Credit expansion, housing prices, and non-linearity

First draft,

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Abstract

This paper investigates the effects of an increase in the household debt to GDP ratio on the subsequent housing prices in the medium run for an unbalanced panel of 22 OECD countries over the past three decades. The main finding are as follows. First, the household credit to GDP ratio leads to the appreciation in housing prices in the short-run perspective. Second, the short-run positive effects tend to diminish gradually. Third, in the medium-run perspective, the current increase in the household credit to GDP ratio predicts the subsequent depreciation of housing prices. Looking at the effects of the shock on the 5 years ahead, the negative coefficients are robust to several specifications including the country fixed effect, the time fixed effect, and the time trend.

Keywords: Household Credit, Housing Prices,

JEL classification: G12, G21

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1. Introduction

A lot of recent empirical literature has provided the evidence that a rapid expansion in the supply of credit explains house price appreciations (Mian and Sufi 2009, Mian et al 2017, and others).[3] On the other hand, ever since Kindleberger (1978) and Minsky (1986) have highlighted the euphoria and mania on the speculations of asset prices, several papers find the evidence that the excessive credit expansion very often results in the deep recession along with the collapse of the asset price boom.[4] These arguments predicts that an excessive credit supply, when it is measured by an persistent faster growth in the household debt relative to GDP, can lead initially to a boom but later to a bust in the housing market.

This paper investigates the effects of an increase in the household debt to GDP ratio on the subsequent housing prices in the medium run for an unbalanced panel of 22 OECD countries over the past three decades.

The main finding are as follows. First, the household credit to GDP ratio leads to the appreciation in housing prices in the short-run perspective. Second, the short-run positive effects tend to diminish gradually. Third, in the medium-run perspective, the current increase in the household credit to GDP ratio predicts the subsequent depreciation of housing prices. Looking at the effects of the shock on the 5 years ahead, the negative coefficients are robust to several specifications including the country fixed effect, time fixed effects, and time trend.

This medium-run negative effect contradicts with the rational expectation demand shock view but will rather support a supply shock view. It suggests that an excessive

[3] The literature includes Mian and Sufi (2009), Favara and Imbs (2015), Justiniano et al (2019), Mian, Sufi, and Verner (2017), among others. Mian and Sufi (2009) demonstrate that a rapid expansion in the supply of mortgages explains a large fraction of recent US house price appreciation and subsequent mortgage defaults. Mian, Sufi, and Verner (2017) provide evidence that an increase in the household debt to GDP ratio predicts lower GDP growth and higher unemployment in the medium run for an unbalanced panel of 30 countries from 1962 to 2012.

[4] Gourinchas and Obstfeld (2012) and Jordà, Schularick, and Taylor (2015) conduct a broad empirical analysis of countries that have experienced bubbles to examine the link between bubbles and credit expansion.

lending to the household sector leads to the future collapse of housing price booms.

2. Data and Methodology

2.1 Panel Data

We construct the unbalanced panel data quarterly for the period from the first quarter of 1980 to the fourth quarter of 2017. The data covers 22 advanced countries listed in Panel A of Table 1. To examine the dynamic feature of housing prices, this paper uses the residential property price provided by Bank of International Settlements (BIS). The BIS dataset provides housing price indices, based on a definition as comparable as possible across broad sample of countries. As the most important explanatory variable, we highlight the total credit to the household sector to GDP ratio as a measure of credit expansion. This credit data provided by BIS captures the total credit to the household sector in the economy, including not only credit provided by domestic and foreign banks but also non-bank financial institutions.

[Insert Table 1 here]

The panel data also includes following variables: nominal GDP, interest rate on a 10-year government bond (long-term interest rate), consumer price index, and the population to control for the fundamentals of housing prices. The population data is provided in annual frequency, so we convert it into quarterly frequency by repeating annual frequency values.

Baseline analysis uses 12-quarter (3-year) growth of these variables computed by log difference, except for interest rate. Thus, the growth of the household credit to GDP ratio captures credit expansion/contraction in each economy. For example, positive values indicate that the credit to household sector expands faster than the real economy. The interest rate is 12-quarter (3-year) averaged value. Details of the variables and summary statistics are summarized in Panels A of Table 2 and 3, respectively.

[Insert Table 2 here]

[Insert Table 3 here]

2.2 Empirical Methodology

To examine dynamic relation between housing prices and credit to household sector, we estimate impulse responses using Jordà (2005) local projections. This paper uses the two types of specifications: the level specification and the first difference specification. The local projection impulse responses to household credit shocks, based on the level specification, are given by the sequence of coefficients β^h estimated from the following equation, for $h = 1, \dots, 30$:

$$\ln HP_{i,t+h} = \alpha_i + \ln \boldsymbol{X}_{i,t-1} \boldsymbol{\Gamma}^h + \beta^h \ln Credit_{i,t-1} + \varepsilon_{i,t+h}^h,$$

where i is country and t is time period. $\ln HP_{i,t+h}$ is natural logarithm of housing prices, and $\ln Credit_{i,t-1}$ is natural logarithm of the household credit to GDP ratio. $\boldsymbol{X}_{i,t-1}$ is vector of control variables described in the previous section, and $\boldsymbol{\Gamma}^h$ is vector of coefficients. α_i is country-fixed effect and $\varepsilon_{i,t+h}^h$ is error term. In this level specification, the control variables are natural logarithm values, except for interest rates.

Similarly, the local projection impulse responses to household credit shocks, based on the first difference specification, are given by the sequence of coefficients β^h estimated from the following equation, for $h = 1, \dots, 30$:

$$\Delta_{12Q} HP_{i,t+h} = \alpha_i + \boldsymbol{X}_{i,t-1} \boldsymbol{\Gamma}^h + \beta^h \Delta_{12Q} Credit_{i,t-1} + \varepsilon_{i,t+h}^h,$$

where i is country and t is time period. $\Delta_{12Q} HP_{i,t+h}$ is 12-quarter growth of housing prices, which is defined as $\Delta_{12Q} HP_{i,t+h} = \ln HP_{i,t+h} - \ln HP_{i,t+h-12}$. $\Delta_{12Q} Credit_{i,t-1}^{HH}$ is 12-quarter growth of the household credit to GDP ratio, which is defined as $\Delta_{12Q} Credit_{i,t-1} = \ln Credit_{i,t-1} - \ln Credit_{i,t-13}$. $\boldsymbol{X}_{i,t-1}$ is vector of control variables described in the previous section, and $\boldsymbol{\Gamma}^h$ is vector of coefficients. α_i is country-fixed effect and $\varepsilon_{i,t+h}^h$ is error term. In this first difference specification, control variables are 12-quarter (3-year) growth, except for interest rate. Interest rates are 12-quarter (3-year) averaged values.

In our local projection analysis, the sequence of coefficients β^h (for $h = 1, \ldots, 30$) is the key. β^h will capture the impulse response of housing price to household credit shocks. In the first difference specifications, the analysis fixes the independent variables to be the growth of household credit to GDP ratio from 13 quarters ago to last quarter. In contrast, the analysis varies dependent variable, i.e., 12-quarter housing price growth, from being current to further into the future. For example, β^{20} would be the effect of a increase in household credit to GDP ratio from 13 quarters ago to last quarter on growth of housing price from next 8 quarter to 20 quarter into the future.

3. Results and Discussion

3.1 Results of Local Projection

This section provides results of empirical analysis. Figure 1 shows the impulse responses estimated by Jordà (2005) local projections using first difference specification with/without controls, time trend, or time-fixed effects. According to this figure, the household credit has positive effects on growth of housing price in 1-5 quarter after the shock. For example, one-percentage point increase in the household credit leads to 0.3-0.5 percentage point increase in growth of housing price in next period (Panels A-D). This result indicates that credit expansion leads to housing price appreciation in short-run perspective.

However, these short-term positive effects diminish gradually, and become statistically insignificant since 6 quarter after the shock. More interestingly, the effects of credit to household sector shocks turn to become negative and statistically significant in medium-run perspective. This medium-run negative effect tends to be statistically significant since 15-20 quarter (4-5 year) after the shock in panels A-C of Figure 1. The results almost hold when we use level specification, instead of first difference specification (Panels A-D of Figure 2). These results suggest that present increase in credit to household sector to GDP ratio predicts subsequent depreciation of housing prices.

To examine this medium-run effect further, we perform single equation specifications based on local projections. The first difference specification is the following:

$$\Delta_{12Q} HP_{i,t+20} = \alpha_i + \boldsymbol{X}_{i,t-1}\boldsymbol{\Gamma} + \beta^{20}\Delta_{12Q} Credit_{i,t-1} + \varepsilon_{i,t+20}.$$

The coefficient: β^{20} will capture medium-run effects of the household credit on housing prices. As described in the precious section, β^{20} would be the effect of a rise in household credit to GDP ratio from 13 quarters ago to last quarter on growth of housing price from next 8 quarter to 20 quarter into the future. We estimate this single equation specification with/without controls, time trend, or time-fixed effects.

Table 4 summarizes the results of coefficients: β^{20}. The coefficients of the household credit are negative and statistically significant in most specifications (columns 1-5), corroborating the key finding in Figure 1. Similarly, Table 5 summarizes the single equation specifications using level specification, instead of first difference specification. As can be seen, the results hold especially when the specifications include control variables. (columns 2, 4, and 6).

[Insert Table 4 here]

[Insert Table 5 here]

To summarize, the analysis provides the following three findings. First, the household credit to GDP ratio leads to the appreciation in housing prices in the short-run perspective. Second, the short-run positive effects tend to diminish gradually. Third, in the medium-run perspective, the current increase in the household credit to GDP ratio predicts the subsequent depreciation of housing prices. This medium-run negative effects suggests that an excessive lending to household sector leads to future collapse of housing prices or housing bubbles, which implies that the irrational behavior of agents induces credit booms, as Kindleberger (1978) addresses using the words, euphoria and speculations.

3.2 Robustness Checks

This sub-section provides several robustness checks. First, we show impulse responses estimated by recursive panel vector autoregression (VAR) analysis, instead of local projections. The VAR analysis can consider fully dynamic relations between housing prices and credit to household sector.

Panel VAR includes parsimonious list of endogenous variables: housing price and the household credit to GDP ratio. In this VAR analysis, panel data is converted into annual frequency by picking-up the fourth quarter's values, and the analysis uses 4-quarter (1-year) growth to identify the exogenous shock properly. The shocks are identified by Cholesky ordering that sets the household credit is the last variable, which is most conservative setting to identify the shocks of the credit. The VAR includes 4-lags, but we confirm that the results are not sensitive even when the models include longer lag-length.

Panel A of Figure 3 shows impulse response of housing price to the household credit to GDP ratio's shock. The Result is similar to the impulse responses obtained by local projections. Positive shock of credit to household sector leads to appreciation of housing price in short-run perspective. However, the effect diminishes gradually and become negative at statistically significant level in medium-run perspective. This result holds if the VAR uses level variables, instead of first difference (Panel B of Figure 3).

Second, we replicate the baseline analysis using an alternative dataset. A possible concern of our quarterly frequency panel data arises from missing values in the 1980s. In the late 1980s to the early 1990s, some advanced countries, such as Finland, Japan, Norway, and Sweden, have experienced severe boom and bust cycles. However, our analysis might not fully capture the effects of these episodes because of missing values in the early- to mid- 1980s, which might make the medium-run negative effects of credit expansion more benign ones.

In response, we use strongly balanced long-term annual panel data provided by Jordà et al. (2016), covering 17 advanced countries listed in Panel B of Table 1 from 1870 to 2013. This alternative dataset collects credit to household sector by banks, so definition of the credit is relatively narrow compared to our quarterly frequency panel data. However, using this balanced dataset can provide valuable insights. To reconcile with baseline analysis using quarterly frequency panel data, we use data from 1980 to 2013. Details of the variables and summary statistics are summarized in Panels B of Table 2 and 3, respectively.

We estimate the first difference single equation specification in the following:

$$\Delta_{3Y}HP_{i,t+5} = \alpha_i + \boldsymbol{X}_{i,t-1}\boldsymbol{\Gamma} + \beta^5\Delta_{3Y}Bank\_Credit_{i,t-1} + \varepsilon_{i,t+5},$$

where i is country and t is year. $\Delta_{3Y}HP_{i,t+5}$ is 3-year growth of housing price, and $\Delta_{3Y}Bank\_Credit_{i,t-1}$ is growth of bank credit to household sector to GDP ratio. $\boldsymbol{X}_{i,t-1}$ is vector of 1-year lagged control variables, and $\boldsymbol{\Gamma}$ is vector of coefficients. α_i is country-fixed effect and $\varepsilon_{i,t+5}$ is error term. β^5 would be the effect of a rise in bank credit to household sector to GDP ratio from 4 years ago to last year on growth of housing price from next 2 year to 5 year into the future. We estimate this single equation specification with/without controls, time trend, or time-fixed effects.

Table 6 summarizes the results of single equation specification. Coefficients of bank credit to household sector is negative and statistically significant in all specifications. Moreover, the point estimates are quantitatively similar to the baseline results presented in Table 1, although they become slightly more negative. Similarly, Table 7 summarizes the results when we use level specification, instead of first difference specification.

Results hold when the specifications include controls (columns 2, 4, and 6). Thus, this alternative balanced panel dataset provides consistent results to our main findings presented in the last section.

Third, we examine non-linearity. Our main finding is that present increase in the household credit to GDP ratio predicts subsequent depreciation of housing prices. However, decrease in the credit may not lead to subsequent appreciation of housing prices, which implies non-linear effects of the credit to household sector. In response, we construct dummy variables for whether the economy has experienced positive or negative growth of credit to household sector to GDP ratio, and interact these dummies with growth of the credit to household sector.

Panel A of Figure 4 shows the result of local projection's impulse response, considering the non-linearity, and using quarterly frequency panel dataset. According to this figure, when the economy has experienced credit expansion, the impulse responses show the consistent dynamics to Figure 1: present increase in credit to household sector predicts subsequent depreciation of housing prices in medium-run perspective (black lines). In contrast, when the economy has experienced credit contraction, growth of the credit does not predict subsequent depreciation in medium-run perspective (grey lines).[5]

These non-linear effects are clear when the analysis uses the annual frequency data provided by Jordà et al. (2016), as shown in Panel B of Figure 4. Panel B indicates that present increase in credit to household sector predicts subsequent depreciation of housing prices when the economy has experienced credit expansion (black lines). In contrast, when the economy has experienced credit contraction, impulse response does not show statistically significant signs (grey lines).

Overall, the additional analysis shows the robustness of the key finding: present

[5] When the economy has experienced credit contraction, increase in growth of credit to household sector leads to depreciation in housing prices in short-run perspective (from 4 to 15 quarter after the shock, Panel A of Figure 4). Economies that have experienced credit contraction may be in financial crisis in most cases. In such a situation, housing prices tend to continue declining, even when household credit increase.

increase in credit to household sector predicts subsequent depreciation of housing prices.

4. Conclusion

This paper investigates the effects of an increase in the household debt to GDP ratio on the subsequent housing prices in the medium run for an unbalanced panel of 22 OECD countries over the past three decades. The main finding are as follows. First, the household credit to GDP ratio leads to the appreciation in housing prices in the short-run perspective. Second, the short-run positive effects tend to diminish gradually. Third, in the medium-run perspective, the current increase in the household credit to GDP ratio predicts the subsequent depreciation of housing prices.

The next step is to investigate the mechanism under which the credit expansion results in the depreciation in housing prices. It is interesting to examine if the fundamental shock leading to a rise in household debt is either the movement in credit demand or credit supply. It is also interesting to investigate the determinants of the rise in household, such as foreign capital inflows, monetary expansion, financial deregulations, among others.

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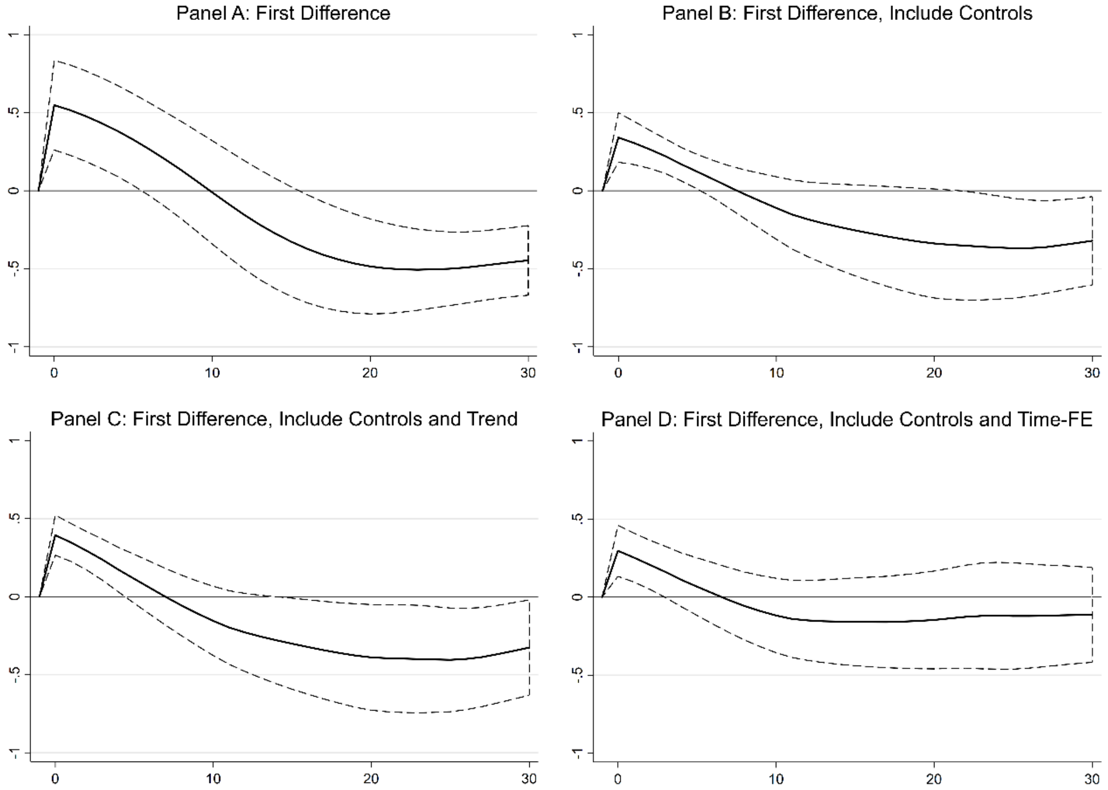
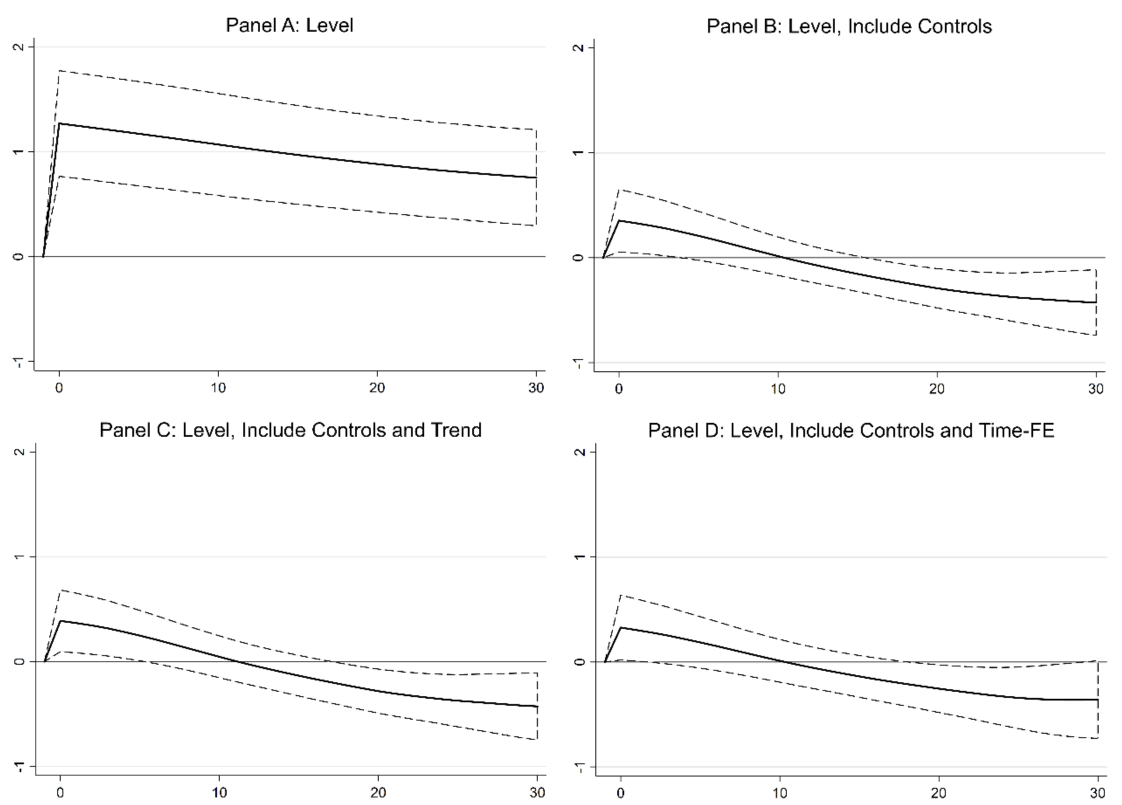
Figure 1. Local Projections (First Difference Specifications)



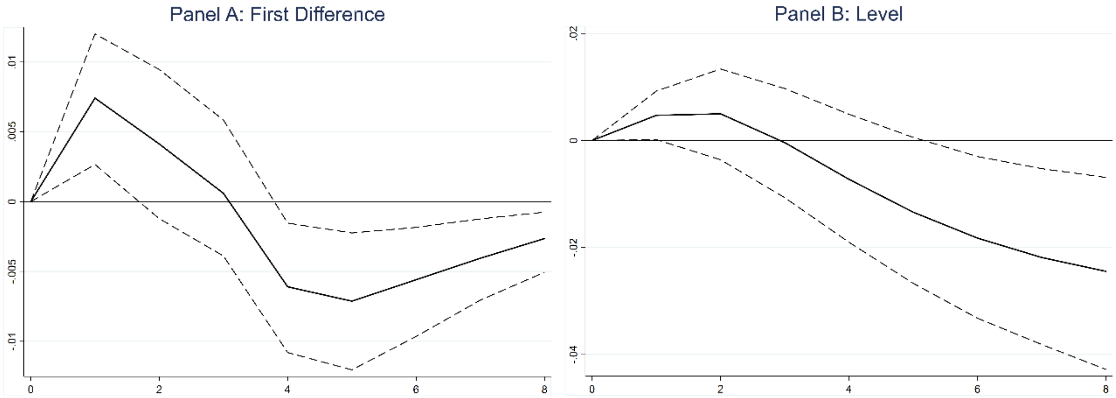
Note: This figure reports impulse responses estimated by local projections, using first difference specification. Each panel shows the housing price response to a credit to household sector shock. The basic model is $\Delta_{12Q}HP_{i,t+20} = \alpha_i + \boldsymbol{X}_{i,t-1}\boldsymbol{\Gamma} + \beta^{20}\Delta_{12Q}Credit_{i,t-1} + \varepsilon_{i,t+20}$, for $h = 1, \dots, 30$. Black lines represent impulse responses, and dashed lines represent two-standard deviation band computed using standard errors clustered at country level.

Figure 2. Local Projections (Level Specifications)



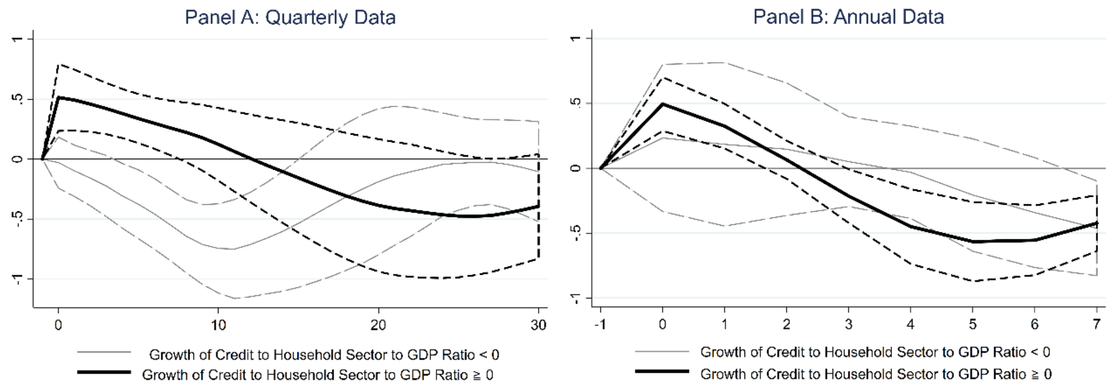
Note: This figure reports impulse responses estimated by local projections, using level specification. Each panel shows the housing price response to a credit to household sector shock. The basic model is $\ln HP_{i,t+h} = \alpha_i + \ln \boldsymbol{X}_{i,t-1} \boldsymbol{\Gamma}^h + \beta^h \ln Credit_{i,t-1} + \varepsilon_{i,t+h}^h$, for $h = 1, \dots, 30$. Black lines represent impulse responses, and dashed lines represent two-standard deviation band computed using standard errors clustered at country level.

Figure 3. Impulse Responses (Recursive Panel VAR)



Note: This figure reports impulse responses estimated by recursive panel VAR model, including housing prices and the household credit to GDP ratio. The model includes 4 lags of these variables. Each panel shows the housing price response to a credit to household sector shock. The shocks are identified using a Cholesky ordering that sets credit to household sector is the last variable. Black lines represent impulse responses, and dashed lines represent 95% confidence intervals computed by Monte-Carlo.

Figure 4. Local Projection, Considering Non-linearity



Note: This figure reports impulse responses estimated by local projections, using first difference specification. Each panel shows the housing price response to a credit to household sector shock. We estimate coefficients for positive or negative changes in credit to household sector to GDP ratio. The model of panel A is $\Delta_{12Q}HP_{i,t+h} = \alpha_i + \boldsymbol{X}_{i,t-1}\boldsymbol{\Gamma}^h + \beta^{h+}\Delta_{12Q}Credit_{i,t-1}^{+} + \beta^{h-}\Delta_{12Q}Credit_{i,t-1}^{-} + \varepsilon_{i,t+h}^{h}$, for $h = 1, \ldots, 30$. The model of panel B is $\Delta_3 HP_{i,t+h} = \alpha_i + \boldsymbol{X}_{i,t-1}\boldsymbol{\Gamma}^h + \beta^{h+}\Delta_3 Bank\_Credit_{i,t-1}^{+} + \beta^{h-}\Delta_3 Bank\_Credit_{i,t-1}^{-} + \varepsilon_{i,t+h}^{h}$, for $h = 1, \ldots, 7$. Black lines represent impulse responses, and black dashed lines represent two-standard deviation band for the positive change. Grey lines represent impulse responses, and grey dashed lines represent two-standard deviation band for the negative change. Standard errors are clustered at country level.

Table 1. List of Countries

Panel A: Quarterly Data, 22 Advanced Countries				
Australia	Austria	Belgium	Canada	Denmark
Finland	France	Germany	Greece	Ireland
Italy	Japan	Korea	Netherlands	New Zealand
Norway	Portugal	Spain	Switzerland	Sweden
United Kingdom	United States			
Panel B: Annual Data, 17 Advanced Countries				
Australia	Belgium	Canada	Denmark	Finland
France	Germany	Italy	Japan	Netherlands
Norway	Portugal	Spain	Sweden	Switzerland
United Kingdom	United States			

Table 2. Notations and Data Sources

Notation	Description	Source
Panel A: Quarterly Data		
Δ_{12Q}HP	Residential property price, 3-year (12-quarter) growth	BIS
Δ_{12Q}Credit	Total credit to households to GDP ratio, 12-quarter (3-year) growth	BIS
Δ_{12Q}GDP	Nominal GDP, local currency , 12-quarter (3-year)	IFS (IMF)
Long_rate^{12Q}	Interest rate on a 10-year government bond, 12-quarter (3-year) average	OECD
Δ_{12Q}CPI	Consumer price index, 12-quarter (3-year) growth	IFS (IMF)
Δ_{12Q}Population	Population, 12-quarter (3-year) growth	WEO (IMF)
Panel B: Annual Data (Jordà et al., 2016)		
Δ_{3Y}HP	House price, 3-year growth	Jordà et al., 2016
Δ_{3Y}Bank_credit	Bank loans to households to GDP ratio, 3-year growth	Jordà et al., 2016
Δ_{3Y}GDP	Nominal GDP, loca currency , 3-year growth	Jordà et al., 2016
Long_rate^{3Y}	Long-term interest rate, 3-year average	Jordà et al., 2016
Δ_{3Y}CPI	Consumer price index, 3-year growth	Jordà et al., 2016
Δ_{3Y}Population	Population, 3-year growth	Jordà et al., 2016

Table 3. Summary Statistics

	Observation	Mean	Std. Dev	Min	Max
Panel A: Quarterly Data					
Δ_{12Q}HP	2832	0.1379	0.1752	-0.5727	0.7789
Δ_{12Q}Credit	2637	0.0817	0.1371	-0.5712	0.7329
Δ_{12Q}GDP	2371	0.1387	0.1036	-0.2467	0.5727
Long_rate^{12Q}	2570	0.0604	0.0349	-0.0017	0.1675
Δ_{12Q}CPI	3080	0.0971	0.0969	-0.0468	0.6693
Δ_{12Q}Population	3080	0.0174	0.0136	-0.0131	0.0815
Panel B: Annual Data (Jordà et al., 2016)					
Δ_{3Y}HP	567	0.1520	0.1830	-0.4360	0.7684
Δ_{3Y}Bank_credit	562	0.0901	0.1408	-0.2905	0.8115
Δ_{3Y}GDP	578	0.1794	0.1222	-0.0727	0.7149
Long_rate^{3Y}	578	0.0733	0.0394	0.0085	0.2049
Δ_{3Y}CPI	578	0.1136	0.1048	-0.0240	0.6823
Δ_{3Y}Population	578	0.0163	0.0212	-0.0206	0.2640

Table 4. Single Equation Specification (First Difference)

	Dependent Variable: $\Delta_{12Q}HP_{i,t+20}$					
	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta_{12Q}Credit_{i,t-1}$	-0.485***	-0.338*	-0.497***	-0.389**	-0.313*	-0.146
	(0.152)	(0.175)	(0.145)	(0.169)	(0.159)	(0.157)
Country Fixed Effect	✓	✓	✓	✓	✓	✓
Control Variables	-	✓	-	✓	-	✓
Time Trend	-	-	✓	✓	-	-
Time Fixed Effect	-	-	-	-	✓	✓
Within R^2	0.0907	0.2182	0.1381	0.2262	0.3893	0.4914
Number of Country	22	22	22	22	22	22
Observation	2084	1553	2084	1553	2084	1553

Note: This table reports the results of the following model: $\Delta_{12Q}HP_{i,t+20} = \alpha_i + \boldsymbol{X}_{i,t-1}\boldsymbol{\Gamma} + \beta^{20}\Delta_{12Q}Credit_{i,t-1} + \varepsilon_{i,t+20}$. Standard errors clustering at the country level are reported in parentheses. ***, **, and * denote significance at the 1, 5, and 10% levels, respectively.

Table 5. Single Equation Specification (Level)

	Dependent Variable: $Ln.HP_{i,t+20}$					
	(1)	(2)	(3)	(4)	(5)	(6)
$Ln.Credit_{i,t-1}$	0.884***	-0.291***	-0.0288	-0.282**	0.0485	-0.254**
	(0.230)	(0.0938)	(0.244)	(0.105)	(0.251)	(0.114)
Country Fixed Effect	✓	✓	✓	✓	✓	✓
Control Variables	-	✓	-	✓	-	✓
Time Trend	-	-	✓	✓	-	-
Time Fixed Effect	-	-	-	-	✓	✓
Within R^2	0.4077	0.8451	0.6917	0.8456	0.7298	0.8801
Number of Country	22	22	22	22	22	22
Observation	2348	1801	2348	1801	2348	1801

Note: This table reports the results of the following model: $\ln HP_{i,t+20} = \alpha_i + \ln \boldsymbol{X}_{i,t-1}\boldsymbol{\Gamma} + \beta^{20} \ln Credit_{i,t-1} + \varepsilon_{i,t+20}$. Standard errors clustering at the country level are reported in parentheses. ***, **, and * denote significance at the 1, 5, and 10% levels, respectively.

Table 6. Single Equation Specification (Annual Data, First Difference)

	Dependent Variable: $\Delta_{3Y}HP_{i,t+5}$					
	(1)	(2)	(3)	(4)	(5)	(6)
Δ_{3Y}Bank_Credit$_{i,t-1}$	-0.537***	-0.494***	-0.511***	-0.514***	-0.339***	-0.321**
	(0.0990)	(0.116)	(0.0949)	(0.115)	(0.106)	(0.126)
Country Fixed Effect	✓	✓	✓	✓	✓	✓
Control Variables	-	✓	-	✓	-	✓
Time Trend	-	-	✓	✓	-	-
Time Fixed Effect	-	-	-	-	✓	✓
Within R^2	0.1752	0.2104	0.2164	0.2249	0.393	0.3986
Number of Country	17	17	17	17	17	17
Observation	457	457	457	457	457	457

Note: This table reports the results of the following model: $\Delta_{3Y}HP_{i,t+5} = \alpha_i + \boldsymbol{X}_{i,t-1}\boldsymbol{\Gamma} + \beta^5\Delta_{3Y}Bank\_Credit_{i,t-1} + \varepsilon_{i,t+5}$. Standard errors clustering at the country level are reported in parentheses. ***, **, and * denote significance at the 1, 5, and 10% levels, respectively.

Table 7. Single Equation Specification (Annual Data, Level)

	Dependent Variable: Ln.HP$_{i,t+5}$					
	(1)	(2)	(3)	(4)	(5)	(6)
Ln.Bank_Credit$_{i,t-1}$	0.678***	-0.330*	-0.0225	-0.332*	0.0171	-0.323*
	(0.104)	(0.161)	(0.144)	(0.166)	(0.152)	(0.179)
Country Fixed Effect	✓	✓	✓	✓	✓	✓
Control Variables	-	✓	-	✓	-	✓
Time Trend	-	-	✓	✓	-	-
Time Fixed Effect	-	-	-	-	✓	✓
Within R^2	0.3423	0.7772	0.687	0.7772	0.7169	0.8072
Number of Country	17	17	17	17	17	17
Observation	464	464	464	464	464	464

Note: This table reports the results of the following model: $\ln HP_{i,t+5} = \alpha_i + \ln \boldsymbol{X}_{i,t-1}\boldsymbol{\Gamma} + \beta^5 \ln Bank\_Credit_{i,t-1} + \varepsilon_{i,t+5}$. Standard errors clustering at the country level are reported in parentheses. ***, **, and * denote significance at the 1, 5, and 10% levels, respectively.