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EXTENDED ABSTRACT

Title: A time series analysis of foreclosures rates in Spain

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Abstract:

Recent research (González-Val, 2021) has examined the effects of the legal reform passed in 2012 in Spain to protect mortgage debtors. Under the new regime, it is difficult for low-income debtors who meet certain requirements to be evicted. Using panel data models with regional, year, and quarter fixed effects, linear and quadratic region-specific time trends, and other relevant control variables at the regional level (house prices, inflation, and unemployment rates), those results revealed that the reform significantly reduced the number of foreclosures, but that this effect was transitory, fading six years after the reform. However, the negative effect on the mortgage loans market was permanent throughout the period under consideration. Nevertheless, the same study suggests that, although the change in the law affected all regions at the same time, the spatial impact of the law reform was uneven across units.

To disentangle the regional differences across regions in the effectiveness of the law reform, this paper explores the frequency of permanent shocks in foreclosure rates (defined as the number of judicial foreclosures per 1,000 inhabitants) for 50 Spanish provinces (NUTS III regions) during the period 2001(Q1) to 2019(Q4) using time series analysis. We use data from completed foreclosure procedures in the courts of first instance, and data come from the General Council of the Judiciary (*Consejo General del Poder Judicial*). Loans data at the regional level come from the General Council of the Notary (*Consejo General del Notariado*).

We examine whether the foreclosure rate is a stationary series, exhibits a unit root, or is stationary around a process subject to structural breaks. A clear finding from this analysis is that not all shocks have transitory effects on the foreclosure rate. The percentage of unit root rejected is around 40%, thus providing evidence of both stationarity around occasional shocks that have permanent effects, and of a unit root, where all shocks have a permanent effect on the foreclosure rate. To test for the presence of unit roots, we run the Augmented Dickey-Fuller test. We also test for unit roots allowing for the presence of one (Perron and Vogelsang, 1992) and two (Clemente et al., 1998) structural breaks. Most of the permanent shocks (structural breaks) are

positive, and the majority are grouped from 2008 onwards, coinciding with the financial crisis and the subsequent collapse of the Spanish housing bubble. The next Table summarises the results:

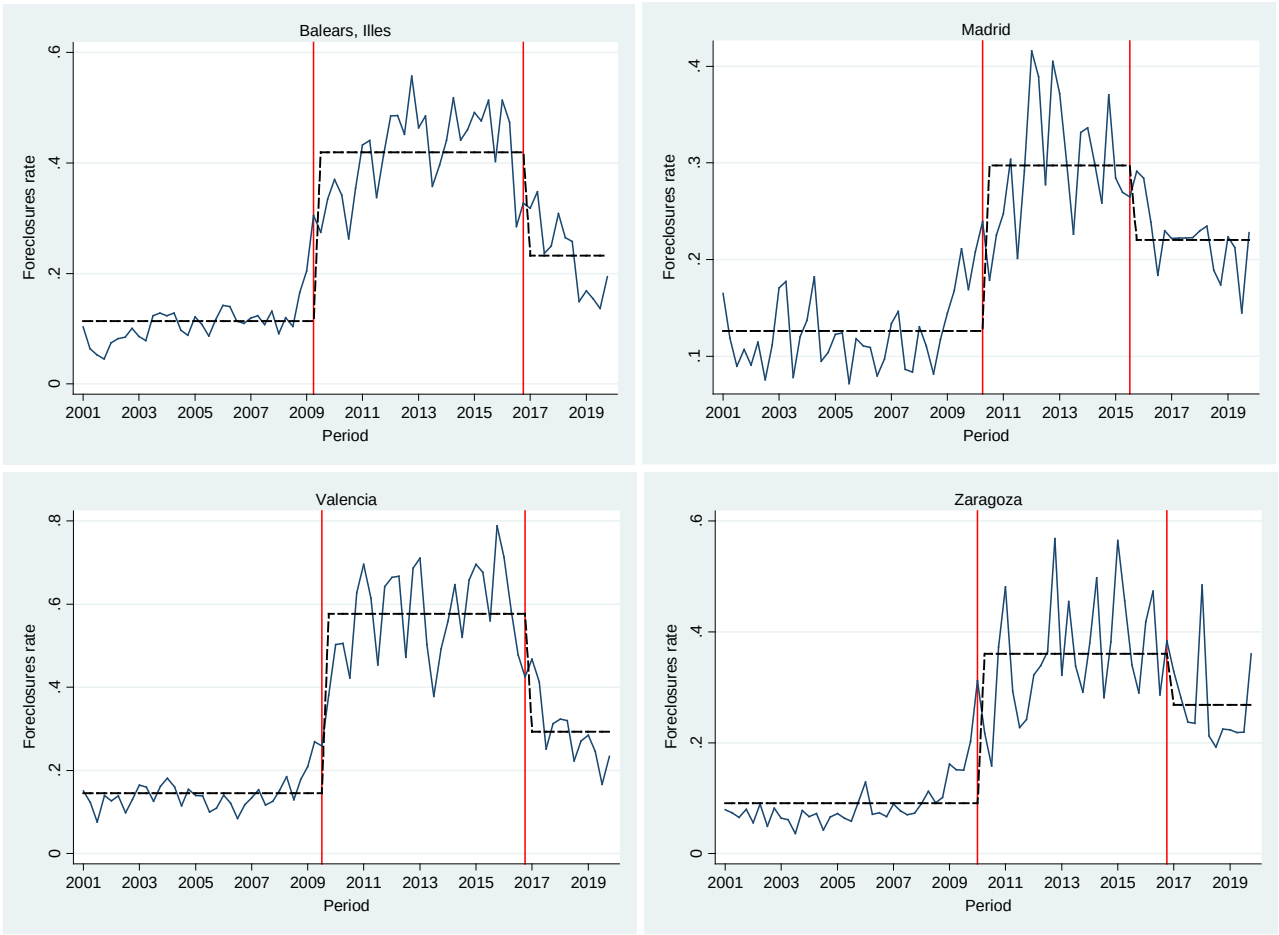
Table 1. Results of unit root tests on foreclosures rates

A: Region specific tests	% Unit root rejected		
Significance level	Trend stationarity	Trend stationarity with one break	Trend stationarity with two breaks
1%	20%	36%	38%
5%	34%	40%	46%
10%	42%	40%	46%
B: Panel tests (p = 1)	Test-statistic (p-value)		
Statistic Type			
Levin–Lin–Chu (2002)	-7.971 (0.000)		
Im–Pesaran–Shin (2003)	-10.192 (0.000)		
Pesaran (2007)	-19.419 (0.000)		

Notes: The null hypothesis is the existence of a unit root in divorce rate in all cases. We choose the optimal number of lagged growth rates to be included in the regression to control for autocorrelation using a 'general-to-specific procedure' based on the t-statistic, see Ng and Perron (1995). The maximum lag length to begin this procedure is set at 11. The panel test statistics are the t^*, the $W[\bar{t}]$, and the $Z[\bar{t}]$-statistic in case of the Levin–Lin–Chu, Im–Pesaran–Shin, and Pesaran test respectively.

Nevertheless, when two breaks are allowed, we find evidence of a negative change in the mean of the foreclosure rate series after the law reform in 22 out of the 50 regions, most of them located in the North of the country. Therefore, the change in the law significantly reduced foreclosures rates, but only in some regions. However, the negative change in the mean of the foreclosure rates in these regions is smaller than the positive rise in the mean observed at the beginning of the economic crisis (2008-2010) in most cases. This means that, even in those provinces in which the change in the law reduced foreclosures, the final mean of the foreclosure rate is higher than the pre-crisis period. The next Figure presents four selected regions showing this behaviour:

Figure 1. Foreclosure rates and their changing means (selected regions)



Note: Figure 1 plots the foreclosures rates, along with the permanent breaks in their means (dashed lines) and the structural break dates (vertical lines).

Supplementary analysis considering the loans rate (defined as the number of mortgage loans per 1,000 inhabitants) reveals that the effect in the mortgage loans market was permanent in most of the cases, with a percentage of unit root rejected around 20%, and negative breaks in the mean of the series are found in almost all regions. The timing of the breaks is quite similar across provinces; we found a negative break in the mean loans rate around the 2008-2010 period (beginning of the financial crisis) for all provinces, and the second negative break is found from 2010 onward. The next Table summarises the results for the loans rate:

Table 2. Results of unit root tests on loans rates

A: Region specific tests	% Unit root rejected		
Significance level	Trend stationarity	Trend stationarity with one break	Trend stationarity with two breaks
1%	72%	20%	8%
5%	96%	26%	18%
10%	98%	46%	26%
B: Panel tests (p = 1)	Test-statistic (p-value)		
Statistic Type			
Levin–Lin–Chu (2002)	-21.107 (0.000)		
Im–Pesaran–Shin (2003)	-21.050 (0.000)		
Pesaran (2007)	-18.105 (0.000)		

Notes: The null hypothesis is the existence of a unit root in divorce rate in all cases. We choose the optimal number of lagged growth rates to be included in the regression to control for autocorrelation using a 'general-to-specific procedure' based on the t-statistic, see Ng and Perron (1995). The maximum lag length to begin this procedure is set at 11. The panel test statistics are the t^*, the $W[\bar{t}]$, and the $Z[\bar{t}]$-statistic in case of the Levin–Lin–Chu, Im–Pesaran–Shin, and Pesaran test respectively.

Therefore, our analysis provides new evidence about regional differences in the effects of the law reform, and cast new research questions: What regional characteristics can help to explain why the law reform diminished the foreclosure rate only in some regions? Could a club convergence analysis identify differentiated behaviours and group regions with a similar evolution of their foreclosure rate?

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