In (Re)Search of Credit Crunch (Rationing) Periods in Albania: A Disequilibrium Approach

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Introduction...(1)

- In EME countries, as in advance economies, credit patterns are expected to be shaped by:
  - Banks' decision to allocate liquidity (credit), e.g. to borrowers with the highest valuation.
  - Firms (HHs) decision to acquire liquidity (including banking system) to finance their investments.
- at which, Credit Market Equilibrium occurs when credit demand (d_t) equals credit supply (s_t), and vice versa, at the equilibrium real interest rate (price).
- **BUT**, as Yuan and Zimmermann (1999) imply, if prices are thought to be:
  - "**Too high**", credit supply will exceed credit demand, and banks will have to reduce their prices until the market clears (*i.e. equilibrium is reached*).
  - "**Too low**", credit supply will be lower than credit demand (*credit demand excess*) and prices will have to be raise until the market clears (*i.e. equilibrium is reached*).

Introduction...(2)

- This market imperfection (clearing), as Torsten and Lina (2012) imply, is related to:
  - Asymmetric information;
  - Problems of moral hazard between lenders and borrowers;
  - Monitoring cost due to regulatory pressures;
  - Over-reaction to deteriorating bank asset values and profitability;

Due to which, two situations have to be distinguished:

- **CREDIT CRUNCH (CC)** – a situation in which an **unusually sharp decline** in the **supply of credit**, as banks are less willing to lend, generates an unsatisfied excess demand for real credit in the loan market at the prevailing lending interest rates, which do not rise [Council of Economic Advisors (1991)].

- **CREDIT RATIONING (CR)** – describes a situation of permanent excess demand due to imperfect information on credit markets [Soana, *et al.*, (2017)].

Introduction...(3)

- Some evidences by Shijaku (2021) related to episodes of CC (CR) concerning credit market in Albania, **BUT**…still the question is…

- **RQ**: Did credit market in Albania experience episodes of CC (CR), in particular during the Covid-19 Pandemic Crisis? Or do methodological issues improve our understanding on the topic?

- Albanian credit market remains still an excellent laboratory:

  - Albania is a bank-oriented economy and changes in credit supply entails monetary policy shocks.

  - Banks operating in Albania have been affected in the aftermath of GFC and Pandemic Crisis, **BUT** their systemic stability has not been endangered.

  - Macro-prudential policies (2015) and Covid-19 Pandemic Crisis experience.

- The novelty is the focus to analyse Albanian credit market from a disequilibrium point of view and in the case of Firms and Households (HHs).

Literature Review – Theoretical Approach

- CC (CR) is explained through supply and demand side point of view.
  - **THE SUPPLY-SIDE** sees this as an inefficient situation, explaining it through:
    - Lenders point of view – cuts of credit supply, without allowing for interest rate adjustment can be rational, as Nehls and Schmidt (2003) and Baek (2002) relate it to:
      - A monetary policy transmission (bank lending channel) approach;
      - A portfolio theory;
      - In extreme, it is related also with the risk premium of flight to quality;
    - Borrowers' point of view – demand for credit is not fully met as lenders show undue caution, ending up with credit-worthy borrowers that do not receive adequate financing, either cannot get it at reasonable terms or see their loan applications turned down and are unable to fund their investment projects [Ślazak (2011)];
  - **THE DEMAND-SIDE** sees a higher volume of credit could resulting from a strong demand, due to over-optimism over business outlooks by Firms (and HHs) [Nehls and Schmidt (2003)].

Literature Review – Empirical Approach

- Still as in Soana, *et al.,* (2017), LR identifies credit crunch (rationing) through means of:
  - Credit registry data on firms that have multiply lenders [e.g. Lyer, *et al.,* (2014)];
  - Survey data [Popov and Udell (2012); and Presbitero, *et al.,* (2014)];
  - A disequilibrium model approach [e.g. Kremp and Sevestre (2013); Farinha and Felix (2015)] that includes use of maximum likelihood, simple OLS and GMM approach, as well more complex Bayesian VAR method.

- The disequilibrium model requires to separately identify **demand** (d) and **supply** (s), by either:
  - Using microeconomic survey approach [Rottmann and Wollmershäuser (2011)];
  - Macroeconomic and banking sector time series [Borensztein and Lee (2002)].
    - DEMAND SIDE VARIABLES: backwards and forwards looking (*e.g. interest rates, inflation, industrial production, investments, real GDP, and output gap*).
    - SUPPLY SIDE VARIABLES: backwards and forwards looking (e.g. financial corporate net worth, stock-market prices, risk-premium, banks' lending capacity, macroeconomic variables such as interest rates, industrial production, real GDP, and output gap).

Methodology – Theoretical Approach...(1)

- Banks face a demand for loans (ld_t) and decides the amount of actual credit allocation (ls_t) according to a loan supply function that depends on the interest rate (r_t) it charges it and other control endogenous variables (Z_t), which contain more than one explanatory variable, as follows:

$$ld_t = \beta_1 + \beta_2 r_t + \beta_3 Z_t + \varepsilon_t^D \quad [1]$$

$$ls_t = a_1 + a_2 r_t + a_3 Z_t + \varepsilon_t^S \quad [2]$$

Where, a_1 and β_1 are constants; [a_2 and a_3] and [β_2 and β_3] are LR coefficients; ε_t^S and ε_t^D are error terms;

- The economic theory, as Hoque, *et al.*, (2016) advocate, suggests that equilibrium in credit market is at the point where:

$$ld_t = ls_t \quad [3]$$

at least, as Sóvágó (2011) accepts, related to the fact that the observed (or published) actual data do not distinguish between the exact extent of real credit demand and supply.

Methodology – Theoretical Approach...(2)

- The assumption of perfect credit market equilibrium is, **HOWEVER**, not applicable to reality, as Tirole (2006) explains is due to:
  - Information asymmetry;
  - Problems of moral hazard between lenders and borrowers;
  - Monitoring cost due to regulatory pressures;
  - Over-reaction to deteriorating bank asset values and profitability;

  that means, that credit market can at any time be in equilibrium (or disequilibrium) due to incomplete adjustment of real interest rate to equalise credit demand and supply, so that:

$$ld_t \neq ls_t \qquad [4]$$

- This means that a disequilibrium moment occurs as:
  - Credit market does not clear in each period of time [Čeh, *et al.*, (2011)];
  - Banks never fully achieve a correct adjustment of price-to-risk [Nehls and Schmidt (2003)];

Methodology – Theoretical Approach...(3)

- The simplest form of a credit market disequilibrium consists of three distinguish equations [Maddada and Nelson (1974)], which takes the form:

$$ld'_t = a_1 + a_2 Z_t^d + \mu_t^{d'} \quad [5]$$

$$ls'_t = \beta_1 + \beta_2 Z_t^s + \mu_t^{s'} \quad [6]$$

And,

$$q_t = min(ld'_t, ls'_t) \quad [7]$$

where, q_t **transitory bank lending**, considered as the actual ratio; ld'_t and ls'_t denote the unobservable quantity of loan demanded and supplied at period t, respectively, $Z_{i,t}^d$ and $Z_{i,t}^s$ with i=1,2,…n are vectors of K_1 and K_2 exogenous explanatory variables that influence ld'_t and ls'_t. For identification, as Schmidt and Zwick (2012) imply, it is crucial that these vectors differ in at least one variable. a_2 and β_2 are (K_1,1) and (K_2,2) vectors of parameters. a_1 and β_1 are constants. $\mu_t^{d'}$ and $\mu_t^{s'}$ are independent random error terms with $\mu_t^{d'} \sim N(0, \sigma_{d'}^2)$ and $\mu_t^{s'} \sim N(0, \sigma_{s'}^2)$ respectively.

Methodology – Empirical Approach

- This paper builds upon the empirical work by *Schmidt and Zwick (2012)* and *Dumičić and Ljubaj (2017)* and apply a dynamic demand-supply disequilibrium model approach, as follows:

$$ld_t^{firms} = a_{11} + a_{12} ld_{t-j}^{firms} + a_{13} BLS_{t-j}^{d^{firms}} + a_{14} Z_{t-j}^{d^{firms}} + \mu_t^{d^{firms}} \quad [8]$$

$$ld_t^{HH} = a_{21} + a_{22} ld_{t-j}^{HH} + a_{23} BLS_{t-j}^{d^{HH}} + a_{24} \boldsymbol{Z_{t-j}^{d^{HH}}} + \mu_t^{d^{HH}} \quad [9]$$

$$ls_t^{firms} = \beta_{11} + \beta_{12} ls_{t-j}^{firms} + \beta_{13} BLS_{t-j}^{s^{firms}} + \beta_{14} Z_{t-j}^{s^{firms}} + \mu_t^{s^{firms}} \quad [10]$$

$$ls_t^{HH} = \beta_{21} + \beta_{22} ls_{t-j}^{HH} + \beta_{23} BLS_{t-j}^{s^{HH}} + \beta_{24} \boldsymbol{Z_{t-j}^{s^{HH}}} + \mu_t^{s^{HH}} \quad [11]$$

Where, $ld_t^{firms\prime}$ and $ld_t^{HH\prime}$ is the volume of CD by firms and households. $s_t^{firms\prime}$ and $s_t^{HH\prime}$ is the volume of CS provided by banks. BLS data related to easing credit standards on firms ($BLS_{t-j}^{s^{firms}}$) and households ($BLS_{t-j}^{s^{HH}}$) and increasing demand for loan by firms ($BLS_{t-j}^{d^{firms}}$) and households ($BLS_{t-j}^{d^{HH}}$). Finally, $Z_{i,t-j}^{d^{firms}}$ and $Z_{i,t-j}^{s^{firms}}$ is now a vector of variables related to other demand-side and supply-side factor explaining bank lending to firms, and similarly $Z_{i,t-j}^{d^{HH}}$ and $Z_{i,t-j}^{s^{HH}}$ represent those in the case of households.

Methodology – Credit Demand (Firms)

- This model is expressed mathematically as follows:

$$ld_t^{firms} = a_{11} + a_{12} ld_{t-j}^{firms} + a_{13}\left[BLS_{t-j}^{d^{firms}} * ESI_{t+j}\right] + a_{14} GDP_{t-j} + a_{15} PPI_{t-j} + a_{16} EC_{t-j}^{firms} + a_{17} i_{t-j}^{firms} + a_{18} DEP_{t-j}^{firms} + a_{19} REER_{t-j} + \mu_t^{d^{firms}} \quad [12]$$

Where,

- GDP_{t-j} refers to the level of economic performance and controls the scale of economy;
- ESI_{t-j} refers to expectation of firms' optimisms over the performance of economy;
- PPI_{t-j} is an inflationary pressure indicator related to cost of production;
- EC_{t-j}^{firms} a demand consumption proxy by firms' energy consumption, which is a proxy for firms' degree of activity or firms investment behaviour;
- i_{t-j}^{firms} relates to bank lending rate to firms;
- DEP_{t-j}^{HH} captures effect with regards to internal available financial capital funds of firms;
- $REER_{t-j}$ refers exchange rate movements; a_i are empirical parameters to be estimated.

Methodology – Credit Demand (Households)

- This model is expressed mathematically as follows:

$$ld_t^{HH} = a_{21} + a_{22} ld_{t-j}^{HH} + a_{23}\left[BLS_{t-j}^{d^{HH}} * CC_{t+j}\right] + a_{24} W_{t-j} + a_{25} HPI_{t-j} + a_{26} EC_{t-j}^{HH} + a_{27} i_{t-j}^{HH} + a_{28} DEP_{t-j}^{HH} + a_{29} REER_{t-j} + \mu_t^{d^{HH}} \quad [13]$$

Where,

- W_{t-j} denotes wage, which is added to control the scale of economy;
- CC_{t-j} denotes consumer confidence;
- HPI_{t-j} refers to real estate prices;
- EC_{t-j}^{HH} is related to households energy consumption;
- i_{t-j}^{HH} relates to bank lending interest rate to households.
- DEP_{t-j}^{HH} captures effect with regards to stock of deposit claims by households.
- Others are as previously explained.

Methodology – Credit Supply (Firms)

- Consequently, the model is specified as follows:

$$ls_t^{firms} = a_{31} + a_{32}ls_{t-j}^{firms} + a_{33}\left(BLS_{t-j}^{s^{firms}} * GDP_{t+j}^{*}\right) + a_{34}LIQ_{t-j}^{tot} + a_{35}s_{t-j}^{firms} \quad [14]$$
$$+a_{36}(\boldsymbol{Boone_{t-j} * BPI_{t-j}}) + a_{37}(\boldsymbol{BSI_{t-j}} * \boldsymbol{NPL_{t-j}^{firms}}) + a_{38}REER_{t-j} + \mu_t^{d^{firms}}$$

And,

$$ls_t^{HH} = a_{41} + a_{42}ls_{t-j}^{HH} + a_{43}\left(BLS_{t-j}^{s^{HH}} * W_{t+j}^{*}\right) + a_{44}LIQ_{t-j}^{tot} + a_{45}s_{t-j}^{HH} \quad [15]$$
$$+ a_{46}(\boldsymbol{Boone_{t-j} * BPI_{t-j}}) + a_{47}(\boldsymbol{BSI_{t-j}} * \boldsymbol{NPL_{t-j}^{HH}}) + a_{48}REER_{t-j} + \mu_t^{d^{HHs}}$$

Where, ls_{t-j}^{firms} and ls_{t-j}^{HH} refer to the interest difference between the lending rate to firms and households compared to that of an asset risk-free borrowers; LIQ_{t-j}^{tot} denotes the financial ability of banks to lend from a capital disposable point of view; $Boone_{t-j}$ is an indicator related to bank competition; BPI_{t-j} refer to prudential behaviour of banks[1]; and BSI_{t-j} is a measure of bank stability conditions; NPL_{t-j}^{firms} and NPL_{t-j}^{HH} refer to the volume of non-performing loan with regards to firms and households. Others are as previously described.

[1] It is used previously by Shijaku (2019c).

Methodology – Data Generating Process

Table 1. The dataset included in the empirical approach.

	L_t^{Firms}	-	end-period amounts of total new banking lending to firms / GDP (q_t^{Firms})
1	L_t^{HH}	-	end-period amounts of total new banking lending to households / GDP (q_t^{HH})
2	ESI	-	Economic Sentiment Index
	CCI	-	Consumer Confidence Index
3	GDP	-	Annualised Gross Domestic Product
	GDP*	-	Annual Real Economic Growth rate
	WAGE	-	Average Wage Level in public and private sector in Albania
4	EC^F (EC^{HH})	-	Energy Consumption of firms and households (annualised by taking the moving sum of four quarters)
5	i^F (i^{HH})	-	Average interest rate of lending to firms (households)
	s^F (s^{HH})	-	Difference between the interest rate of bank lending to firms (and households) and the interest rate of 12 months T-Bills
6	PPI	-	Cost of production as measure by product cost index
	HPI	-	Housing price index
	REER	-	Real effective exchange rate
7	Boone	-	Boone indicator as an instrument of competition
	BSI	-	Bank stability index [Shijaku (2017)]
	BPI	-	Bank prudential behaviour [Shijaku (2019)]
	NPL^F (NPL^{HH})	-	non-performing loans related to firms and households
8	LIQ^{tot}	-	stock of active liquidity in the banking system as a ratio of GDP
	DEPT	-	total deposits in the banking sector / GDP
	DEPF (DEPHH)	-	total stock deposits of firms (and households) / GDP
9	GFC	-	a financial crisis period dummy, being 1 during the period 2008 Q03 – 2010 Q04, and 0 otherwise
	EUROZONE	-	a multi-year European debt crisis dummy, being 1 during the period 2009 Q03 – 2014 Q02, and 0 otherwise
	COVID	-	a pandemic crisis dummy, being 1 during the period 2020 Q1 to 2021 Q1, and 0 otherwise

Methodology – The Sample

- The sample includes quarterly data period **2007 Q4 – 2023 Q02**.
- The model is estimated, as in the case of Bassett, *et al*., (2014) and Ciccarelli, *et al*., (2015) through means a flexible VAR model approach that includes:
  - Exogenous variables;
  - Number of lags is set to between 2 – 4 depending on the results of the diagnostic tests;
- CC (CR) based on the analysis of the estimated credit demand and supply;

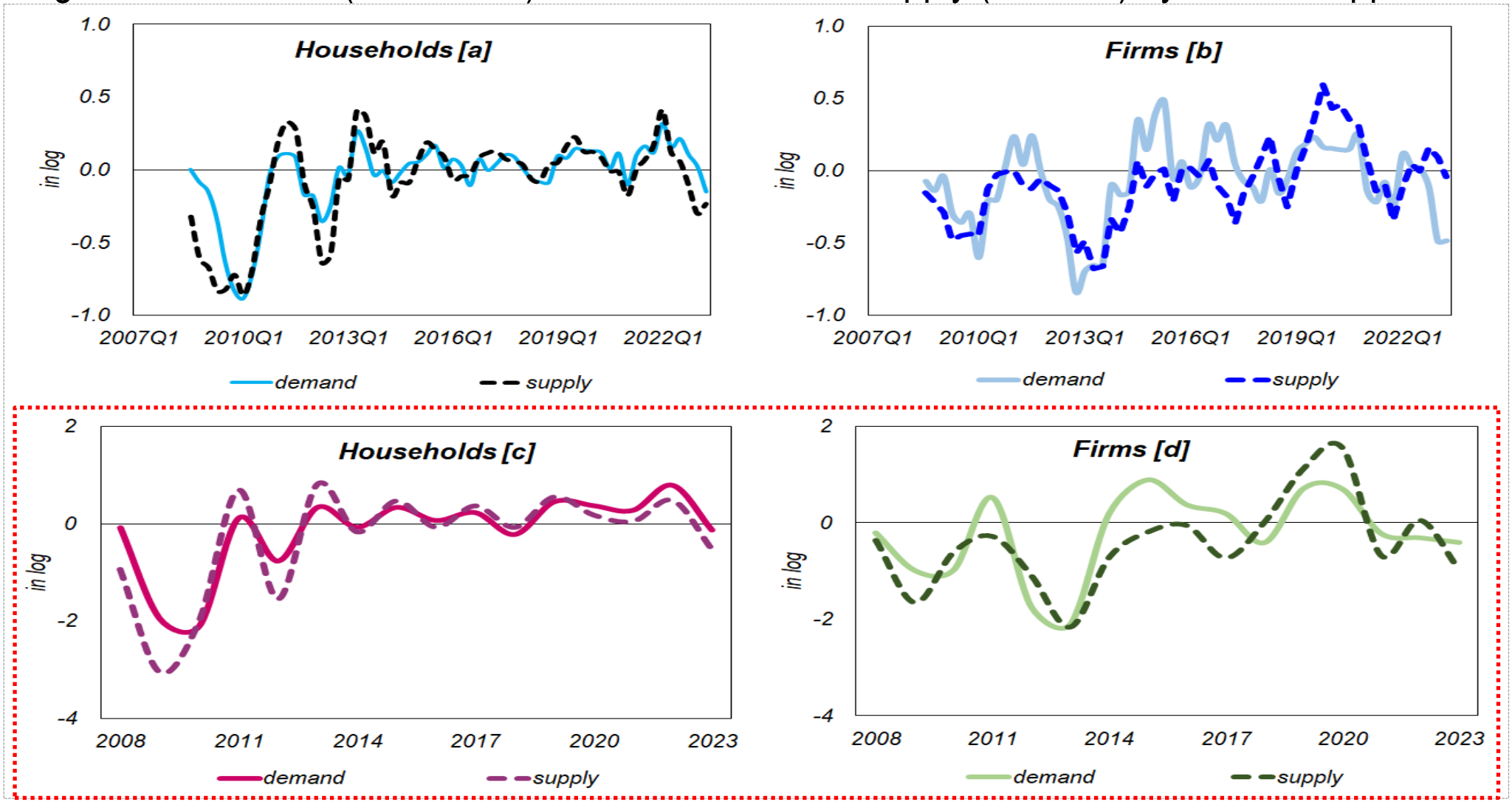
$$CC_t^{firms}(CR_t^{firms}) = ls_t^{firms} - ld_t^{firms} \quad \textit{and if > 5\%} \qquad (16)$$

$$CC_t^{HH}(CR_t^{HH}) = ls_t^{HH} - ld_t^{HH} \quad \textit{and if > 5\%} \qquad (17)$$

- The data on quarterly CPI, GDP, WAGE, FEC and HEC are taken from the Albanian Institute of Statistics (INSTAT). Data related to BPI, BSI and Boone indicator are calculated by the author. The rest is taken from Bank of Albania.

Results – Credit Crunch or Credit Rationing...(1)

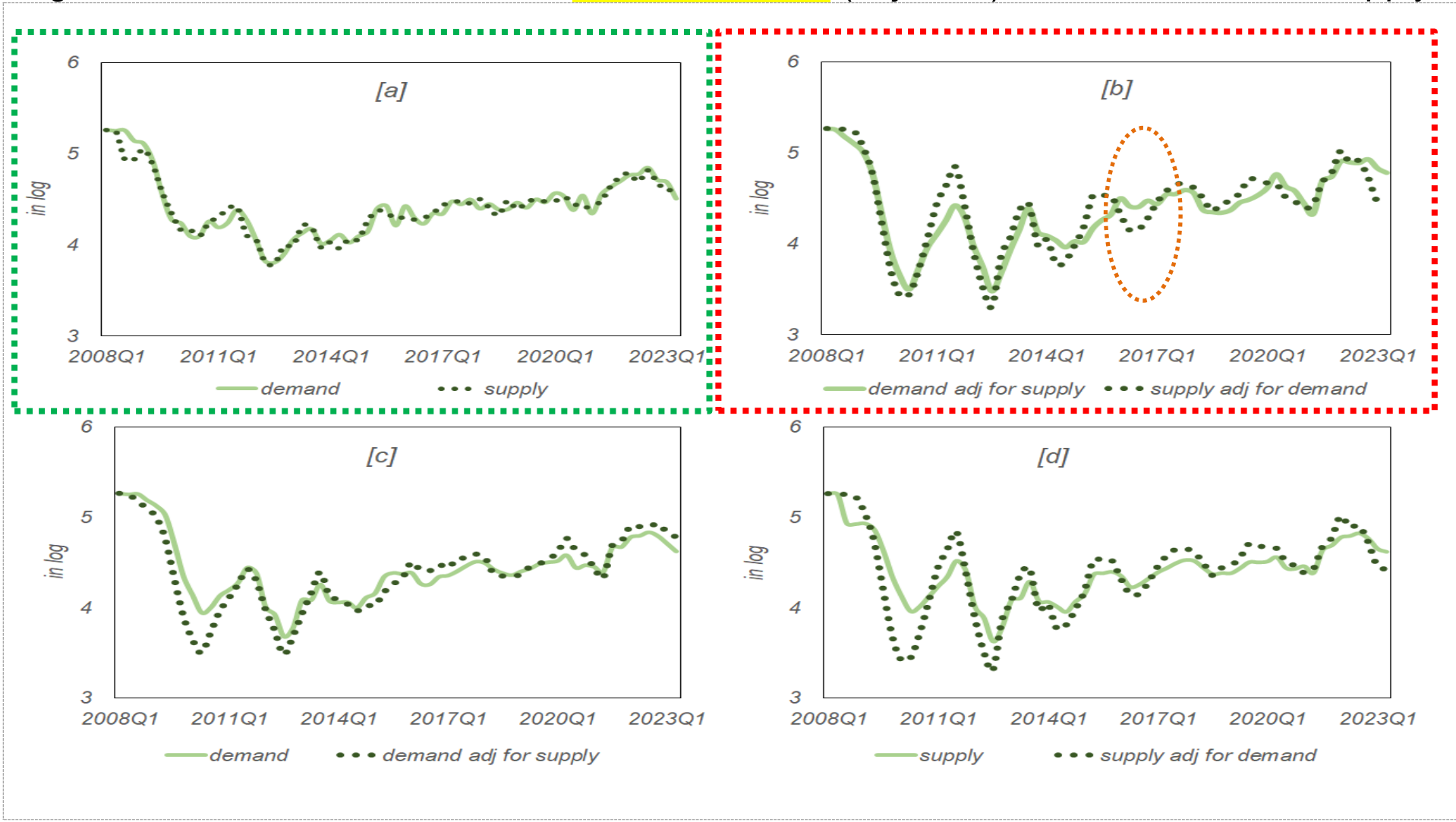
Figure 1. Estimated (annualised) fitted value of credit supply (demand) by the VAR approach.



Source: Author's Calculations

Results – Credit Crunch or Credit Rating...(2)

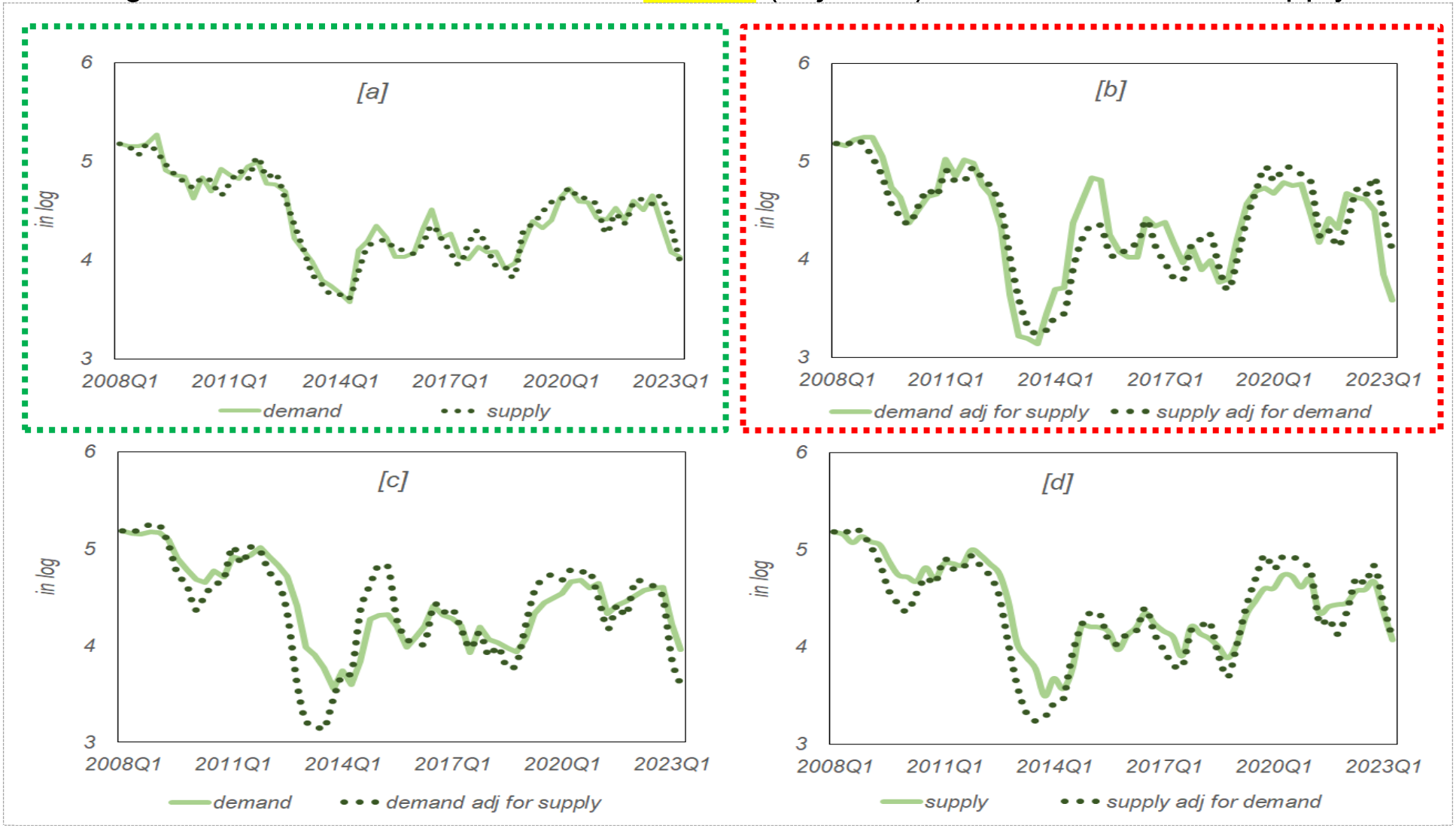
Figure 2. Estimated fitted value of **HOUSEHOLDS** (adjusted) credit demand and supply.



Source: Author's Calculations

Results – Credit Crunch or Credit Rating...(3)

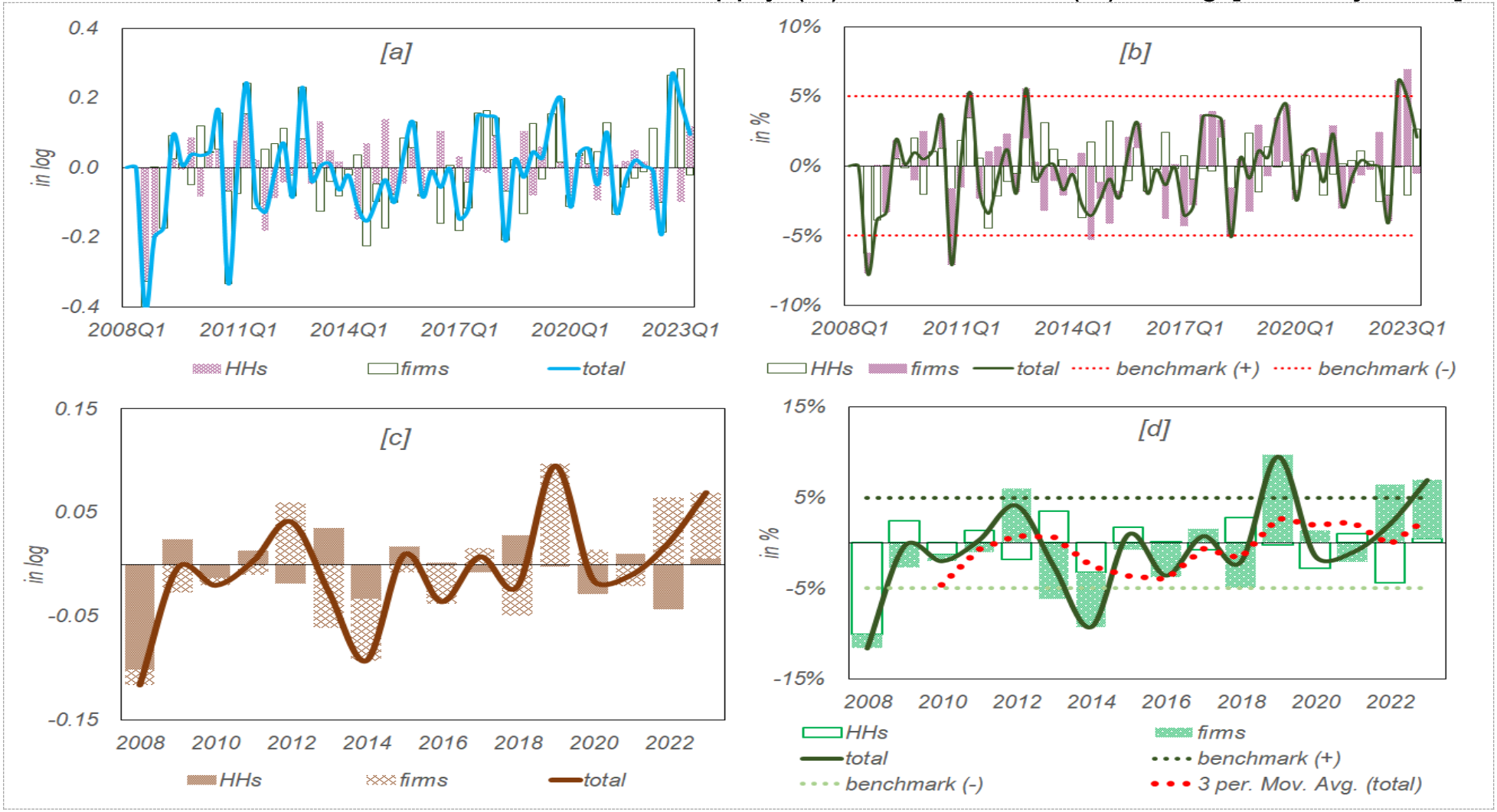
Figure 3. Estimated fitted value of **FIRMS** (adjusted) credit demand and supply.



Source: Author's Calculations

Results – Credit Crunch or Credit Rationing...(4)

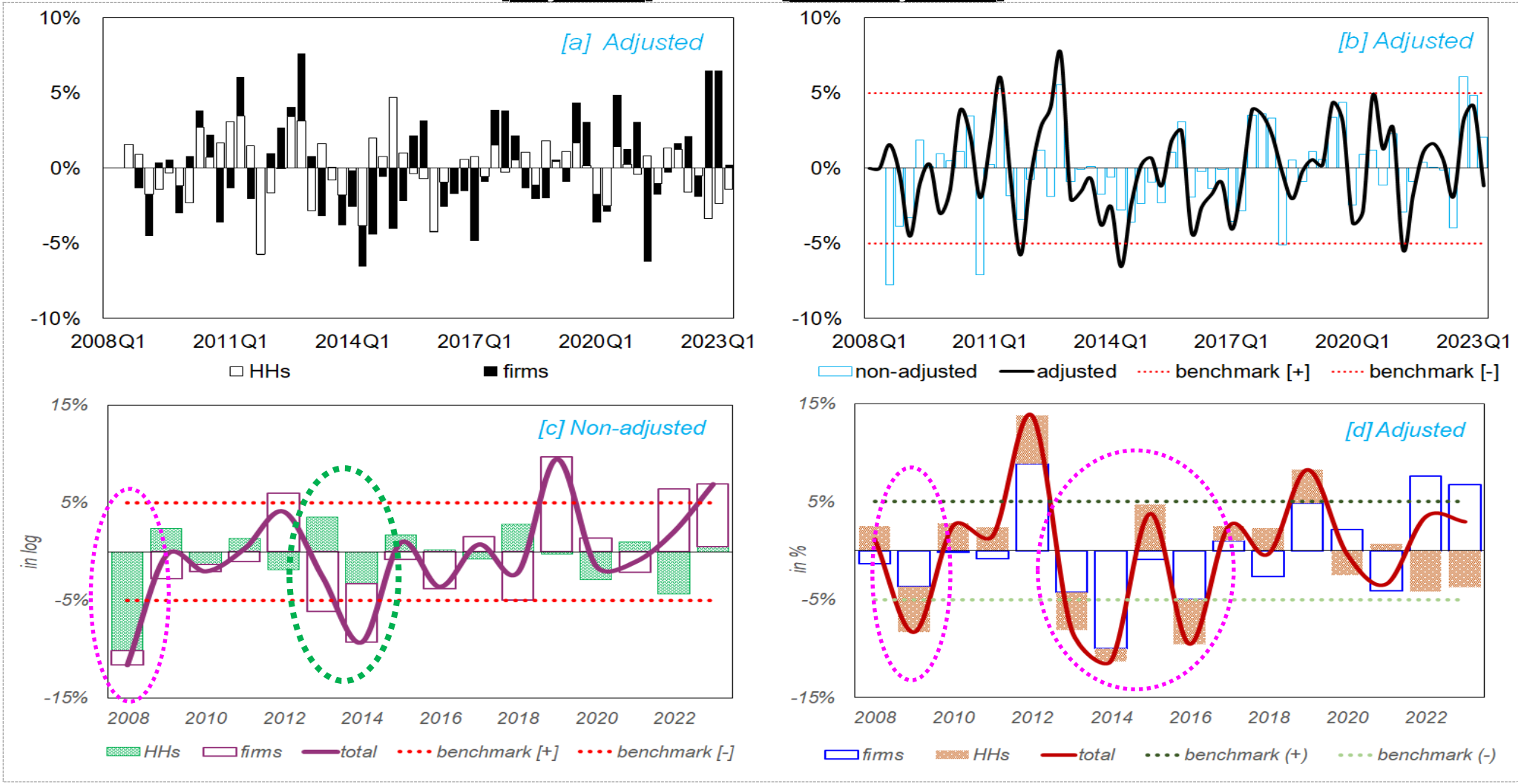
Figure 4. Results of possible **credit crunch (rationing) episodes** estimated as the difference between fitted value of credit supply (s_t) and demand (d_t), 0 lag [non-adjusted].



Source: Author's Calculations

Results – Credit Crunch or Credit Rationing...(5)

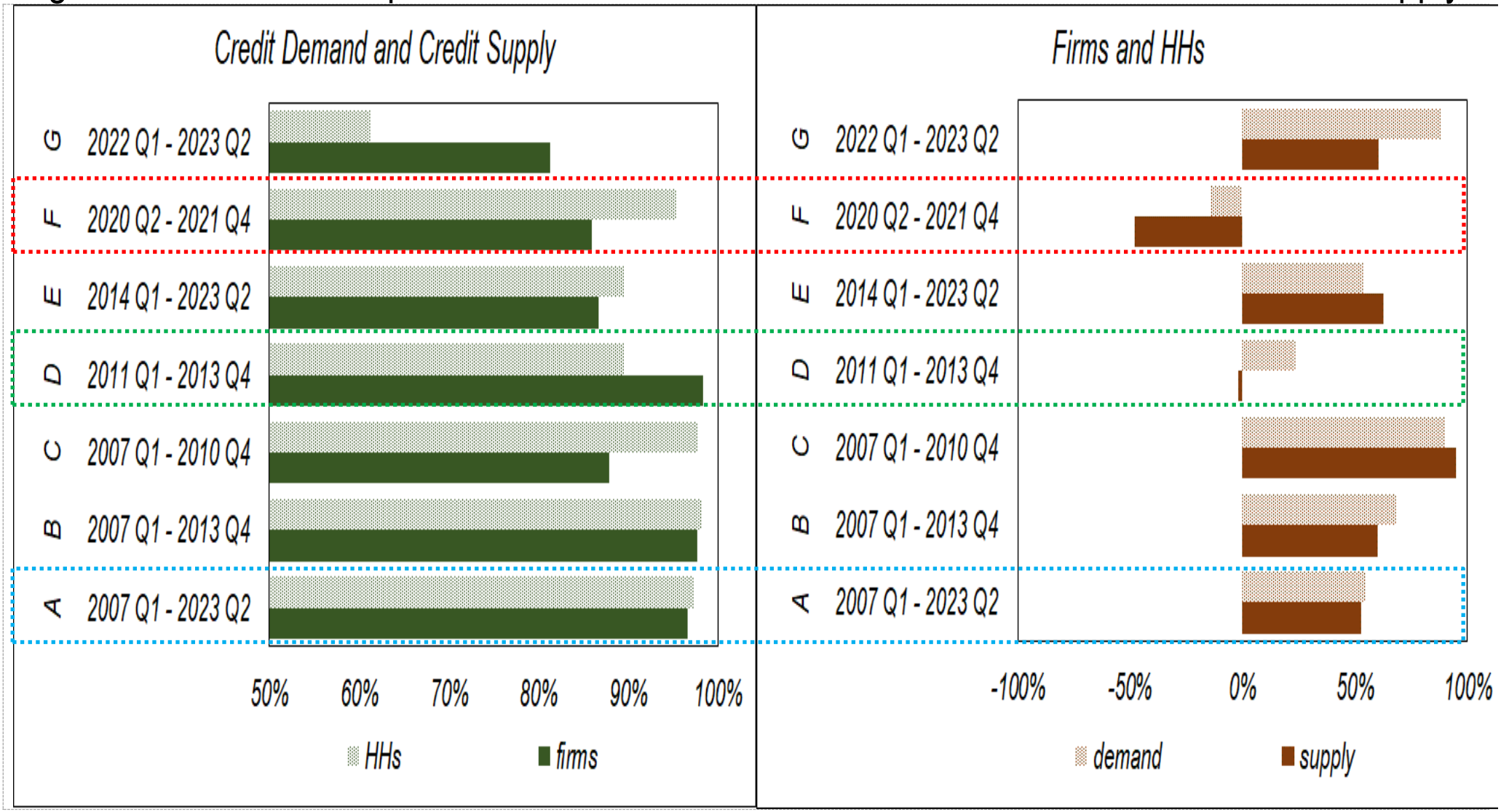
Figure 5. Results of possible **credit crunch (rationing) episodes** based on [adjusted] versus [non-adjusted] estimates.



Source: Author's Calculations

Other Results...(1)

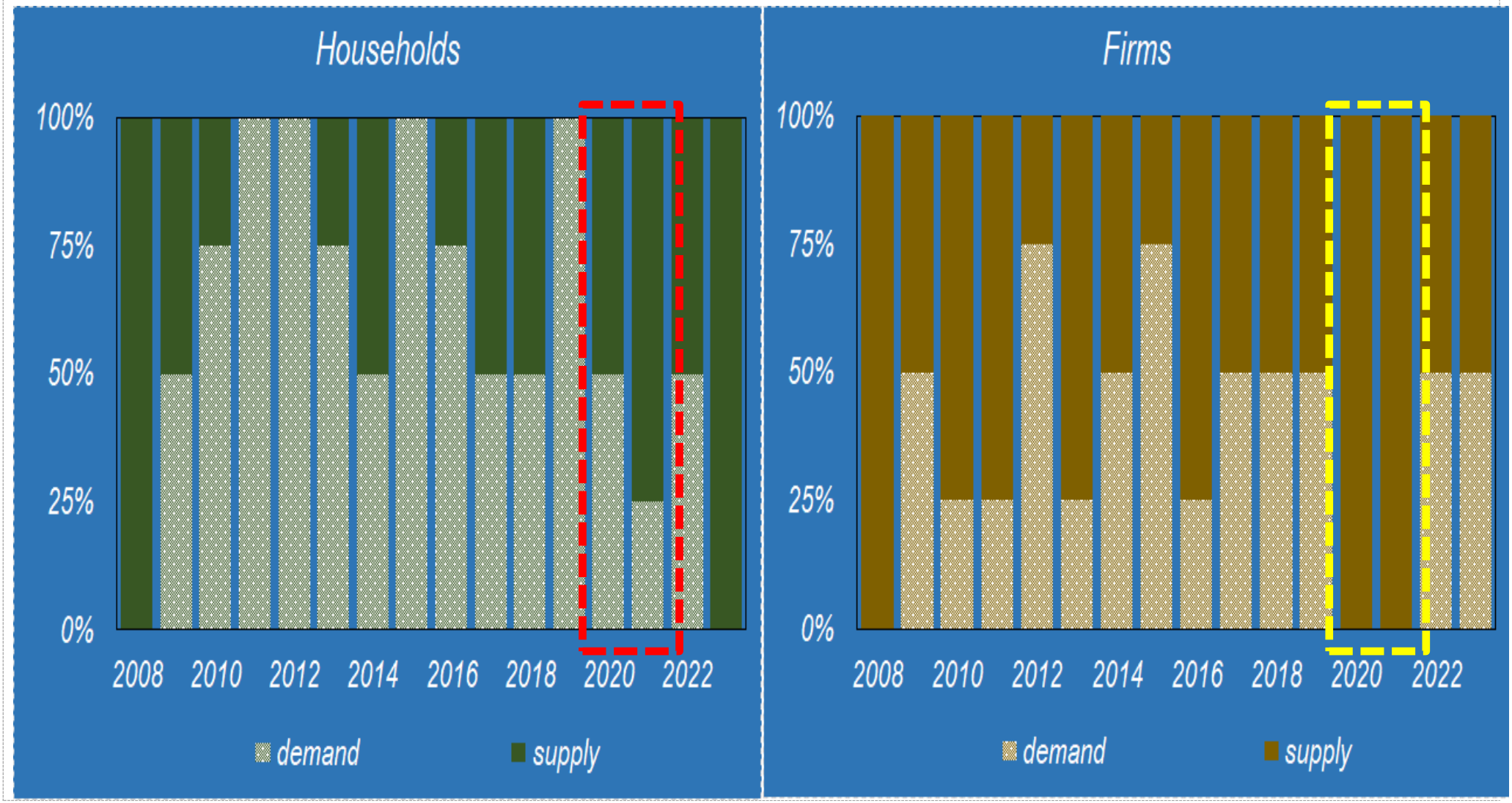
Figure 8. Results of simple correlation tests between fitted value of credit demand and supply.



Source: Author's Calculations

Other Results...(2)

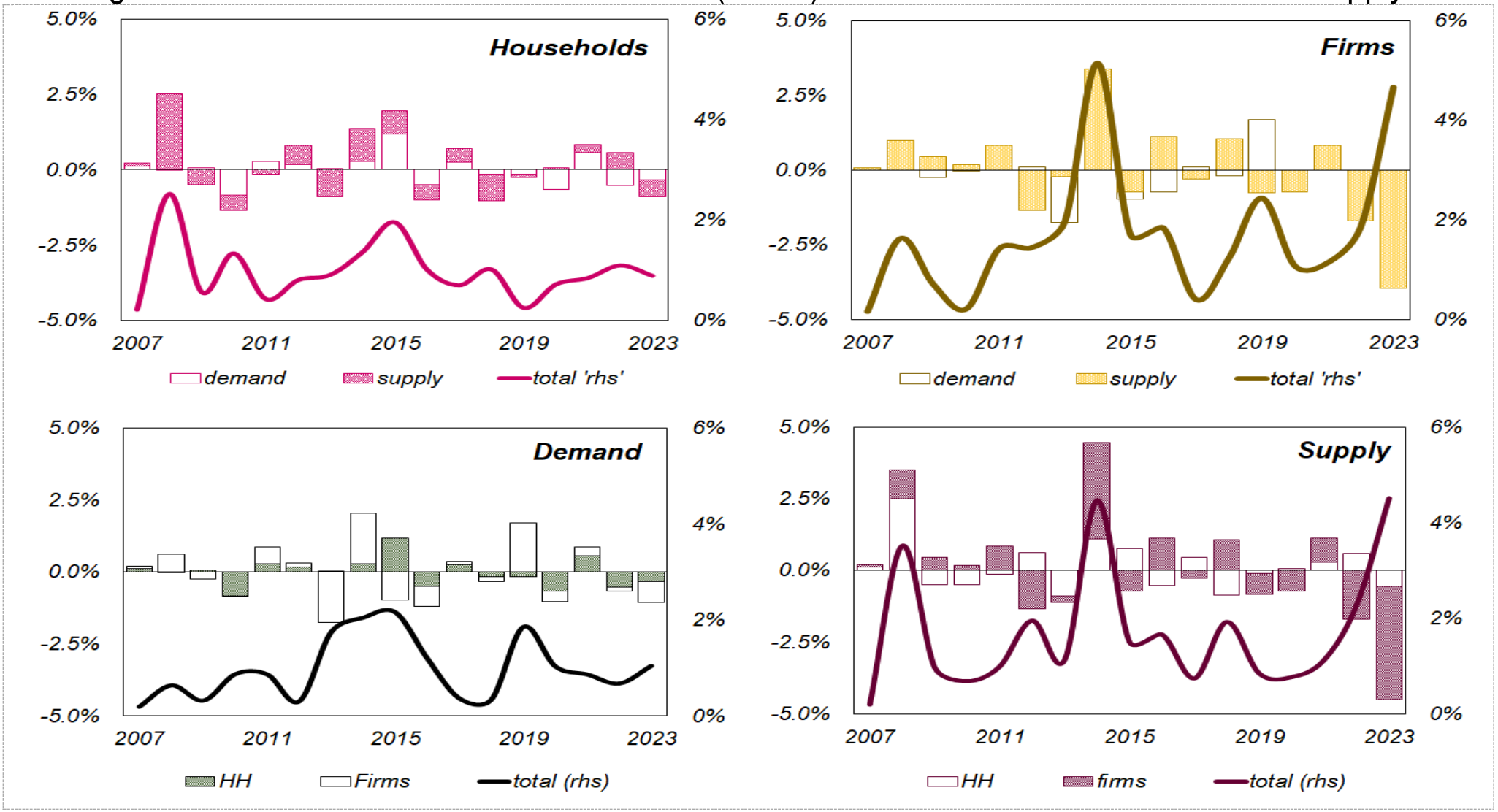
Figure 10. Results of achieving credit (transition) equilibrium [$q_t - d_t\,(q_t - s_t)$] – who gave up more?



Source: Author's Calculations

Other Results...(4)

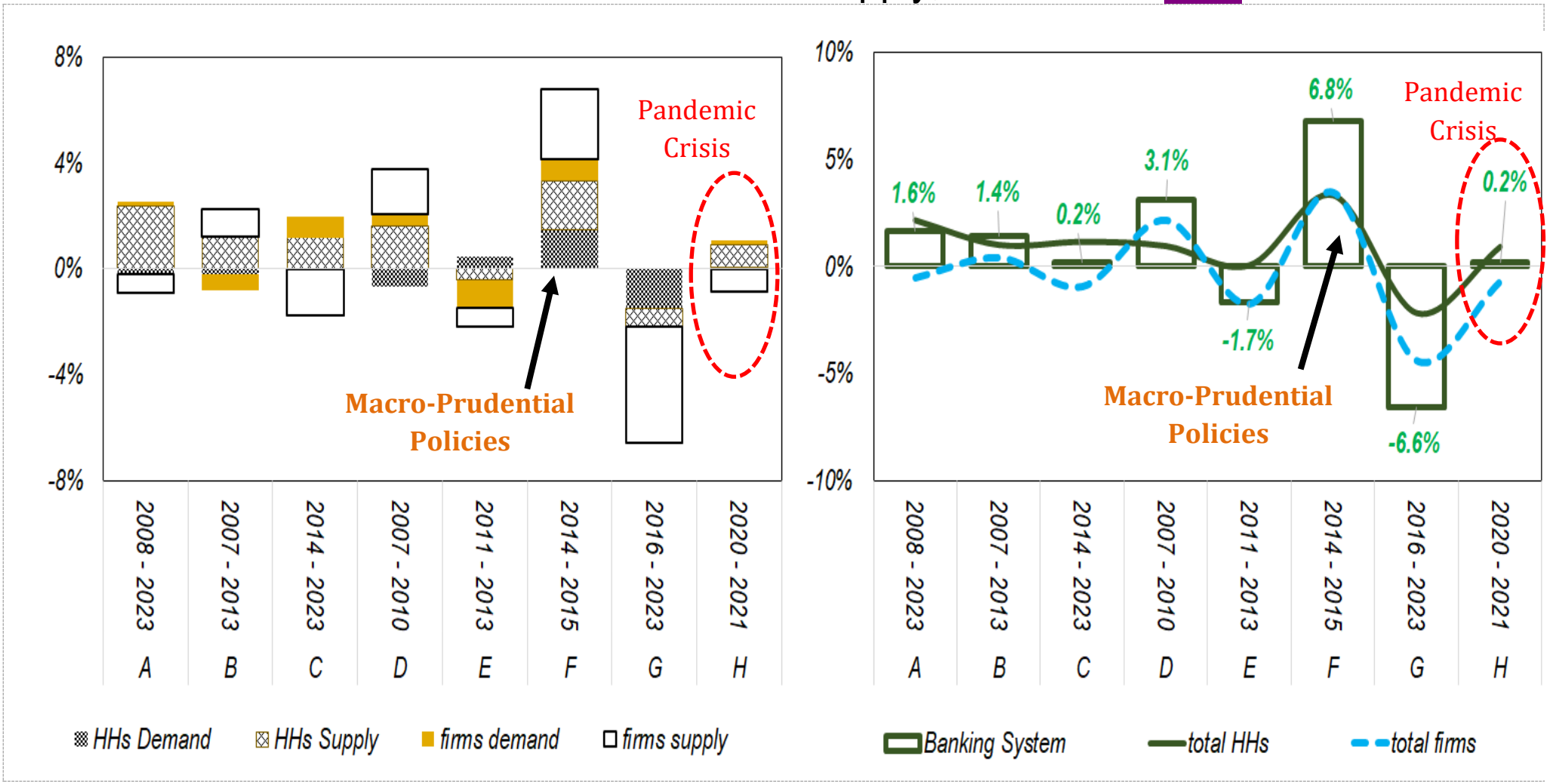
Figure 11. The difference between new loan (actual) and estimated credit demand and supply.



Source: Author's Calculations

Other Results...(6)

Figure 13. Credit patterns according to "**sum up**" differences between actual and estimated credit demand and supply, **FIRMS** and **HHs**.



Source: Author's Calculations

Conclusions...

- The main empirical results, holding similarly for HHs and Firms, do support :
  - No **CREDIT CRUNCH** in the after math of GFC.
  - No **CREDIT CRUNCH** during the **pandemic crisis of Covid-19**.
- Results do, however, provide evidences of credit rationing behaviour occurring at both demand-side and supply-side, holding similarly for HHs and Firms.
- Results confirm that credit patterns are not always homogenous for HHs and Firms.
- Future aspects should consider issue that are related to:
  - CC (CR) for LR and SR term bank lending in domestic versus FX currency.
  - How is CR effected by economic performance? How is excess (Deficit) credit related to inflation pressure?
  - What affects credit demand and supply in the long run?
  - Might it be worth to analyse CR (CR) on bank-level data?

End

Thank you for your attention!!!

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