beyond the short-term horizon where the estimated coefficient magnitudes seem to be low, persistent differences in judicial quality may have far-reaching consequences for the access to the mortgage market and its capitalization, and may widen provincial differences in mortgage market outcomes even further. Since the rates of confirmation and revocation may be fundamentally affected by the congestion of pending cases and judicial backlog, the estimated positive effects of increased confirmation rate and negative effect of increased revocation rate is robust to the inclusion of province-level civil congestion rate and appears to be intact.

Table 2: Arellano-Bond Dynamic Estimate of the Judicial Quality Effects on the Mortgage Market

	Mortgage Market Access		Mortgage Market Capitalization	
	(1)	(2)	(3)	(4)
	Full Sample	w/o high-leverage obs	Full Sample	w/o high-leverage obs
Panel A: Structural Effects				
Litigation Rate	-.001	-.002	-.001	-.003
	(.001)	(.001)	(.002)	(.002)
Confirmation Rate	.449***	.358	.427**	.220
	(.189)	(.295)	(.217)	(.568)
Revocation Rate	-.176	-.331*	-.090	-.297
	(.167)	(.214)	(.159)	(.280)
Panel B: Long-Run Effect of Judicial Quality and Litigation				
Litigation Rate	-.002	-.002	-.002	-.004
(p-value)	(0.386)	(0.224)	(0.560)	(0.182)
Confirmation Rate	.605	.457	.639	.308
(p-value)	(0.017)	(0.224)	(0.051)	(0.699)
Revocation Rate	-.238	-.422	-.135	-.417
(p-value)	(0.298)	(0.119)	(0.571)	(0.285)
Outcome persistence	[0.000]	[0.000]	[0.000]	[0.000]
(p-value)				
# observations	500	460	500	460
# covariates	9	9	9	9
Province-fixed effects	YES	YES	YES	YES
(p-value)	(0.000)	(0.000)	(0.000)	(0.000)
Time-fixed effects	YES	YES	YES	YES
(p-value)	(0.000)	(0.000)	(0.000)	(0.000)
Province-specific time trends	YES	YES	YES	YES
(p-value)	(0.000)	(0.000)	(0.000)	(0.000)

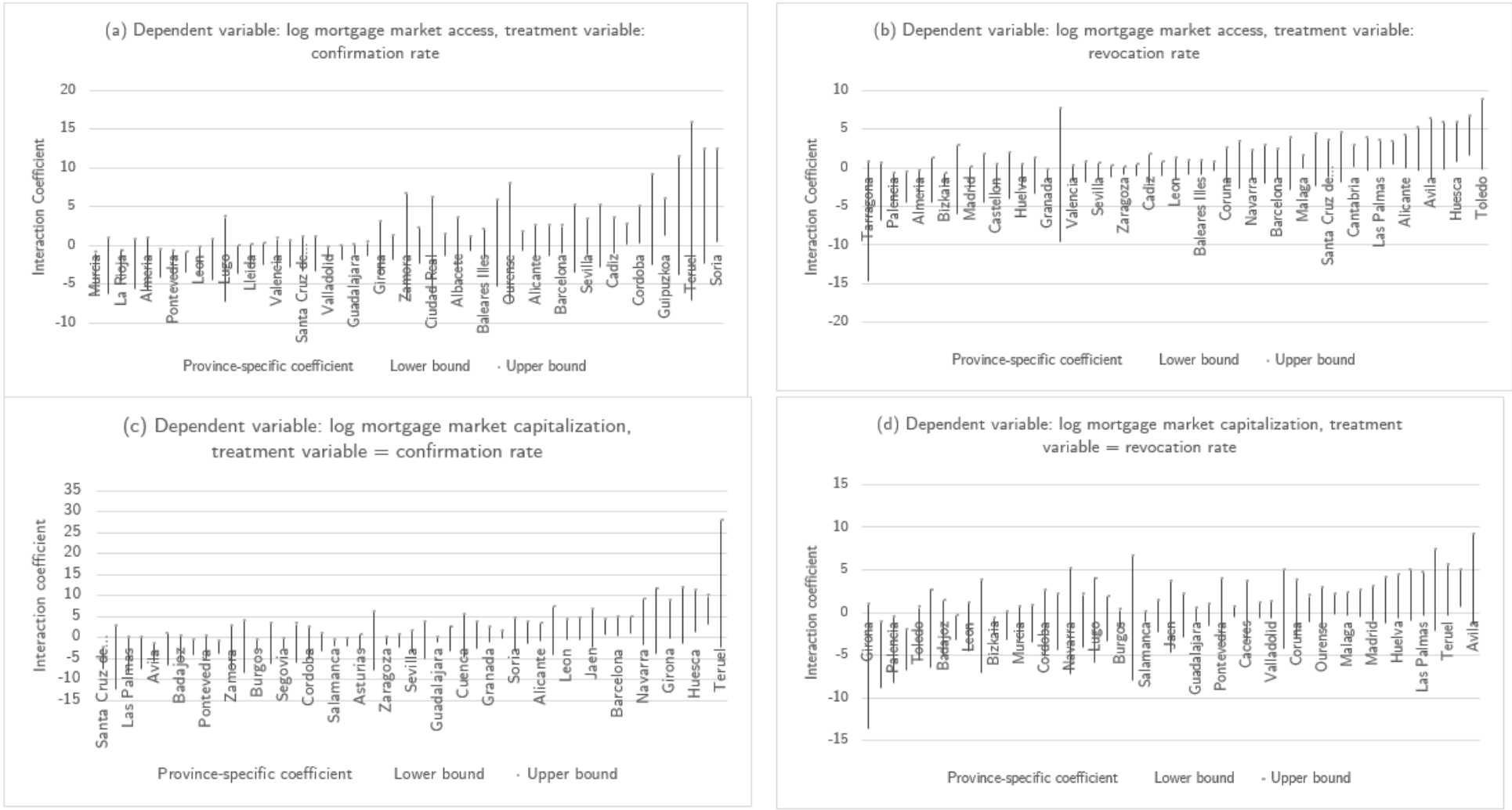
Notes: the dependent variable is the natural log of per capita number of mortgages in columns (1) and (2) and the natural log of the market value of mortgages in columns (3) and (4). Standard errors are adjusted for serially correlated stochastic disturbances across and within provinces using finite-sample empirical distribution function to adjust for the non-zero spatial and temporal covariance of the random error term. Province-clustered standard errors are denoted in parentheses. Asterisks denote statistically significant coefficients at 10% (*), 5% (**), and 1% (***), respectively.

Figure 5 exhibits province-specific heterogeneity in the effect of judicial quality on the mortgage market outcomes. Decomposing effect heterogeneity across provinces allows us to observe both the differences in province-specific reaction of the mortgage market to judicial quality improvement and deterioration as well as to identify the provinces, which appear to be most sensitive to the underlying changes in the quality of justice. Panel (a) and (b) exhibits the province-level decomposition of effect heterogeneity using the mortgage market access as the dependent variable. The evidence suggests that the province-level reaction to increasing confirmation rate is overwhelmingly positive with some important differences. For instance, a handful of provinces such as Soria, Toledo, Córdoba and Navarra tend to be disproportionately more reactive to the changes in confirmation rate than the rest of our sample. By contrast, more peripheral provinces such as Cáceres, Murcia and Lugo do not seem to react strongly to the improvements in judicial quality. By contrast, some provinces seem to be hit particularly badly by the increasing revocation rate such as Tarragona, Jaén, Palencia and Guipúzcoa. In terms of further example, Panel (c) and (d) exhibit decomposed province-specific effect heterogeneity using the mortgage market capitalization as a dependent variable. The evidence uncovers an overwhelmingly positive reaction to the improvement in the quality of justice as well as a negative reaction to the deterioration of judicial quality. For instance, a reasonably strong positive effect of increasing confirmation rates on mortgage market capitalization can be found

in provinces such as Teruel, Murcia, Huesca and Barcelona. In addition, some provinces, such as Gerona, Palencia and Zamora, seem to be hurt particularly badly by the rising rate of revocation, whilst some of the provinces do not seem to be particularly reactive to the deteriorating conditions in judicial quality. Although the exploration of the potential determinants of these differences are beyond the scope of our investigation, the notion that provincial mortgage markets react differently to the changes in judicial quality despite the common legal and historical framework should not be left unexplored. As a final caveat, the estimated impact magnitudes behind the relationship between judicial efficacy and mortgage market outcomes are robust to the alternate choices of confirmation and revocation rate when partially revoked cases and orders are dropped from either measure which provides additional leverage against the possible measurement error in the judicial efficiency variables.[40]

[40] The full results with accompanying tables are available upon request.

Figure 5: Province-specific effect heterogeneity



5.3. Quantile-specific estimates

The empirical estimates so far indicate substantially better access to the mortgage market and higher capitalization in response to the improvement in judicial quality where important province-level heterogeneities are present. One of the remaining caveats against our results arises from the decomposition of the effect across different levels of the mortgage market. In particular, do provinces with a higher initial and contemporaneous density of mortgages and capitalization react to the changes in judicial quality differently than their peers at lower levels of both density and capitalization?

Table 3 reports quantile regression estimates where the baseline fixed-effects model of the mortgage market variables is fitted using the asymmetric loss function. By making use of conditional quantile function, we are able to parse out how the effect of judicial quality varies across different levels of mortgage density and capitalization. More specifically, the table reports quantile-specific estimated relationships between judicial quality and mortgage market outcomes across five designated quantiles ranging from the 10^{th} percentile to the 90^{th} percentile of the outcome distribution.

Panel (a) reports the set of quantile-specific effects using the mortgage density as the dependent variable. The evidence unequivocally suggests a similar variance of the effect across different levels of the outcome variables. The point estimates confirm the beneficial effect of the improving judicial quality on mortgage market access. The estimated overall effect appears to be particularly strong at the 10^{th} and 25^{th} percentile where the quantile-specific magnitudes are statistically significant at conventional levels. This implies that the provincial mortgage markets characterized by low access to the mortgage market tend to benefit disproportionately more than the provinces already characterized by a highly accessible mortgage market. In addition, the negative effect of higher revocation rates on mortgage market access tends to be particularly strong in the lower tail of the distribution (i.e. 10^{th} percentile) and in its upper tail (i.e. 90^{th} percentile). This implies that both low-access provincial mortgage markets as well as those that are the most sophisticated and have the most accessible markets tend to suffer most from deteriorating judicial quality in terms of market accessibility. Each specification contains the full vector of both province-fixed effects and time-fixed effects which arguably do not render the estimated quantile-specific effects statistically insignificant. Panel (b) lays out the estimated mortgage market capitalization specifications of the underlying structural model and

convey a similar pattern. In particular, the positive effect of judicial quality is considerably strong in the 10th and 25th percentile of the distribution. That is, the provinces characterized by a less capitalized mortgage market tend to benefit relatively more from the higher rate of confirmation than the rest of the sample. Pointwise, the estimates in column (1) suggest that 1 percentage point increase in the confirmation rate at the 10th percentile of the mortgage market capitalization distribution translates into 0.55 percent [=exp(.439)-1] increase in the overall mortgage market capitalization, ceteris paribus. The positive effect of the equivalent increase in the confirmation rate drops to 0.44 percent [=exp(.366)-1] at the 25th percentile of the distribution. In both respective specifications, the estimated judicial quality parameter is statistically significant at 5 percent, which confirms discernible improvements in the mortgage market capitalization emanating from the increasing quality of the judiciary at the provincial level.

In Figure 6, we break down the asymmetric loss function from the five quantiles into the micro-percentiles. That is, q is decomposed into each 0.001 percentile of the distribution to estimate the relationship between judicial quality and mortgage market outcomes at the lowest possible percentile to partially remove the biases arising from the compression of the effect in the conditional quantile distribution. This approach allows us to investigate the effect of judicial quality across micro-percentiles of the distribution and observe the possible discrepancies. The simulation of the quantile-specific relationship into micro-percentiles is computationally intensive but allows us to unravel the effect of judicial quality more comprehensively across the entire spectrum of the mortgage market outcomes distribution. Panel (a) reports the estimated q-th percentile-level effect of judicial quality on mortgage market access. The evidence overwhelmingly supports a positive effect of increased confirmation rates on the accessibility of the mortgage market. Up to the 80th percentile of the distribution, the estimated effect appears to be relatively stable in the range between 0.2 and 0.5, which is consistent, with prior quantile-level estimates in Table 3. Beyond the 80th percentile, the effect becomes particularly large with a high degree of statistical significance. This implies that provinces with a more readily accessible mortgage market tend to benefit disproportionately from the improvements in judicial quality which may explain the persistent differences in the mortgage market access exhibited in Figure 1. A similar pattern is perceptible in the micro-percentile-level effect of revocation rates on accessibility of interested borrowers to the mortgage market. In particular, the estimated percentile-level effect is expectedly negative largely beyond the 70th

percentile threshold. At higher percentiles, the negative effect of higher revocation rate becomes large and statistically significant at 1 percent. This implies that provinces with more accessible and possibly more sophisticated mortgage markets tend to lose significantly more from a deteriorating quality of civil justice than other provinces. Given the dispersion in the mortgage density per capita in our sample, this implies that our estimates predict a sharper drop in the accessibility in the provinces characterized by high overall density of mortgages such as Almería, Castellón and Toledo, compared to others with lower density of mortgages.

As a further example, Panel (b) reports the percentile-specific effect of judicial quality on the mortgage market capitalization. Consistent with the prior estimates in Table 3, the evidence confirms arguably large and statistically significant effect of higher confirmation rate on the capitalization of the mortgage market in the lowest and highest tails of the distribution. Without loss of generality, this implies that provinces characterized by least capitalized mortgage market such as Teruel and Ávila as well as their counterparts with a highly capitalized market such as Barcelona and Málaga tend to benefit disproportionately more from improvements in judicial quality compared to the middle tail of the distribution. In addition, the simulated percentile-specific effect suggests that the provinces with greater depth and breadth in market capitalization tend to suffer somewhat more from a higher rate of revocation. More specifically, q-level coefficient is negative beyond the 40^{th} percentile, which readily implies that provinces at the median of the capitalization distribution and above tend to have less capitalization and possibly less sophisticated mortgage markets in response to deteriorating judicial quality. Considering the confidence bands and the size of the effect, the negative effect of higher revocation rate appears to be statistically significant at the 70^{th} percentile and 90^{th} percentile and above, which roughly corresponds to the observed market capitalization found in Toledo and Barcelona. The general trend of the effect found in *q*-specific percentile-based simulation of the relationship emphasize somewhat stronger gains from improvement in judicial quality at the lower tails of the distribution and a notably greater loss from deteriorating quality of justice at the higher tails of the distribution. From a more general perspective, decomposed quantile- and percentile-based effects emphasize an important heterogeneity in the mortgage market reactions to the improvements in judicial quality, which are quite far from being uniform.

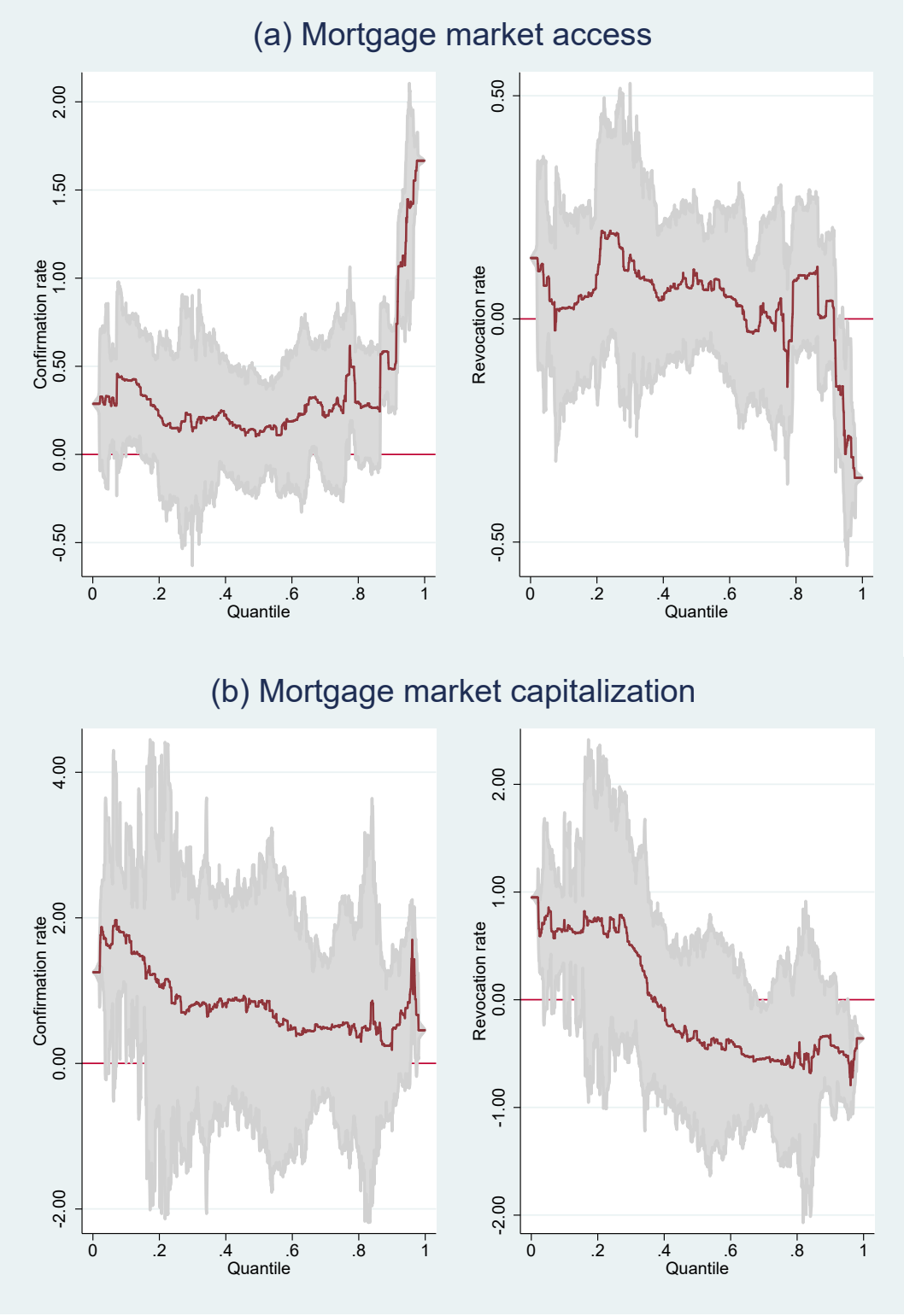
Table 3: Quantile regression estimates

	(1)	(2)	(3)	(4)	(5)
Q(.)	0.10	0.25	0.50	0.75	0.90

Panel A: Outcome variable = log mortgage market access					
Confirmation Rate	.418**	.271*	.089	.094	.314
	(.201)	(.173)	(.222)	(.095)	(.216)
Revocation Rate	-.308**	-.154	-.105	-.052	-.335*
	(.153)	(.235)	(.436)	(.136)	(.189)
Machado-Santos Silva Test for Heteroskedasticity (p-value)	[0.195]	[0.005]	[0.001]	[0.000]	[0.000]
Province-fixed effects (p-value)	YES	YES	YES	YES	YES
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Time-fixed effects (p-value)	YES	YES	YES	YES	YES
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Panel B: Outcome variable = log mortgage market capitalization					
Confirmation Rate	.439**	.366**	.102	.113	-.090
	(.229)	(.158)	(.347)	(.331)	(.181)
Revocation Rate	-.116	-.227	.184	.214	.538***
	(.321)	(.176)	(.786)	(.522)	(.181)
Machado-Santos Silva Test for Heteroskedasticity (p-value)	[0.066]	[0.001]	[0.001]	[0.000]	[0.001]
Province-fixed effects (p-value)	YES	YES	YES	YES	YES
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Time-fixed effects (p-value)	YES	YES	YES	YES	YES
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

Notes: the table presents the effect of judicial quality on the mortgage market access and capitalization for the full sample of Spanish provinces in the period 2007-2019. The dependent variable is the natural log of mortgages per 100,000 inhabitants in Panel A and the natural log of mortgage market capitalization in Panel B. The level of judicial quality is proxied by the rates of confirmation and revocation for each province-year observation pair. The standard errors are cluster-robust against the heteroskedastic distribution of error variance and non-zero serially correlated stochastic disturbances using Machado and Santos Silva (2015) conditional quantile function. Asterisks denote statistically significant regression coefficients at 10% (*), 5% (**) and 1% (***), respectively.

Figure 6: Percentile-specific effect of judicial quality on mortgage market



6. Conclusions

The relationship between judicial efficiency and access to household credit has revived significant scholarly interest with a variety of policy implications concerning the optimal institutional design to facilitate expedited access to credit. However, the degree to which the improvement of judicial efficiency and or judicial quality can improve access to household credit has received little scholarly attention.

To fill the void in the existing literature, this paper examines the contribution of the quality of the judicial system into Spanish mortgage market access. The quality of judicial decisions is proxied by the proportion of judgements and orders by first instance courts in civil matters that are reversed by Province Courts for a sample of 50 Spanish provinces in the period 2007-2019.

The results show that a deterioration of judicial quality reduces significantly the size of the mortgage market and renders the market access substantially more restrictive. The effect is not present if we look instead at increases in the quality of the judicial market, measured by the confirmation of orders and judgements by appeal courts. This relationship is robust to measures that may have an impact on the efficiency and expediency of the legal system, such the litigation rate. In essence, the quality of the judicial system is better captured by the revocation rate rather than by the confirmation rate. The underlying reason behind this finding lies on the fact that revoking a judgement implies an effort and represents a cost for the Province Court and this scheme of incentives gives a more plausible identification of the quality of the judicial system than when a judgment is confirmed.

We further unravel the heterogeneity of the judicial quality effect on household credit by performing a variety of quantile regression to unravel whether more sophisticated and differentiated mortgage markets respond differently to the improvement of judicial quality. Against this backdrop, our findings indicate that more differentiated provincial mortgage markets such with higher pre-existing access and overall capitalization such as Madrid and Barcelona tend to benefit more strongly from the improvement of judicial quality compared to more homogenous and less differentiated ones. In the similar vein, a deterioration of judicial quality, proxied by the increase in the revocation rate, tends to hurt more differentiated mortgage markets relatively more badly. The estimated effects are fully robust to the choice of the judicial quality measures and do not appear to be sensitive to the alternate versions of judicial quality measures.

Without the loss of generality, our results uncover a plethora of relevant policy implications concerning the expedience of judicial quality, and suggest that modest improvements in judicial quality can substantially facilitate easier and more straightforward access to household credit and further reinforce the overall mortgage market capitalization which, in turn, may have beneficial consequences for the resilience against large-scale macroeconomic and idiosyncratic shocks.

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