Bank´s Price Setting and Lending Maturity: Evidence from an Inflation Targeting economy

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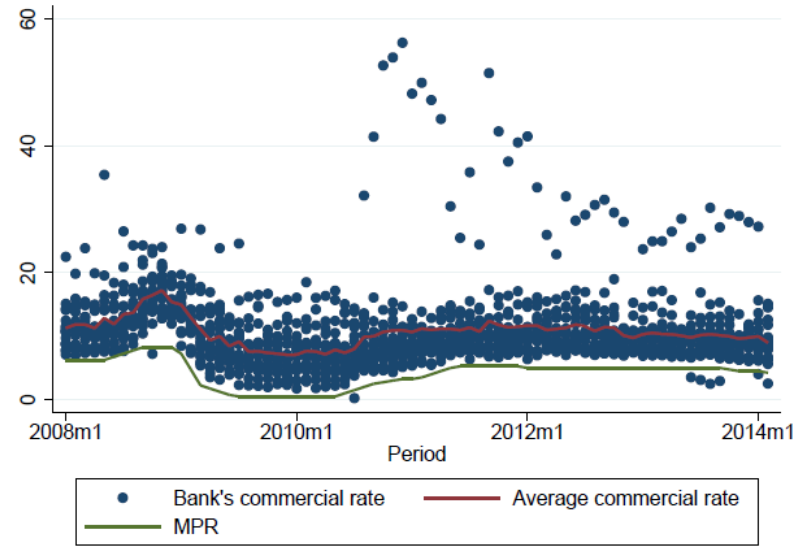
BIS, Banco de México
Mexico City, 13 April 2015

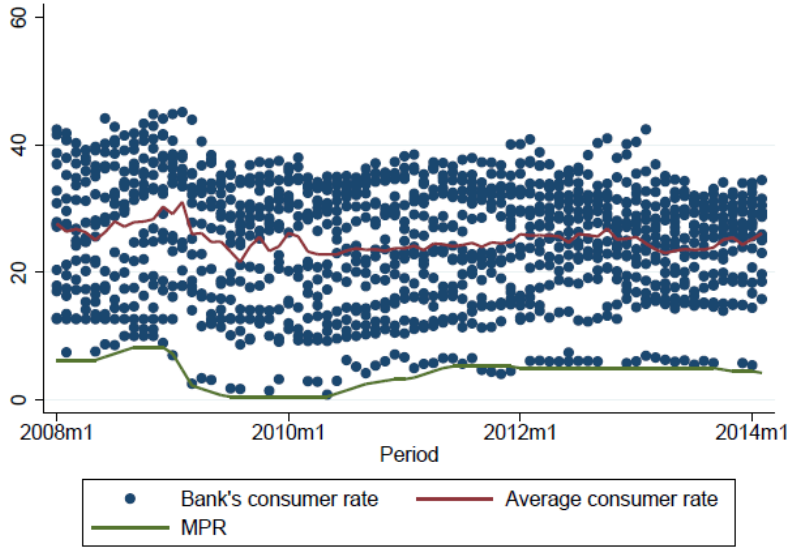
* The views and conclusions presented are our own and do not necessarily represent those of the Central Bank of Chile.

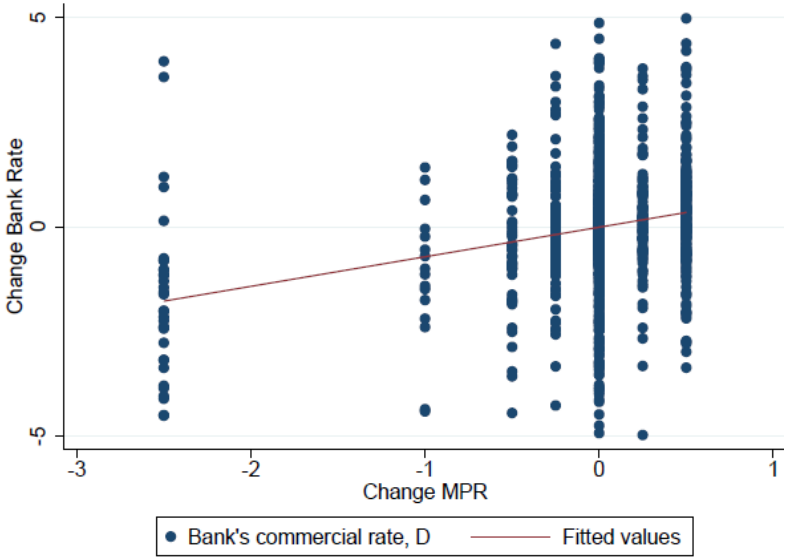
Background

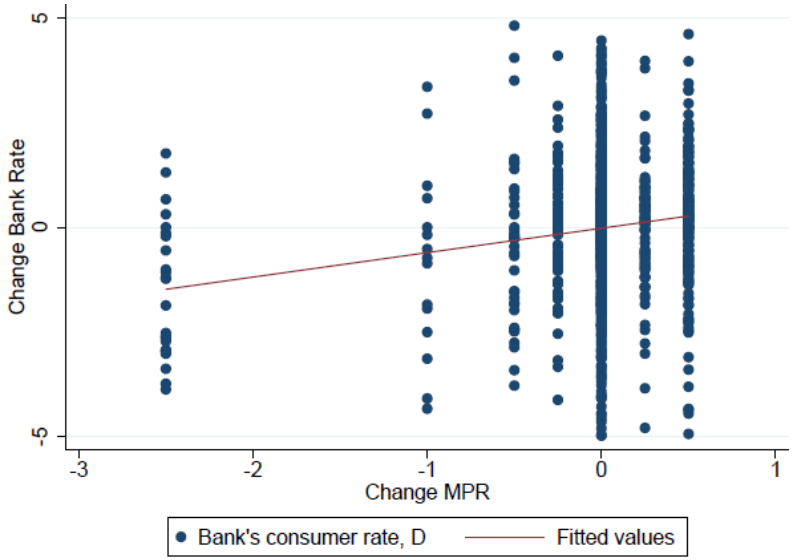
- Lending horizons and inflation seem to matter when banks fix interest rates:
  - Can this be explained theoretical?
  - What about pass-through of changes in the monetary policy rate?
- The way commercial bank fix interest rates may depend on the conditions of their balance sheets
  - Which variables are important in Chile? Size, liquidity, capital requirements, etc.?
  - Which are the variables that determine the degree of pass-through from changes in the policy rate?
    - Different variables for different loan types (commercial / consumer)? For different time horizons?
- Focus of presentation is on nominal rates

There is a lot of heterogeneity in the interest rates of the Chilean bank sector









Preview of some main results

- Long paper with many results. Because of time restrictions focus is on the most important results
- Unconditional pass-through:
  - MPR pass-through is higher for loans with short maturity, while inflationary pass-through is higher for loans with long maturity
- Conditional pass-through
  - MPR pass-through is higher in small banks, while inflation pass-through is higher in big banks.

Road map

- Very briefly about related literature
- Why worry about different lending horizons?
- Theoretical set-up
- Unconditional pass-through for different loans and horizons
- Conditional pass-through
  - Which are the important variables for explaining:
    i. Changes in banks' interest rates?
    ii. Differences in pass-through?
- Summary of results

Related literature

- The related literature, which uses micro bank data, started with explaining changes in amounts:
  - Classical papers: Kashyap & Stein (1995, AER 2000) and Erhmann et al. (OREP 2003).
  - Chile: Alfaro et al. (CBC 2004).
- Later, people started to use a similar approach to analyze the effect on interest rates:
  - De Graeve et al. (JBF, 2007), Gambacorta (EER 2008),Wu et al. (JIMF, 2011), Horváth & Podpiera (ES, 2012).
  - Chile: N/A

Why worry about lending horizons? Distribution of lending amounts

Contents of commercial and consumer interest rates (2013)

IRFS	Commercial	< 30 days	30-89 days	90 days-1 year	1-3 years	>3 years
1105	Amortizing loans	68.1%	53.1%	40.5%	38.2%	59.8%
1145	Approved overdraft current account	9.4%	4.8%	55.3%	60.2%	32.1%
1150	Approved overdraft other accounts and credit cards	3.6%	0.0%	3.8%	0.1%	0.0%
1155	Non-approved overdraft current account	18.9%	41.9%	0.0%	0.0%	0.0%
1160	Credit card purchases paid in fees	0.0%	0.1%	0.3%	0.1%	0.1%
1165	Revolving credit card debt	0.0%	0.1%	0.0%	1.4%	8.0%
Distribution of nominal commercial loans among horizons		4.4%	5.0%	29.9%	26.2%	34.4%

IRFS	Consumer	< 30 days	30-89 days	90 days-1 year	1-3 years	>3 years
1205	Amortizing loans	2.1%	11.0%	7.7%	25.7%	37.8%
1210	Credit payed in fees via paycheck	0.0%	0.0%	0.2%	1.5%	3.3%
1220	Approved overdraft current account	6.1%	14.8%	52.3%	26.1%	8.5%
1225	Approved overdraft other account and credit cards	21.9%	0.1%	5.1%	1.8%	0.0%
1230	Non-approved overdraft current account	69.8%	20.3%	0.0%	0.0%	0.0%
1235	Credit card purchases paid in fees	0.0%	53.8%	34.2%	8.2%	2.2%
1240	Revolving credit card debt	0.0%	0.0%	0.6%	36.6%	48.2%
Distribution of nominal consumer loans among horizons		23.2%	29.4%	36.8%	3.8%	6.7%

Theoretical set-up

- Imperfect competition in the bank sector: Lending rates across banks are set as MPR and a constant mark-up

$$i_{k,t-1,t} = \eta_k + mpr_{t-1,t}$$

- Non-arbitrage between short and long term lending:

$$i_{k,t-1,t+s} = \frac{1}{s+1} E_{t-1}\left(i_{k,t-1,t} + \cdots + i_{k,t+s-1,t+s}\right) + \sigma_{t-1,t+s}$$

- Combining:

$$i_{k,t-1,t+s}$$

$$= \eta_k + \frac{1}{s+1} E_{t-1}\left(mpr_{t-1,t} + \cdots + mpr_{t+s-1,t+s}\right) + \sigma_{t-1,t+s}$$

Theoretical set-up

- Inflation targeting rule:

$$mpr_{t-1,t} = \rho mpr_{t-2,t-1} + (1-\rho)\kappa\pi_t$$

- Banks' inflation expectations:

$$\pi_t = \phi\pi_{t-1} + \epsilon_t$$

- Conditioning on information available at *t*-1:

$$E_{t-1}mpr_{t,t+s} = \rho^{s+1}mpr_{t-2,t-1} + (1-\rho)\kappa\phi\frac{\phi^{s+1}-\rho^{s+1}}{\phi-\rho}\pi_{t-1}$$

Theoretical set-up: Conclusion

- Banks fix interest rate according to:

$$i_{k,t-1,t+s} = \eta_k + \frac{1}{\boldsymbol{s+1}}\left(\left(\frac{\rho-\rho^{\boldsymbol{s+2}}}{1-\rho}\right)\boldsymbol{mpr_{t-2,t-1}} + \frac{\phi(1-\rho)\kappa}{\phi-\rho}\left(\phi\frac{1-\phi^{\boldsymbol{s+1}}}{1-\phi} - \rho\frac{1-\rho^{\boldsymbol{s+1}}}{1-\rho}\right)\boldsymbol{\pi_{t-1}}\right) + \boldsymbol{\sigma_{t-1,t+s}}$$

- Wright (AER, 2011) and Bauer et al. (AER, 2014) argue that term premium (σ) might be accounted for by inflation uncertainty

Unconditional pass-through: Econometric model

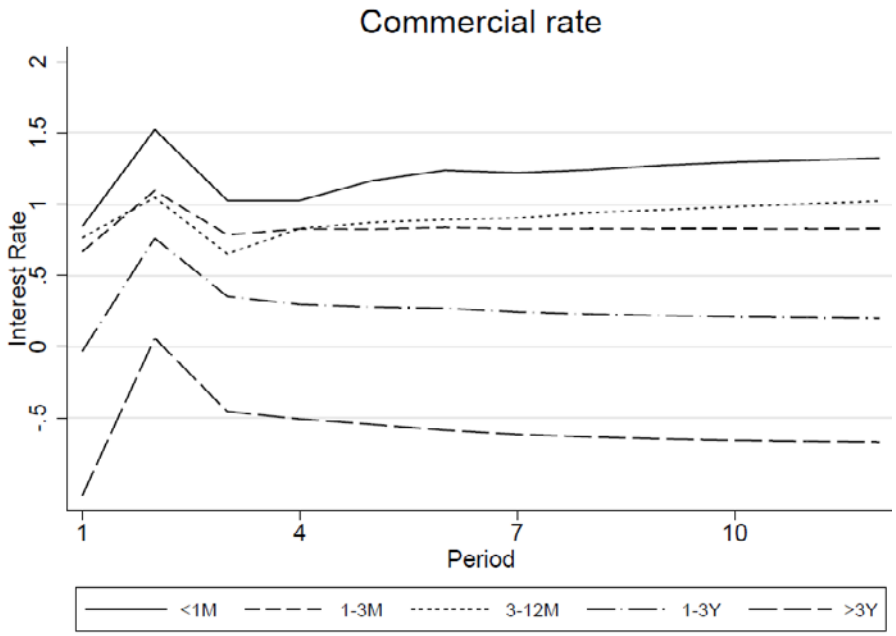
- Error correction model allowing for long term relation between retail banking rate, MPR and inflation.
- Heterogeneous mark-up controlled by bank fixed effects:

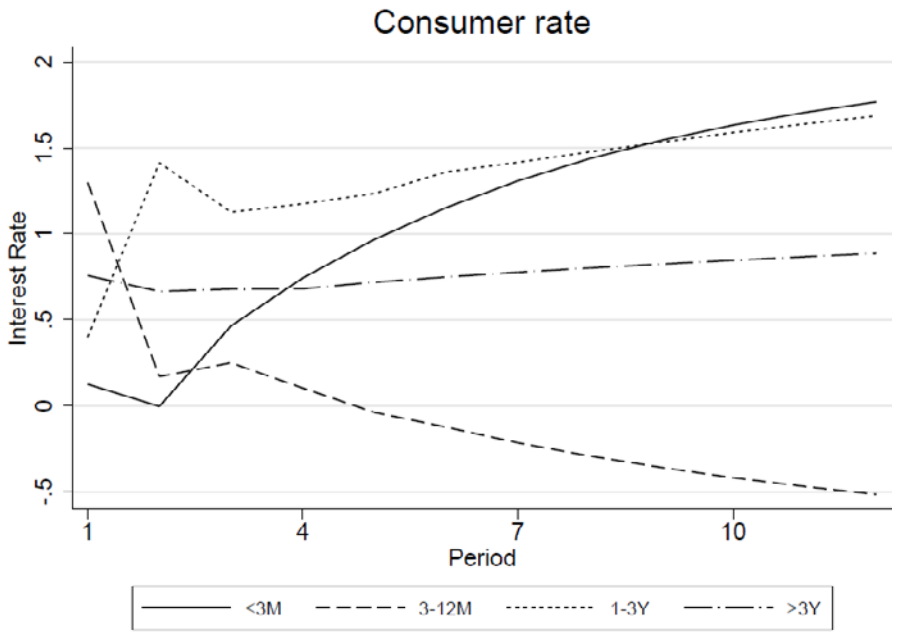
$$\Delta i_{k,t,s} = \alpha_{k,s} + \beta_{0s} i_{k,t-1,s} + \beta_{1s} mpr_{t-1} + \beta_{2s} \pi_{t-1} + \sum_{j=1}^{3} \beta_{2+js} \Delta i_{k,t-j,s} + \sum_{j=0}^{1} \left(\beta_{6+js} \Delta mpr_{t-j} + \beta_{8+js} \Delta \pi_{t-j} \right) + \epsilon_{k,t,s}$$

- Data: Jan-08 – Feb-14.
  - Commercial rates: 14 banks (93% of operations)
  - Consumer rates: 7 banks (87% of operations)
- Control for business cycle and FLAP (Jul-09 – May-10)

Unconditional pass-through estimations: MPR

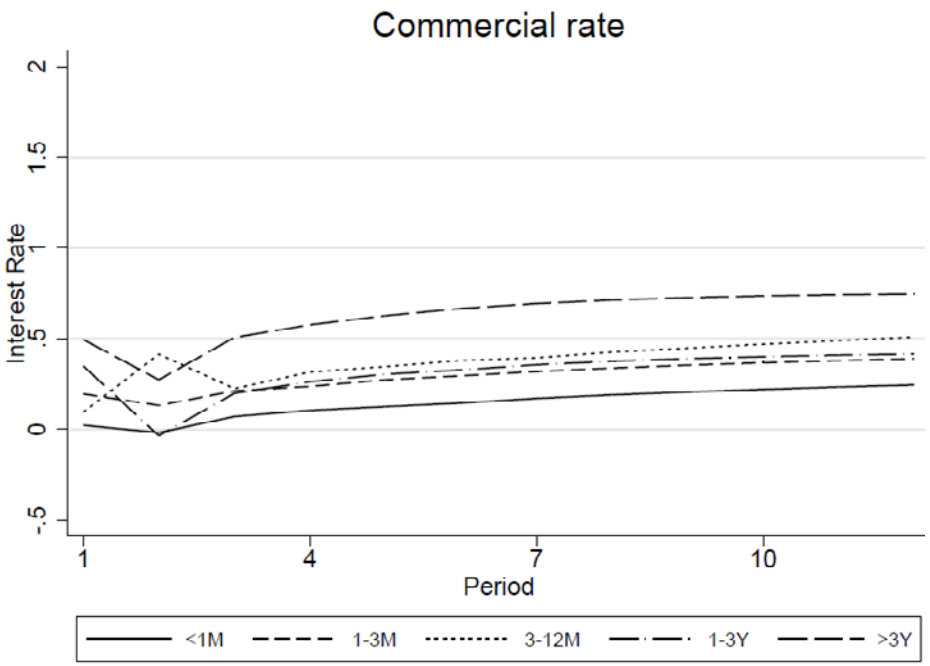
Unconditional IRF to a MPR shock

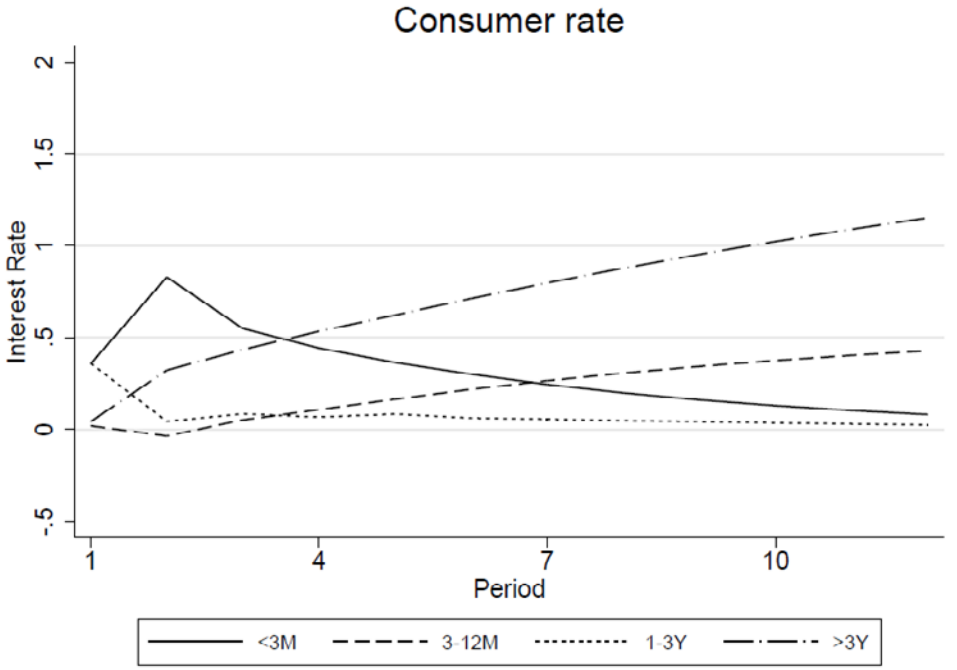




Unconditional pass-through estimations: Inflation

Unconditional IRF to a Inflationary shock





Take away unconditional pass-through

- Pass-through of MPR changes:
  - Different for commercial and consumer loans
  - Different for loans with different horizons.
- Inflationary pass-through is different for consumer loans with different maturities.
- MPR pass-through higher for short-term loans.
- Inflationary pass-through higher for long-term loans.

Heterogeneity amongst banks: Conditioning on bank characterestics

- Include in unconditional model interactions with (demeaned) bank specific characteristics:

Characteristic	Description	Mean	Std. Error	Min	Max
Size	Total assets	14.720	1.992	10.174	17.071
Liquidity ratio	Cash and securities over total assets	0.101	0.116	0.027	0.460
Excess capital	Difference between regulatory capital and capital requirements	10.034	14.056	1.486	60.335
Deposit strength	Deposits over bonds plus deposits	0.869	0.091	0.701	1.000
Long term loans	One year or more commercial loans over total commercial loans	0.169	0.121	0.038	0.469
Non-interest income	Commissions and other operational incomes over total incomes	0.129	0.041	0.058	0.202
Bad loans	Provisions over loans	0.022	0.009	0.011	0.046
External obligations	Deposits abroad over total deposits	0.075	0.218	0.000	0.929

$$\Delta i_{k,t,s} = \alpha_{k,s} + (\beta_{0s} + \Gamma_{1s} z_{kt-1}) i_{k,t-1,s} + (\beta_{1s} + \Gamma_{2s} z_{kt-1}) mpr_{t-1} + (\beta_{2s} + \Gamma_{3s} z_{kt-1}) \pi_{t-1} + \sum_{j=1}^{3} \beta_{2+js} \Delta i_{k,t-j,s} + \sum_{j=0}^{1} \Big((\beta_{6+js} + \Gamma_{4+js} z_{kt-1}) \Delta mpr_{t-j} + (\beta_{8+js} + \Gamma_{6+js} z_{kt-1}) \Delta \pi_{t-j} \Big) + \Gamma_{8s} z_{kt-1} + \epsilon_{k,t,s}$$

Does size matter?

	COMMERCIAL						CONSUMER				
	<30D	**1 - 3M**	**3 - 12M**	**1-3Y**	**>3Y**	**Total**	**<3M**	**3 - 12M**	**1-3Y**	**>3Y**	**Total**
Size(-1)	-0.017	-0.017	-0.007	0.009	0.003	-0.004	0.076	0.019	0.005	0.012	0.016
	(0.012)	(0.004)	(0.004)	(0.009)	(0.011)	(0.006)	(0.037)	(0.024)	(0.022)	(0.016)	(0.010)
i(-1)*Size(-1)	0.001	0.001	0.001	0.001	0.000	0.001	-0.003	-0.001	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)
MPR(-1)*Size(-1)	-0.002	-0.001	-0.001	-0.001	-0.004	-0.001	0.004	-0.005	0.000	-0.002	-0.003
	(0.001)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)	(0.004)	(0.003)	(0.002)	(0.002)	(0.001)
π(-1)*Size(-1)	0.000	0.000	0.000	0.000	0.002	0.000	0.002	0.005	0.002	0.002	0.003
	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)	(0.000)	(0.003)	(0.002)	(0.002)	(0.002)	(0.001)
ΔMPR*Size(-1)	0.003	0.001	0.001	0.002	-0.007	0.000	-0.004	0.013	0.016	-0.006	0.005
	(0.006)	(0.001)	(0.002)	(0.004)	(0.005)	(0.002)	(0.009)	(0.013)	(0.008)	(0.005)	(0.004)
Δπ*Size(-1)	0.003	0.001	0.000	-0.001	0.004	0.000	-0.007	0.012	0.009	0.004	0.003
	(0.002)	(0.001)	(0.001)	(0.002)	(0.003)	(0.001)	(0.006)	(0.006)	(0.004)	(0.003)	(0.002)
ΔMPR(-1)*Size(-1)	-0.004	-0.002	-0.001	-0.005	0.005	-0.001	-0.017	-0.012	-0.011	0.003	-0.003
	(0.006)	(0.001)	(0.001)	(0.004)	(0.005)	(0.002)	(0.008)	(0.015)	(0.006)	(0.005)	(0.004)
Δπ(-1)*Size(-1)	-0.002	-0.001	-0.002	0.002	0.000	-0.001	0.009	-0.001	-0.003	-0.003	-0.003
	(0.002)	(0.001)	(0.001)	(0.002)	(0.003)	(0.001)	(0.006)	(0.005)	(0.004)	(0.003)	(0.002)
P-values											
F (Total)	0.03	0.00	0.00	0.17	0.01	0.04	0.02	0.05	0.52	0.02	0.97
F (MPR)	0.40	0.09	0.20	0.18	0.04	0.10	0.03	0.15	0.56	0.01	0.79
F(Inflation)	0.58	0.49	0.02	0.80	0.17	0.74	0.09	0.09	0.41	0.12	1.00

- Commercial loans: Somewhat
- Consumer loans: Especially for short-to-medium term loans

Does liquidity matter?

	COMMERCIAL						CONSUMER				
	<30D	**1 - 3M**	**3 - 12M**	**1-3Y**	**>3Y**	**Total**	**<3M**	**3 - 12M**	**1-3Y**	**>3Y**	**Total**
Liq(-1)	0.017	0.010	0.090	-0.187	-0.191	0.016	-0.007	0.201	-0.034	-0.360	-0.171
	(0.153)	(0.057)	(0.070)	(0.136)	(0.169)	(0.071)	(0.295)	(0.277)	(0.225)	(0.186)	(0.121)
i(-1)*Liq(-1)	-0.009	0.018	-0.011	0.000	0.016	-0.002	0.012	-0.001	0.001	0.006	0.003
	(0.013)	(0.009)	(0.008)	(0.009)	(0.010)	(0.009)	(0.013)	(0.006)	(0.009)	(0.007)	(0.004)
MPR(-1)*Liq(-1)	0.027	-0.033	-0.009	0.047	-0.023	-0.003	0.043	-0.091	-0.031	0.092	0.061
	(0.065)	(0.016)	(0.019)	(0.044)	(0.050)	(0.021)	(0.094)	(0.098)	(0.051)	(0.046)	(0.037)
π(-1)*Liq(-1)	-0.006	0.004	0.006	-0.055	-0.007	-0.006	-0.102	0.064	0.036	-0.054	-0.043
	(0.053)	(0.013)	(0.016)	(0.042)	(0.043)	(0.018)	(0.089)	(0.085)	(0.041)	(0.041)	(0.033)
ΔMPR*Liq(-1)	0.152	-0.067	-0.029	0.255	-0.235	0.031	0.212	0.214	0.101	0.395	0.226
	(0.268)	(0.069)	(0.087)	(0.189)	(0.270)	(0.086)	(0.318)	(0.331)	(0.191)	(0.145)	(0.145)
Δπ*Liq(-1)	0.026	0.012	0.009	-0.061	-0.008	0.015	-0.094	0.182	0.132	0.075	0.133
	(0.106)	(0.033)	(0.042)	(0.096)	(0.096)	(0.042)	(0.210)	(0.189)	(0.115)	(0.103)	(0.075)
ΔMPR(-1)*Liq(-1)	-0.184	-0.034	-0.126	-0.140	-0.107	-0.074	0.582	-0.437	0.115	-0.245	-0.074
	(0.218)	(0.063)	(0.094)	(0.192)	(0.230)	(0.077)	(0.294)	(0.366)	(0.206)	(0.122)	(0.122)
Δπ(-1)*Liq(-1)	-0.066	-0.001	-0.012	0.015	-0.006	0.014	-0.371	-0.240	-0.064	-0.069	-0.055
	(0.113)	(0.030)	(0.035)	(0.078)	(0.091)	(0.038)	(0.200)	(0.227)	(0.111)	(0.095)	(0.071)
P-values											
F (Total)	0.98	0.09	0.21	0.76	0.24	0.60	0.72	0.80	0.12	0.13	0.10
F (MPR)	0.87	0.10	0.21	0.54	0.34	0.76	0.32	0.51	0.04	0.22	0.99
F(Inflation)	0.92	0.98	0.98	0.52	1.00	0.79	0.72	0.66	0.19	0.08	0.39

- Commercial loans: Not much
- Consumer loans: Maybe for loans with long maturity

Does excess capital matter?

	COMMERCIAL						CONSUMER				
	<30D	**1 - 3M**	**3 - 12M**	**1-3Y**	**>3Y**	**Total**	**<3M**	**3 - 12M**	**1-3Y**	**>3Y**	**Total**
E_Cap(-1)	0.008	0.001	0.002	-0.005	0.005	0.001	0.012	0.009	0.000	0.002	0.005
	(0.003)	(0.001)	(0.001)	(0.003)	(0.004)	(0.001)	(0.014)	(0.008)	(0.006)	(0.008)	(0.004)
i(-1)*E_Cap(-1)	0.000	0.000	0.000	0.000	0.000	0.000	-0.001	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)
MPR(-1)*E_Cap(-1)	-0.001	0.001	0.000	0.000	-0.001	0.000	0.003	-0.001	0.001	0.001	0.000
	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
π(-1)*E_Cap(-1)	-0.001	0.000	0.000	-0.001	0.000	0.000	-0.001	0.000	0.000	0.000	0.000
	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)
ΔMPR*E_Cap(-1)	-0.004	0.002	0.002	0.003	-0.006	0.001	0.000	0.001	0.007	0.003	0.004
	(0.003)	(0.001)	(0.001)	(0.002)	(0.006)	(0.001)	(0.003)	(0.005)	(0.003)	(0.002)	(0.002)
Δπ*E_Cap(-1)	0.002	-0.001	0.000	0.000	0.001	0.000	-0.005	0.001	0.000	0.000	0.001
	(0.001)	(0.001)	(0.000)	(0.001)	(0.002)	(0.000)	(0.003)	(0.002)	(0.001)	(0.002)	(0.001)
ΔMPR(-1)*E_Cap(-1)	0.004	-0.002	-0.001	-0.003	0.002	0.000	-0.003	-0.001	-0.006	-0.004	-0.004
	(0.003)	(0.001)	(0.001)	(0.002)	(0.004)	(0.001)	(0.004)	(0.005)	(0.002)	(0.002)	(0.002)
Δπ(-1)*E_Cap(-1)	0.001	0.001	0.000	0.000	-0.002	0.000	0.002	0.006	0.000	0.001	0.000
	(0.002)	(0.000)	(0.000)	(0.001)	(0.002)	(0.000)	(0.003)	(0.003)	(0.002)	(0.002)	(0.001)
P-values											
F (Total)	0.00	0.04	0.21	0.34	0.56	0.26	0.21	0.12	0.38	0.09	0.70
F (MPR)	0.62	0.02	0.29	0.50	0.42	0.75	0.82	0.04	0.23	0.05	0.58
F(Inflation)	0.26	0.13	0.68	0.52	0.69	0.64	0.05	0.95	0.97	0.65	0.84

- Commercial loans: Short to medium term loans
- Consumer loans: Especially when interacted with MPR

Does deposit strength matter?

	COMMERCIAL						CONSUMER				
	<30D	**1 - 3M**	**3 - 12M**	**1-3Y**	**>3Y**	**Total**	**<3M**	**3 - 12M**	**1-3Y**	**>3Y**	**Total**
Dep(-1)	-0.228	-0.065	-0.061	-0.049	-0.184	-0.179	-0.028	-0.486	-0.094	0.196	0.264
	(0.151)	(0.030)	(0.036)	(0.105)	(0.167)	(0.066)	(0.243)	(0.190)	(0.109)	(0.135)	(0.120)
i(-1)*Dep(-1)	0.014	0.020	0.011	0.010	0.014	0.020	-0.009	0.004	0.005	0.000	-0.004
	(0.006)	(0.007)	(0.003)	(0.006)	(0.008)	(0.006)	(0.012)	(0.005)	(0.004)	(0.005)	(0.004)
MPR(-1)*Dep(-1)	0.023	-0.017	-0.009	-0.040	-0.001	-0.011	0.009	0.063	0.033	-0.020	-0.021
	(0.029)	(0.007)	(0.007)	(0.014)	(0.018)	(0.007)	(0.064)	(0.034)	(0.023)	(0.021)	(0.018)
π(-1)*Dep(-1)	-0.012	-0.006	-0.011	0.025	0.007	-0.009	-0.023	0.016	-0.023	0.019	0.026
	(0.022)	(0.004)	(0.007)	(0.014)	(0.020)	(0.008)	(0.053)	(0.034)	(0.022)	(0.022)	(0.020)
ΔMPR*Dep(-1)	-0.036	0.000	-0.036	-0.060	-0.060	0.000	-0.153	-0.102	0.164	0.059	-0.144
	(0.056)	(0.013)	(0.023)	(0.040)	(0.050)	(0.022)	(0.206)	(0.193)	(0.101)	(0.106)	(0.083)
Δπ*Dep(-1)	0.096	0.003	-0.005	0.045	0.071	0.032	0.032	0.138	0.021	-0.003	0.032
	(0.047)	(0.008)	(0.013)	(0.028)	(0.029)	(0.013)	(0.088)	(0.063)	(0.042)	(0.040)	(0.034)
ΔMPR(-1)*Dep(-1)	-0.127	-0.005	0.052	0.060	0.018	0.024	0.303	0.334	-0.007	0.007	0.159
	(0.072)	(0.016)	(0.020)	(0.047)	(0.049)	(0.031)	(0.186)	(0.208)	(0.094)	(0.097)	(0.072)
Δπ(-1)*Dep(-1)	0.013	-0.001	-0.005	-0.015	0.031	-0.024	-0.068	0.009	0.014	-0.016	-0.024
	(0.036)	(0.009)	(0.014)	(0.027)	(0.029)	(0.014)	(0.087)	(0.058)	(0.042)	(0.041)	(0.032)
P-values											
F (Total)	0.00	0.03	0.00	0.12	0.05	0.00	0.05	0.29	0.98	0.46	0.01
F (MPR)	0.00	0.06	0.07	0.04	0.58	0.24	0.09	0.15	0.62	0.12	0.19
F(Inflation)	0.21	0.48	0.37	0.19	0.02	0.00	0.16	0.56	0.83	0.53	0.17

- Commercial loans: Yes
- Consumer loans: For the 3-12 months horizon

Does long-term loans ratio matter?

	COMMERCIAL						CONSUMER				
	<30D	**1 - 3M**	**3 - 12M**	**1-3Y**	**>3Y**	**Total**	**<3M**	**3 - 12M**	**1-3Y**	**>3Y**	**Total**
LT_Loans(-1)	0.041	0.022	-0.004	0.027	-0.109	-0.001	-0.074	0.011	0.011	-0.035	-0.053
	(0.033)	(0.009)	(0.014)	(0.029)	(0.050)	(0.021)	(0.054)	(0.035)	(0.024)	(0.024)	(0.022)
i(-1)*LT_Loans(-1)	-0.003	0.003	0.000	0.003	0.007	-0.001	0.002	-0.001	0.000	0.002	0.002
	(0.003)	(0.001)	(0.001)	(0.002)	(0.003)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)
MPR(-1)*LT_Loans(-1)	0.000	-0.010	0.002	-0.019	0.009	0.003	-0.003	0.010	-0.006	-0.005	-0.005
	(0.007)	(0.002)	(0.003)	(0.006)	(0.007)	(0.003)	(0.014)	(0.011)	(0.005)	(0.006)	(0.005)
π(-1)*LT_Loans(-1)	0.000	0.001	-0.005	0.007	0.002	-0.001	0.002	-0.007	0.007	0.002	0.006
	(0.005)	(0.002)	(0.002)	(0.005)	(0.006)	(0.002)	(0.012)	(0.010)	(0.005)	(0.005)	(0.004)
ΔMPR*LT_Loans(-1)	-0.014	0.002	-0.009	-0.020	0.002	-0.012	-0.026	0.040	-0.004	0.013	0.017
	(0.039)	(0.010)	(0.012)	(0.029)	(0.049)	(0.016)	(0.047)	(0.043)	(0.029)	(0.024)	(0.024)
Δπ*LT_Loans(-1)	0.006	-0.008	-0.009	-0.019	0.002	0.000	-0.034	-0.008	-0.015	-0.009	-0.006
	(0.013)	(0.005)	(0.006)	(0.014)	(0.016)	(0.006)	(0.032)	(0.018)	(0.010)	(0.011)	(0.010)
ΔMPR(-1)*LT_Loans(-1)	-0.010	-0.013	-0.002	0.027	-0.009	-0.010	0.033	-0.030	0.001	-0.015	0.008
	(0.039)	(0.010)	(0.012)	(0.031)	(0.039)	(0.021)	(0.045)	(0.051)	(0.024)	(0.024)	(0.021)
Δπ(-1)*LT_Loans(-1)	-0.007	-0.008	-0.005	0.009	-0.002	-0.010	0.010	0.001	-0.011	-0.008	-0.011
	(0.014)	(0.004)	(0.006)	(0.013)	(0.017)	(0.006)	(0.032)	(0.022)	(0.011)	(0.010)	(0.009)
P-values											
F (Total)	0.97	0.00	0.02	0.01	0.34	0.03	0.90	0.31	0.59	0.29	0.72
F (MPR)	0.89	0.00	0.50	0.03	0.64	0.07	0.69	0.75	0.63	0.34	0.96
F(Inflation)	0.96	0.05	0.07	0.07	0.99	0.25	0.85	0.05	0.64	0.29	0.34

- Commercial loans: Yes
- Consumer loans: No

Does non-interest income matter?

	COMMERCIAL						CONSUMER				
	<30D	**1 - 3M**	**3 - 12M**	**1-3Y**	**>3Y**	**Total**	**<3M**	**3 - 12M**	**1-3Y**	**>3Y**	**Total**
NII_Loans(-1)	0.130	0.048	0.035	0.011	0.041	-0.028	0.007	0.044	0.048	-0.001	0.060
	(0.072)	(0.025)	(0.029)	(0.075)	(0.098)	(0.031)	(0.112)	(0.074)	(0.064)	(0.075)	(0.070)
i(-1)*NII_Loans(-1)	-0.002	-0.007	-0.005	0.006	-0.006	0.005	0.004	-0.001	-0.003	0.002	-0.004
	(0.006)	(0.006)	(0.004)	(0.005)	(0.006)	(0.004)	(0.005)	(0.002)	(0.004)	(0.003)	(0.003)
MPR(-1)*NII_Loans(-1)	-0.057	0.008	0.009	0.020	0.029	-0.001	-0.007	0.022	0.024	0.011	0.028
	(0.026)	(0.010)	(0.009)	(0.024)	(0.024)	(0.009)	(0.030)	(0.033)	(0.022)	(0.018)	(0.017)
π(-1)*NII_Loans(-1)	0.000	-0.014	-0.011	-0.040	0.005	-0.009	-0.013	-0.010	-0.034	-0.010	-0.012
	(0.023)	(0.007)	(0.007)	(0.023)	(0.024)	(0.009)	(0.034)	(0.029)	(0.019)	(0.016)	(0.015)
ΔMPR*NII_Loans(-1)	-0.152	-0.014	-0.010	0.039	0.058	0.007	0.067	0.033	0.000	0.053	0.042
	(0.045)	(0.014)	(0.016)	(0.043)	(0.053)	(0.019)	(0.059)	(0.060)	(0.034)	(0.026)	(0.030)
Δπ*NII_Loans(-1)	-0.040	-0.038	-0.028	-0.063	0.028	-0.037	-0.031	-0.036	-0.080	0.012	-0.004
	(0.040)	(0.017)	(0.014)	(0.039)	(0.055)	(0.016)	(0.064)	(0.058)	(0.035)	(0.031)	(0.028)
ΔMPR(-1)*NII_Loans(-1)	0.083	0.000	0.011	-0.004	0.003	0.009	-0.076	0.007	0.011	-0.030	0.000
	(0.046)	(0.015)	(0.014)	(0.039)	(0.046)	(0.014)	(0.052)	(0.048)	(0.032)	(0.025)	(0.026)
Δπ(-1)*NII_Loans(-1)	0.068	0.016	-0.006	0.005	-0.079	0.004	0.028	0.062	0.039	0.002	0.010
	(0.036)	(0.013)	(0.013)	(0.036)	(0.054)	(0.014)	(0.058)	(0.043)	(0.030)	(0.028)	(0.024)
P-values											
F (Total)	0.00	0.07	0.03	0.02	0.35	0.06	0.53	0.12	0.27	0.20	0.19
F (MPR)	0.01	0.39	0.17	0.67	0.36	0.86	0.62	0.40	0.12	0.07	0.09
F(Inflation)	0.29	0.09	0.04	0.19	0.51	0.05	0.50	0.11	0.86	0.85	0.13

- Commercial loans: Particularly for short-term loans
- Consumer loans: Maybe for loans with long maturity

Does bad loans ratio matter?

	COMMERCIAL						CONSUMER				
	<30D	1 - 3M	3 - 12M	1-3Y	>3Y	Total	<3M	3 - 12M	1-3Y	>3Y	Total
Bad_Loans(-1)	-1.133	0.560	0.409	0.707	-1.970	-0.522	-0.870	-0.343	1.885	1.152	0.590
	(1.051)	(0.315)	(0.360)	(1.020)	(1.509)	(0.501)	(2.297)	(2.010)	(1.045)	(1.235)	(0.854)
i(-1)*Bad_Loans(-1)	0.129	-0.005	-0.002	-0.042	0.048	0.067	0.095	0.053	-0.032	-0.031	0.001
	(0.074)	(0.056)	(0.050)	(0.067)	(0.087)	(0.055)	(0.111)	(0.058)	(0.043)	(0.035)	(0.026)
MPR(-1)*Bad_Loans(-1)	0.430	-0.206	-0.013	-0.083	0.238	0.089	0.329	0.136	-0.067	-0.014	-0.106
	(0.195)	(0.081)	(0.076)	(0.178)	(0.191)	(0.073)	(0.538)	(0.411)	(0.221)	(0.233)	(0.160)
π(-1)*Bad_Loans(-1)	-0.363	0.117	-0.035	0.064	-0.134	-0.070	-0.704	-0.151	-0.214	0.177	0.082
	(0.171)	(0.053)	(0.056)	(0.163)	(0.153)	(0.067)	(0.490)	(0.381)	(0.200)	(0.204)	(0.147)
ΔMPR*Bad_Loans(-1)	1.228	-0.906	-0.821	-1.150	1.387	-0.358	-2.261	-2.576	-2.120	-0.537	-1.592
	(1.357)	(0.297)	(0.415)	(1.044)	(1.357)	(0.378)	(1.560)	(2.064)	(1.054)	(0.763)	(0.769)
Δπ*Bad_Loans(-1)	-0.060	0.026	0.023	0.328	0.182	0.100	0.745	-0.313	0.181	0.183	0.247
	(0.470)	(0.146)	(0.161)	(0.414)	(0.431)	(0.196)	(0.858)	(0.728)	(0.382)	(0.359)	(0.306)
ΔMPR(-1)*Bad_Loans(-1)	-1.694	1.080	0.923	0.310	-0.460	0.371	3.864	2.675	1.895	1.039	0.649
	(1.313)	(0.326)	(0.400)	(1.208)	(1.319)	(0.358)	(1.557)	(1.961)	(0.805)	(0.696)	(0.617)
Δπ(-1)*Bad_Loans(-1)	-0.335	0.136	0.113	0.456	0.160	0.090	-0.190	-1.171	-0.341	0.354	0.014
	(0.451)	(0.145)	(0.151)	(0.363)	(0.443)	(0.161)	(0.795)	(0.731)	(0.388)	(0.385)	(0.279)
P-values											
F (Total)	0.18	0.01	0.45	0.69	0.81	0.28	0.42	0.04	0.31	0.64	0.85
F (MPR)	0.08	0.00	0.14	0.43	0.43	0.36	0.46	0.10	0.44	0.18	0.84
F(Inflation)	0.17	0.10	0.79	0.34	0.66	0.53	0.22	0.39	0.53	0.84	0.79

- Commercial loans: For loans with relatively short horizon
- Consumer loans: Somewhat

Do external obligations matter?

	COMMERCIAL						CONSUMER				
	<30D	**1 - 3M**	**3 - 12M**	**1-3Y**	**>3Y**	**Total**	**<3M**	**3 - 12M**	**1-3Y**	**>3Y**	**Total**
Ext_Loans(-1)	-0.324	0.085	-0.006	0.177	-0.776	0.062	0.229	0.067	-0.350	0.948	0.906
	(0.152)	(0.062)	(0.076)	(0.186)	(0.323)	(0.082)	(0.891)	(0.305)	(0.314)	(0.399)	(0.272)
i(-1)*Ext_Loans(-1)	0.018	-0.033	-0.001	0.001	0.025	-0.035	0.012	-0.006	0.016	-0.019	-0.024
	(0.020)	(0.020)	(0.015)	(0.012)	(0.013)	(0.015)	(0.036)	(0.011)	(0.014)	(0.011)	(0.008)
MPR(-1)*Ext_Loans(-1)	0.029	0.034	-0.009	-0.138	0.092	0.056	-0.382	0.126	-0.032	-0.137	-0.076
	(0.048)	(0.026)	(0.022)	(0.049)	(0.065)	(0.021)	(0.140)	(0.086)	(0.056)	(0.052)	(0.046)
π(-1)*Ext_Loans(-1)	-0.012	0.004	0.012	0.135	0.085	-0.030	0.271	-0.110	0.022	0.006	-0.017
	(0.038)	(0.016)	(0.016)	(0.043)	(0.065)	(0.016)	(0.183)	(0.081)	(0.061)	(0.048)	(0.041)
ΔMPR*Ext_Loans(-1)	0.021	0.116	-0.042	-0.452	0.628	0.002	-0.336	0.626	0.050	-0.178	-0.229
	(0.165)	(0.065)	(0.082)	(0.156)	(0.240)	(0.092)	(0.345)	(0.367)	(0.189)	(0.333)	(0.159)
Δπ*Ext_Loans(-1)	0.075	-0.027	0.004	0.217	0.161	-0.010	0.211	-0.240	-0.089	-0.042	-0.120
	(0.064)	(0.036)	(0.027)	(0.092)	(0.143)	(0.029)	(0.118)	(0.141)	(0.099)	(0.086)	(0.072)
ΔMPR(-1)*Ext_Loans(-1)	-0.011	-0.138	0.073	0.704	-0.343	-0.108	-0.115	-0.657	0.043	-0.140	0.085
	(0.172)	(0.080)	(0.084)	(0.175)	(0.251)	(0.105)	(0.362)	(0.430)	(0.208)	(0.283)	(0.155)
Δπ(-1)*Ext_Loans(-1)	0.105	-0.054	-0.036	-0.177	-0.153	-0.032	0.086	0.161	-0.027	-0.106	0.021
	(0.069)	(0.027)	(0.026)	(0.097)	(0.142)	(0.028)	(0.113)	(0.133)	(0.111)	(0.078)	(0.065)
P-values											
F (Total)	0.20	0.16	0.87	0.00	0.04	0.07	0.37	0.85	0.09	0.15	0.04
F (MPR)	0.94	0.30	0.81	0.00	0.05	0.02	0.21	0.82	0.05	0.21	0.82
F(Inflation)	0.06	0.05	0.42	0.01	0.47	0.11	0.21	0.62	0.47	0.40	0.29

- Commercial loans: For some horizons
- Consumer loans: Mainly for loans with long maturity

Take away: Which characteristics matter when banks' fix interest rates?

- Pronounced heterogeneity mainly for short-term commercial loans

	Commercial loans		Consumer loans	
	SR (<1Y)	LR (>1Y)	SR (<1Y)	LR (>1Y)
Size	+	(+)	+	(-)
Liquidity	(-)	-	(-)	(+)
Excess Capital	+	(-)	(+)	(+)
Deposit strength	+	(+)	(-)	-
Long-terms loan ratio	+	+	-	-
Non-interest income	+	(-)	(-)	(+)
Bad loans	+	-	(-)	(-)
External obligations	(+)	+	(-)	(-)

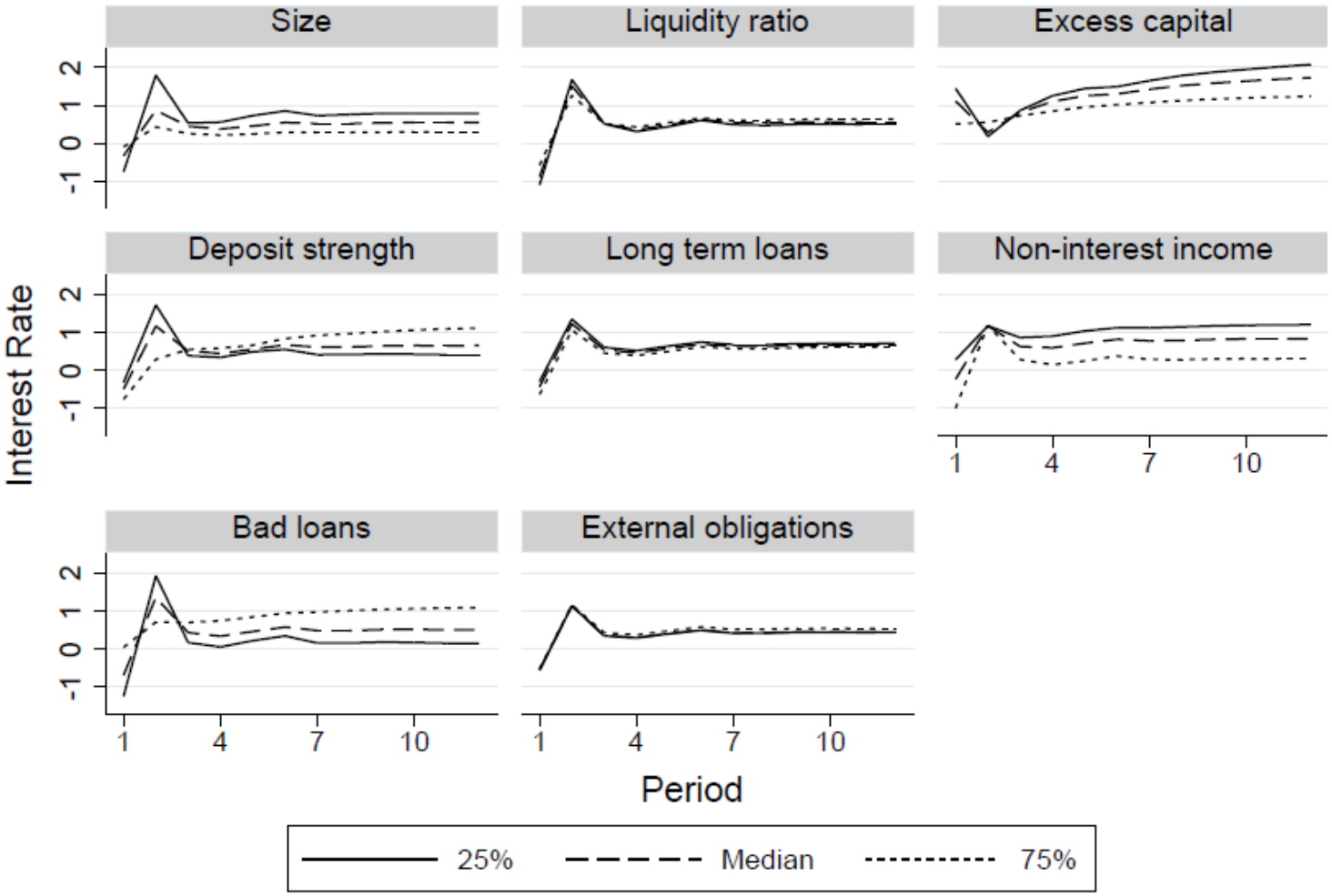
Pass-through conditional on bank characteristics

- How do banks react to monetary / inflationary shocks conditioned on their characteristics?
- Method: Pseudo impulse-response:
  - Fix all bank's characteristics to its mean value except one (bank *i*)
  - Bank *i* is fixed at certain quantiles (25%, 50%, and 75%) of its empirical distribution
  - Compute conditional IRF for bank *i* of 1% shock
  - This allows us to evaluate isolated how banks with different characteristics react to MPR changes.
- Only show results where some characteristics matter

COM: Short-term loans: Differences in PT mainly because of non-interest income and bad loans ratio

Effects of a MPR shock interacted with banks features

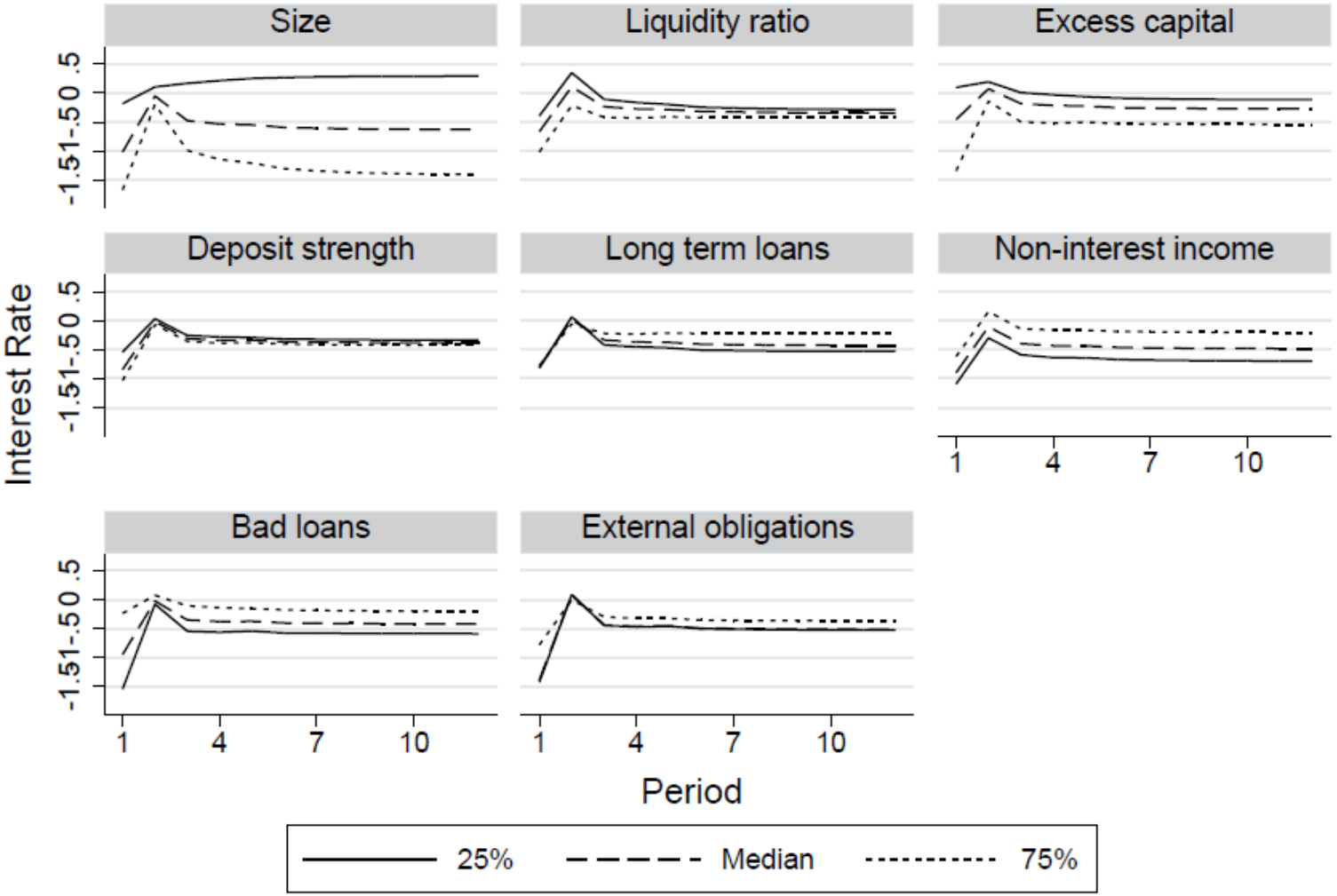
On commercial rates (less than 30 days term)



COM: Long-term loans: Particularly bank size accounts for differences in PT.

Effects of a MPR shock interacted with banks features

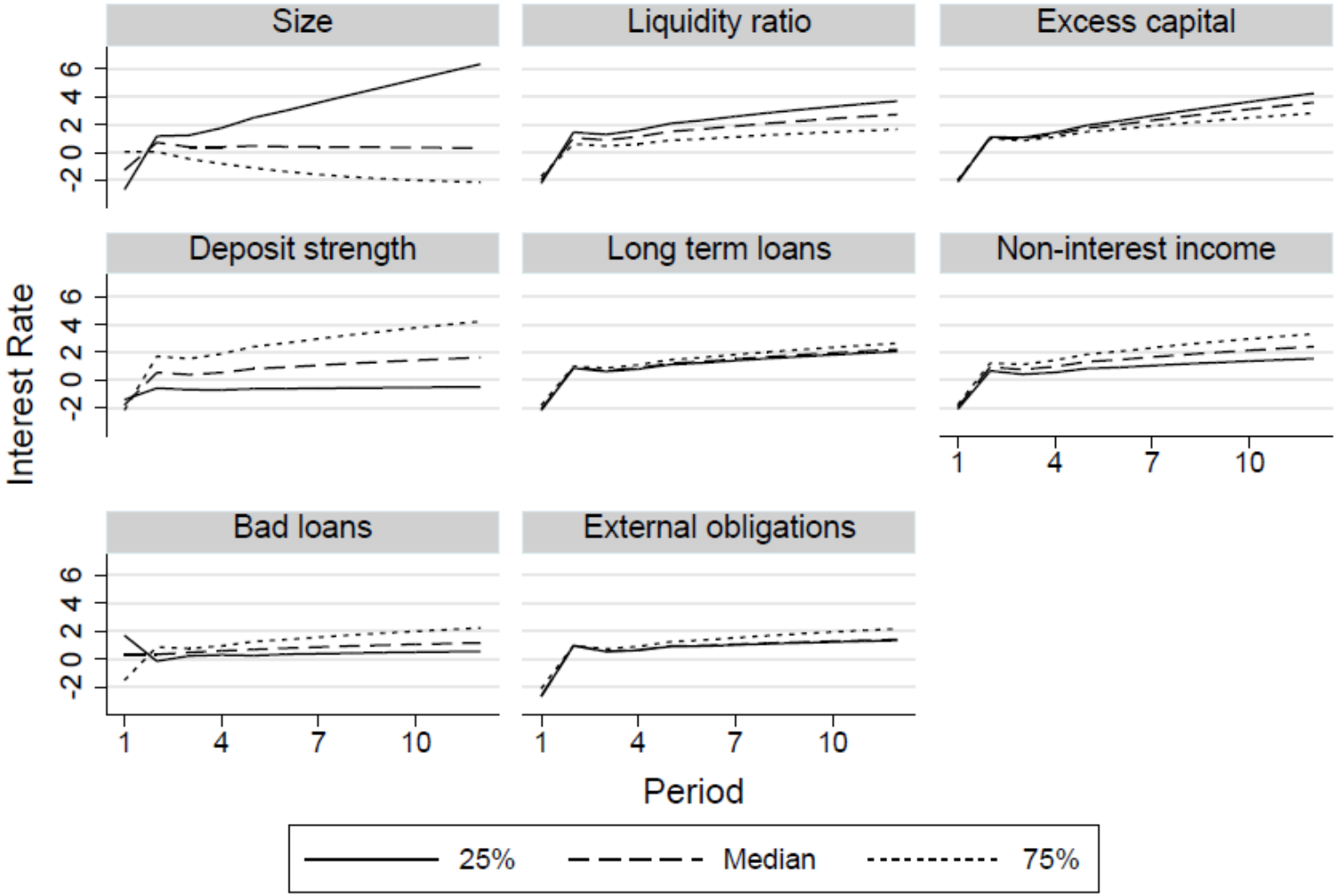
On commercial rates (more than 3 years term)



CONS: Medium-term loans: Size and deposit strength accounts for PT differences

Effects of a MPR shock interacted with banks features

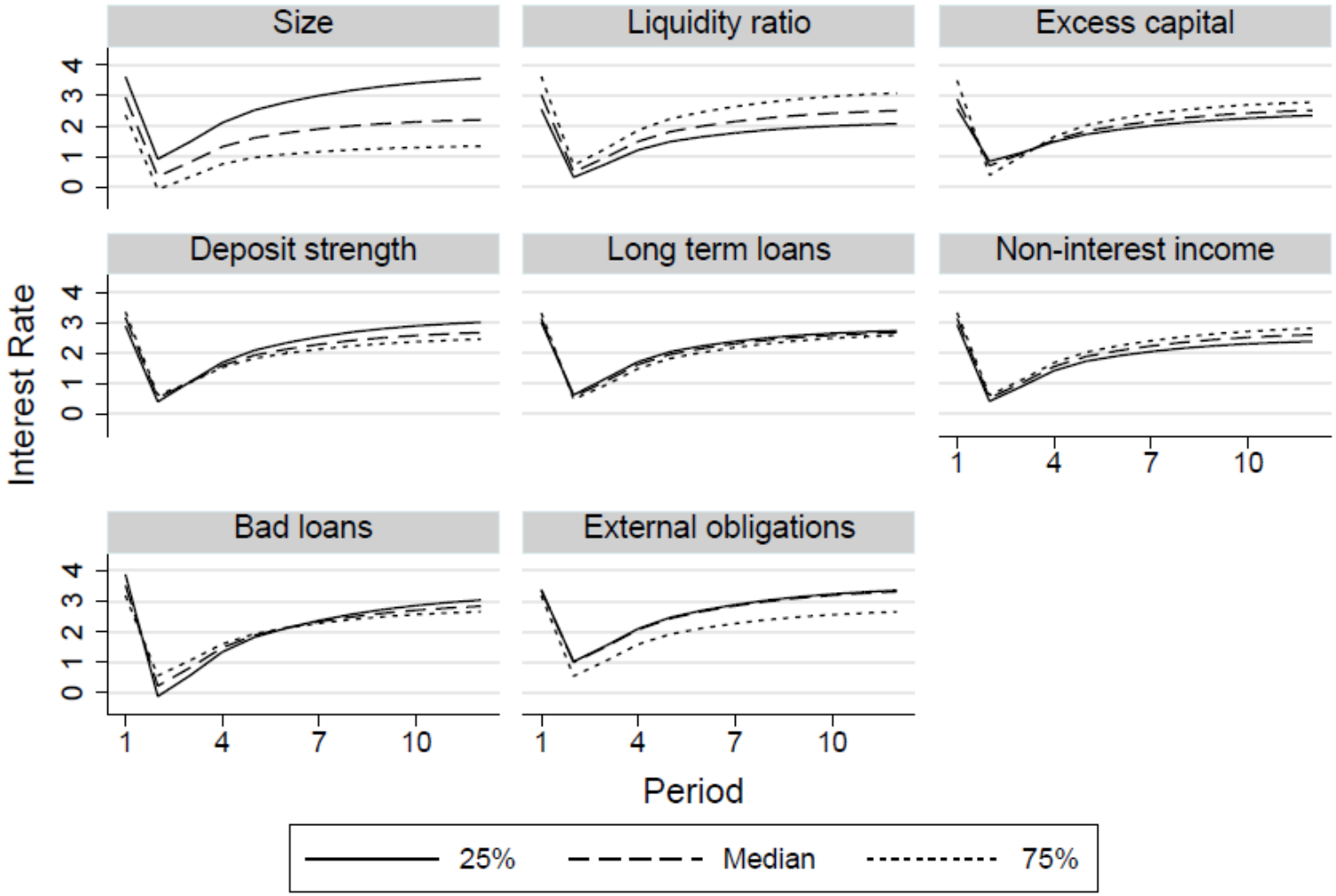
On consumer rates (3 months- less than 1 year term)



CONS: Long-term loans: Particular size matter for the pass-through

Effects of a MPR shock interacted with banks features

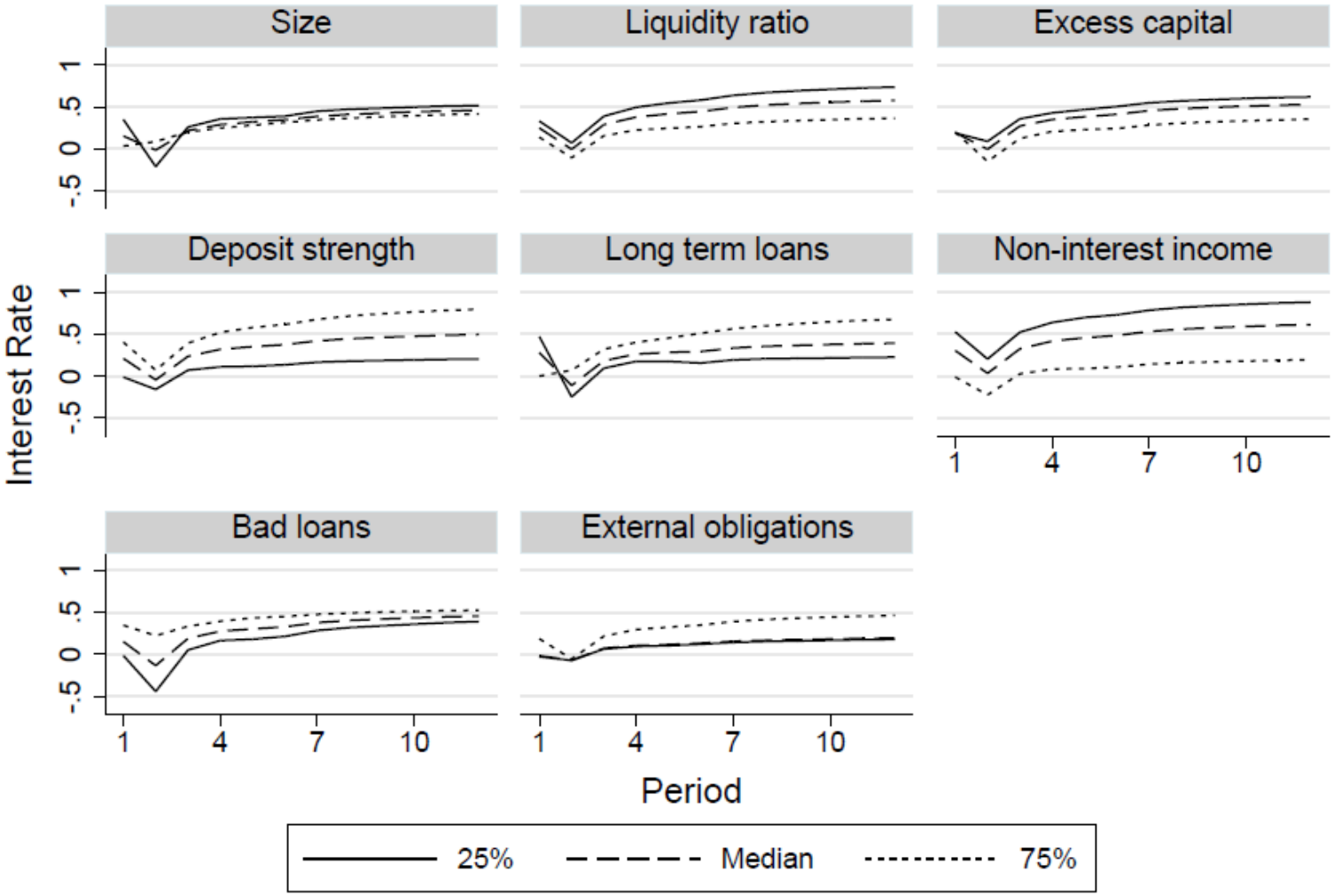
On consumer rates (more than 3 years term)



COM: Medium-to-long-term loans: Deposit strength and non-interest income matter for the PT

Effects of a inflationary shock interacted with banks features

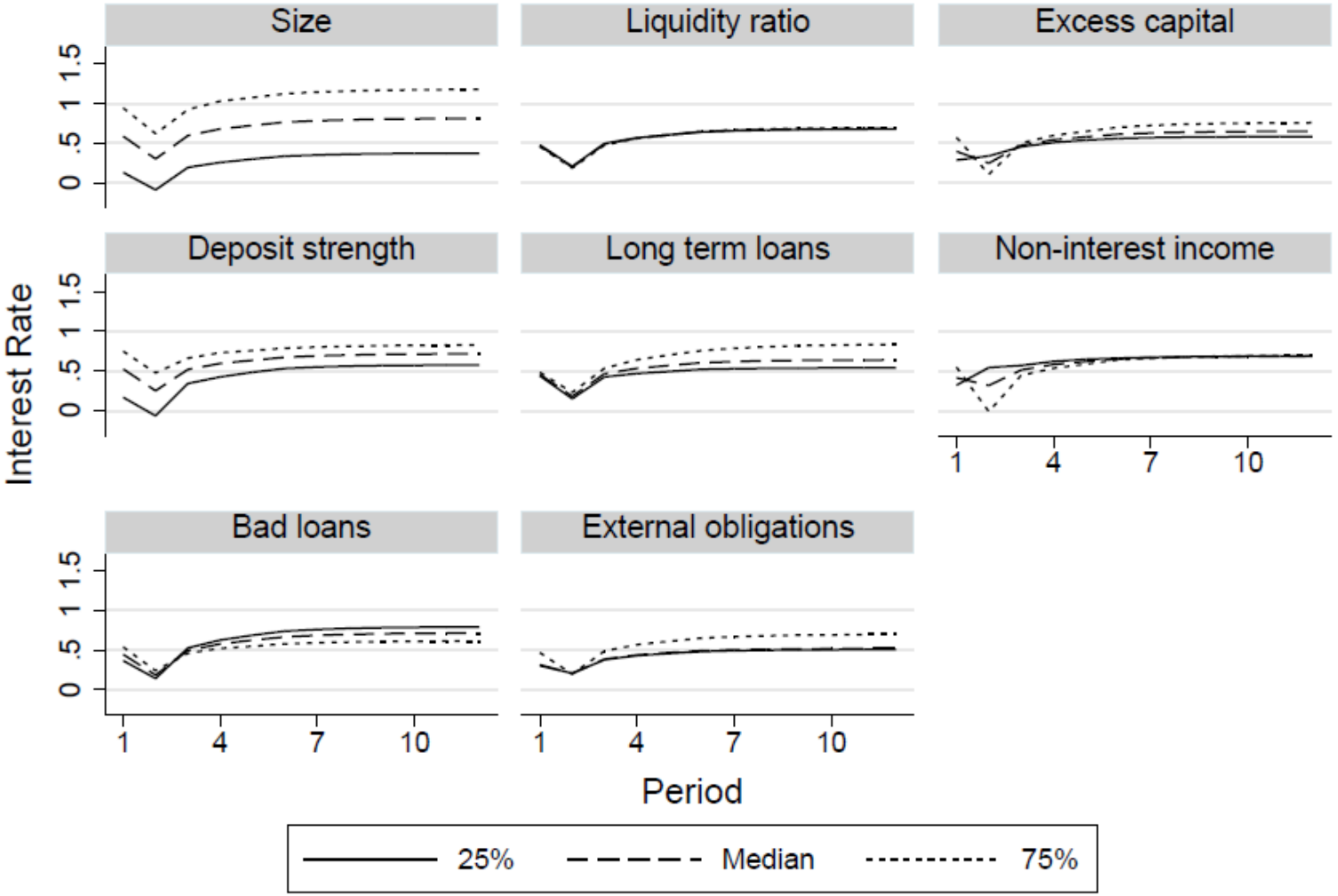
On commercial rates (1-3 years term)



COM: Long-term loans: Size of the bank matters for the PT

Effects of a inflationary shock interacted with banks features

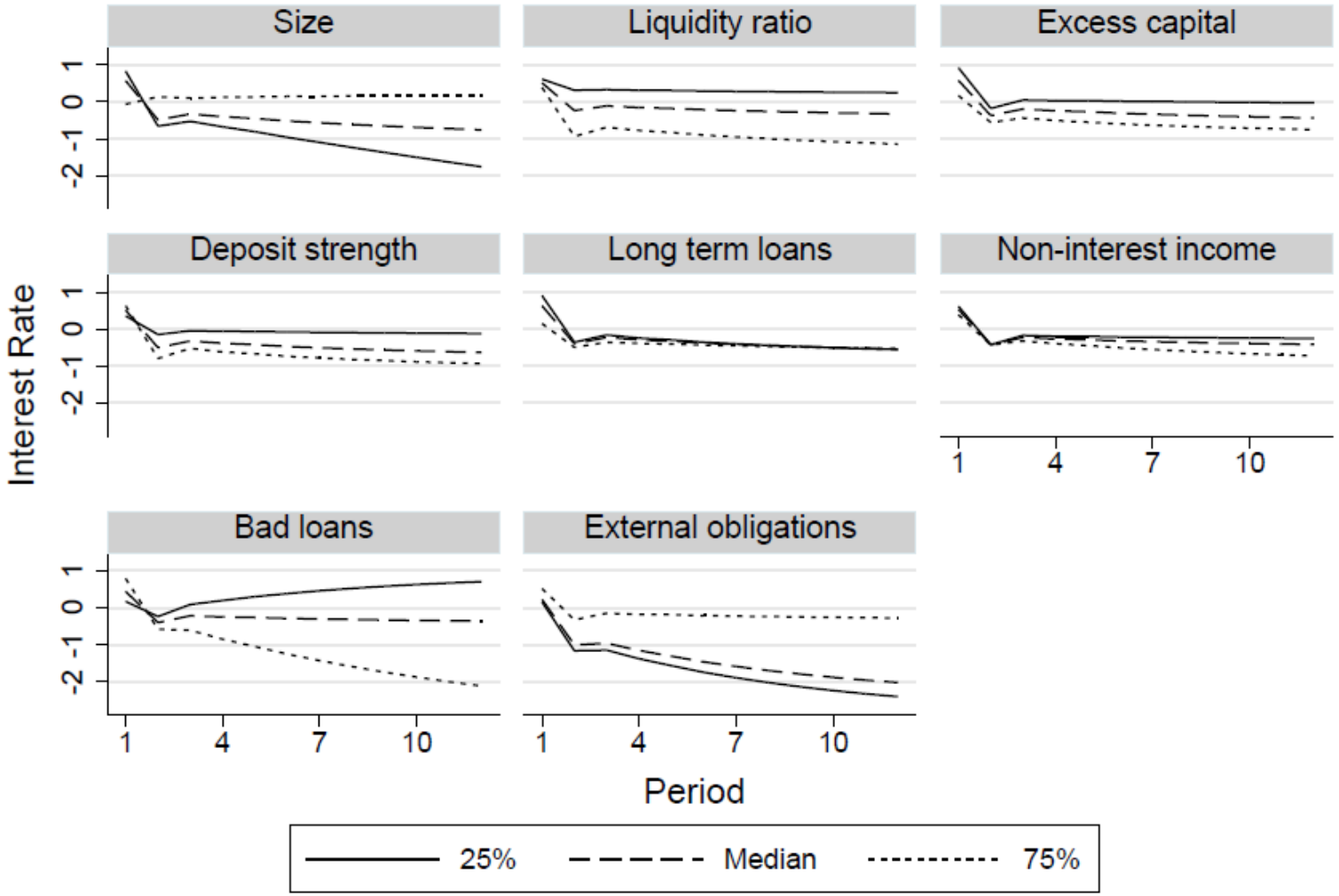
On commercial rates (more than 3 years term)



CONS: Short-to-medium-term loans: Size, liquidity, bad loans and external obligation matter for the PT

Effects of a inflationary shock interacted with banks features

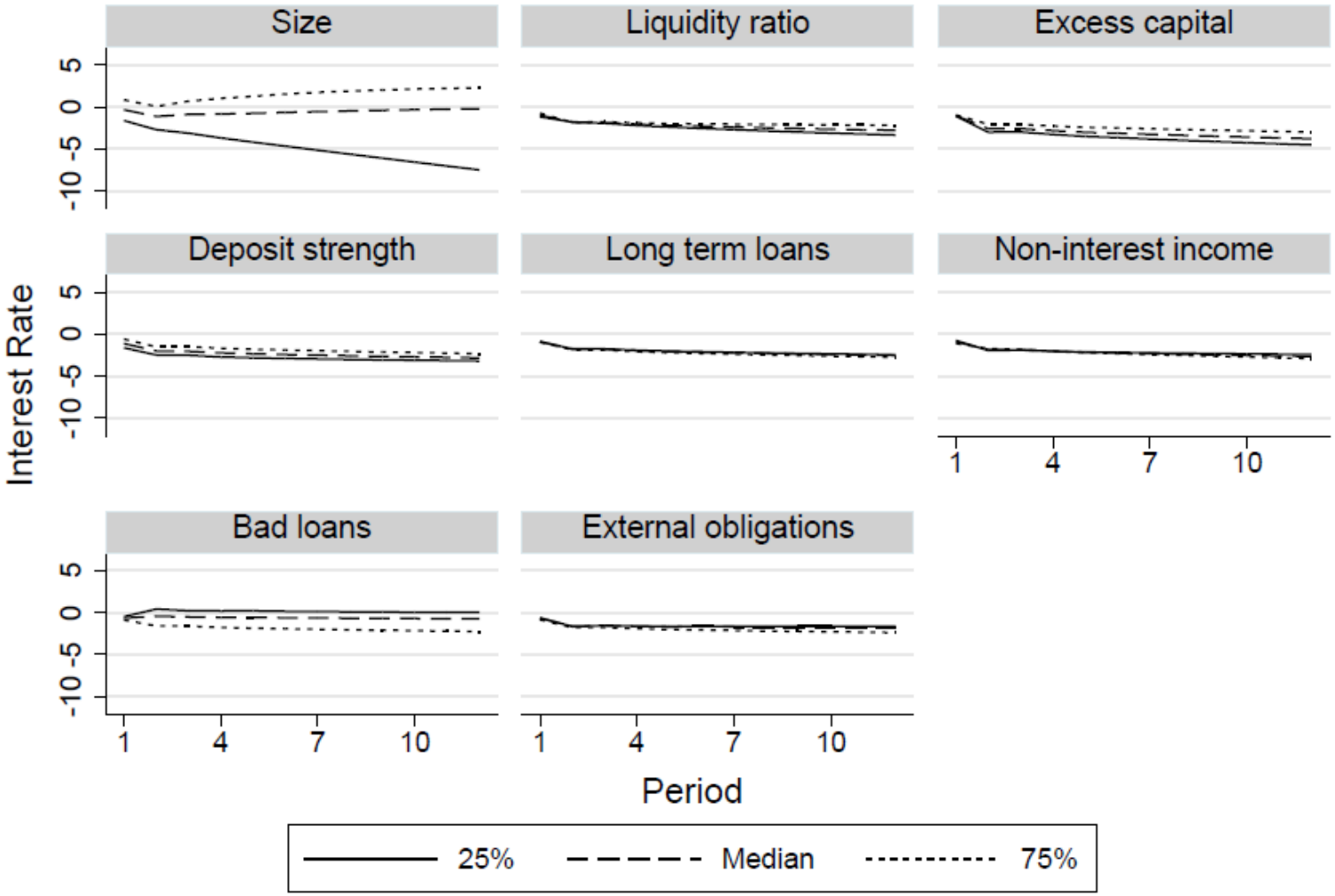
On consumer rates (less than 3 months term)



CONS: Medium-term loans: Bank size matters for the PT

Effects of a inflationary shock interacted with banks features

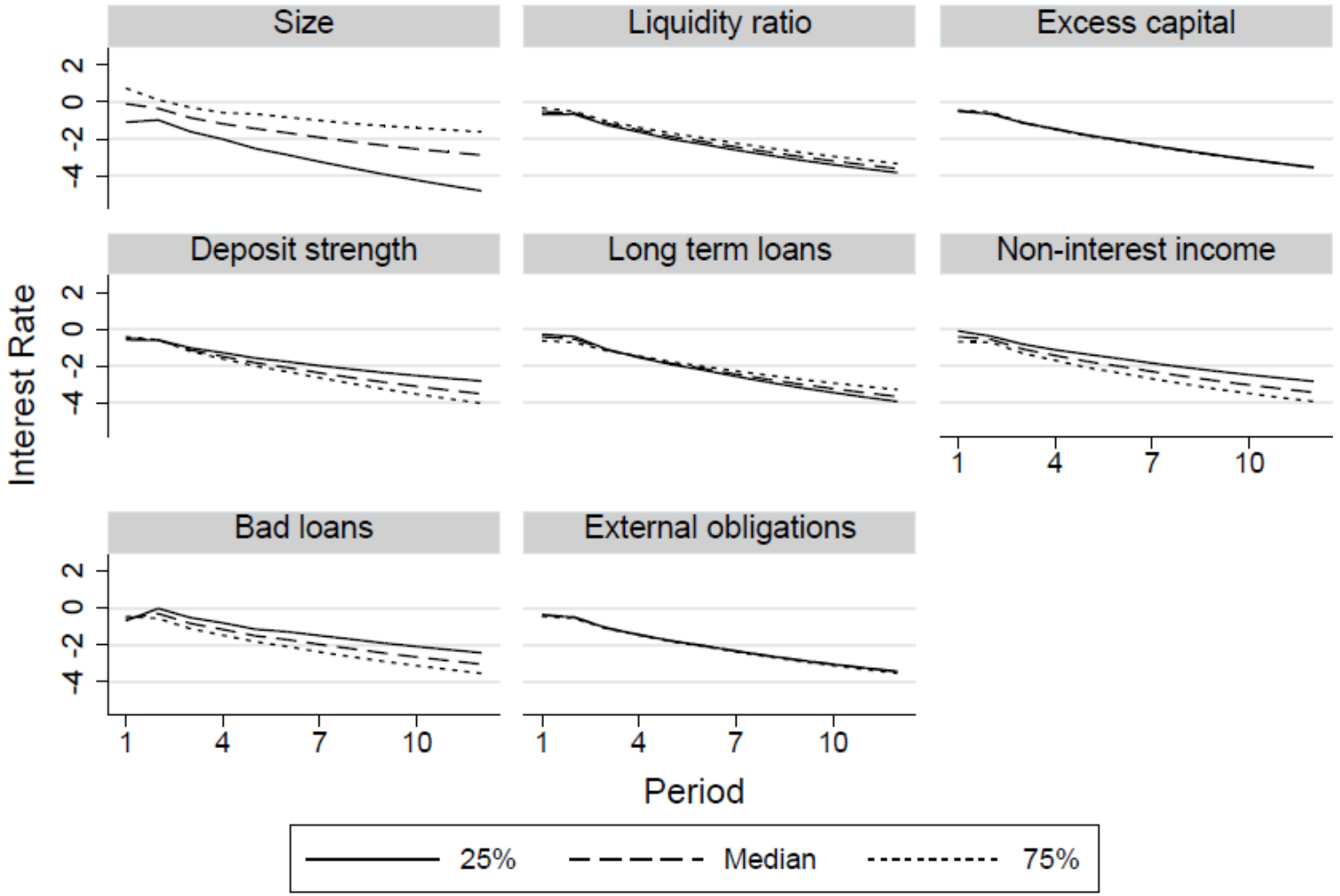
On consumer rates (3 months- less than 1 year term)



CONS: Medium-to-long-term loans: Bank size matters for the PT

Effects of a inflationary shock interacted with banks features

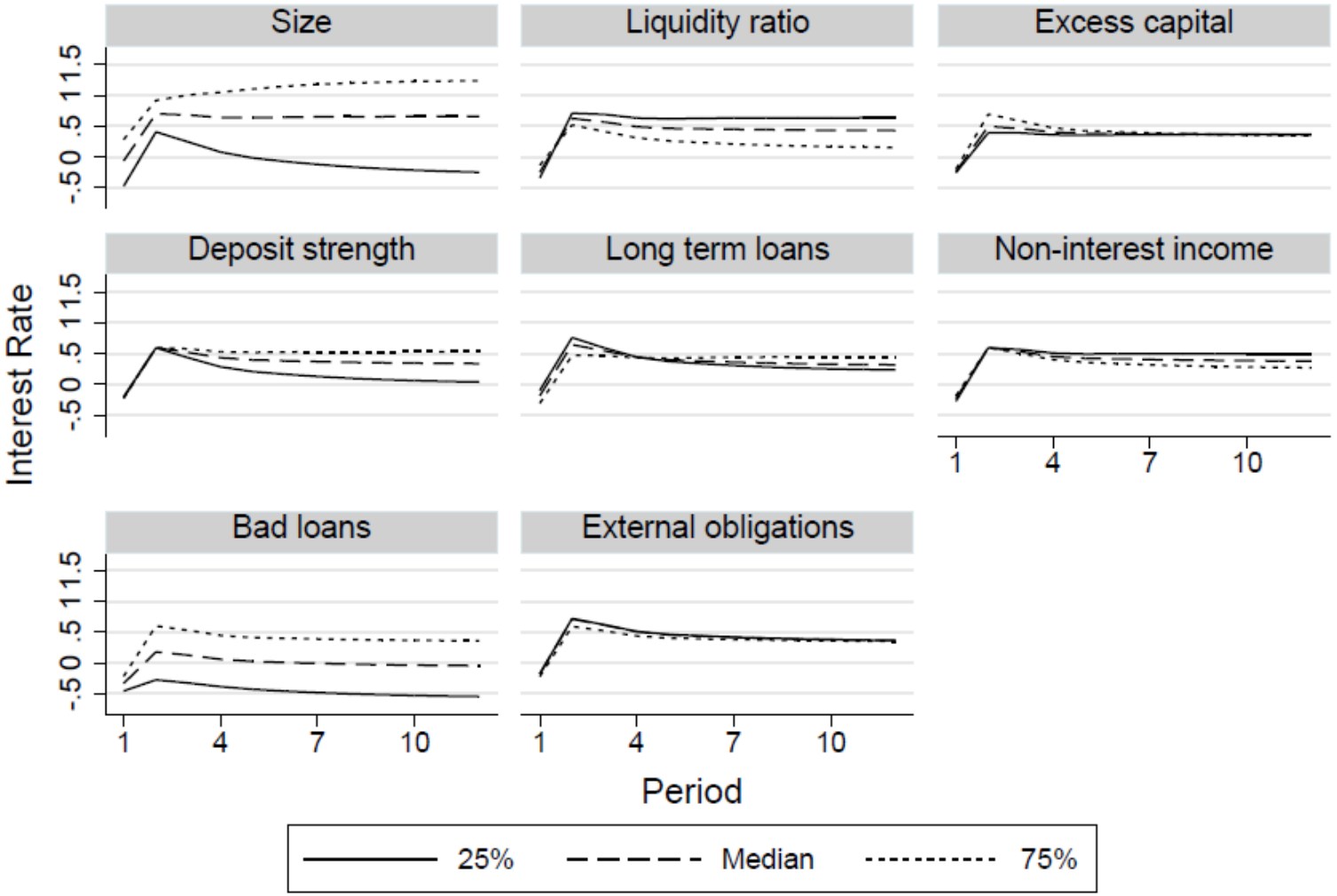
On consumer rates (1-3 years term)



CONS: Long-term loans: Size and bad loans matter for the PT

Effects of a inflationary shock interacted with banks features

On consumer rates (more than 3 years term)



Take away: MPR pass-through

- Commercial loans:
  - Short-term: Higher PT when lower NII and higher bad loans ratio
  - Long-term: Higher PT in small banks
- Consumer loans:
  - Medium-term: Higher PT in small banks and banks with good deposit strength
  - Long-term: Higher PT in small banks

Take away: Inflationary pass-through

- Commercial loans:
  - Medium-to-long-term: Higher PT in banks with good deposit strength and low NII
  - Long-term: Higher PT in big banks
- Consumer loans:
  - Short-to-medium-term: Higher PT in big banks with bad liquidity position, low ratio of bad loans, and many external obligations.
  - Medium-term/medium-to-long-term: Higher PT in big banks
  - Long-term: Higher PT in large banks with high ratio of bad loans

Summary of main results

- Unconditional MPR pass-through is higher for loans with short maturity, while inflationary pass-through is higher for loans with long maturity.
- Specific bank characteristics are particularly important for fixing rates of commercial loans with horizons of less than a year.
- MPR pass-through is higher in small banks, while inflation pass-through is higher in big banks.