Effects of Monetary Policy on the Stock Market Returns of Banks in Turkey: "Evidence From Conventional and Unconventional Policy Episodes"

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Overview

Motivation

- The aim of this work is to analyze the effects of MPC announcements on the bank stock returns.
- Measurement of the reaction of asset prices to monetary policy changes is complicated due to endogeneity and omitted variables bias problems.
- The most common solution is the event study (ES) approach.
- Rigobon and Sack (2004) develop and use the heteroscedasticity based estimation technique as an alternative to the event study (ES) approach.
- This technique is considered more reliable as it is valid under much weaker assumptions.

Literature

- Rigobon and Sack (2004) suggest a significant negative impact of monetary policy on stock indices in the United States
- Similar results in: Ehrmann et al. (2011) for the United States and the Euro Area, Bohl et al. (2008) for the largest four European countries and Kholodilin et al. (2009) for all the European countries.
- Rosa (2011) documents the effects of changes in US monetary policy on stock prices in 51 countries.
- Duran et al. (2012) find that monetary policy has the greatest impact on the financial sector index, 70 percent of which consists of bank stocks, in Turkey

Literature

As a complement to Duran et al. (2012), we show that

- An increase in the policy rate leads to a significant decline in all of the individual banks stock prices that are listed in the Istanbul Stock Exchange (ISE)
- We also detect heterogeneity in this response.
- We provide evidence which suggests that banks that are dependent on money market funding and which incur higher interest rate payments are more likely to give larger response to the monetary policy surprises.
- Once the CBRT has begun following an unconventional policy approach, the effect of MPC surprises became insignificant.
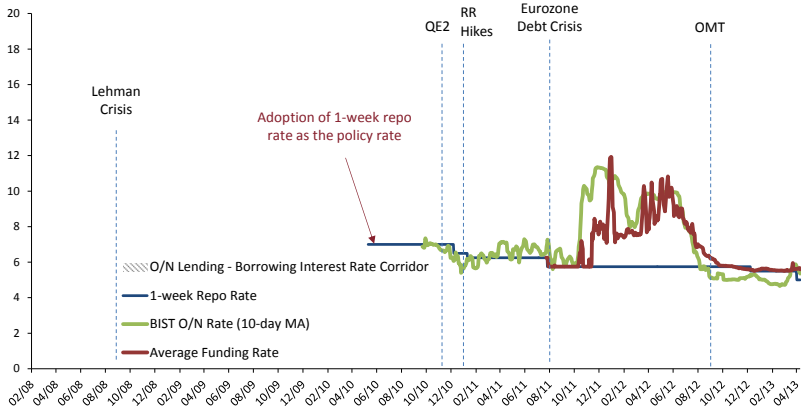
Monetary Policy in Turkey

- Due to unprecedented monetary expansion in developed economies we have observed an excessive volatility in short term capital inflows
- CBRT employed a rich set of cyclical and structural policy tools:
  - Interest rate corridor
  - Liquidity policy
  - Reserve requirements
  - Reserve option mechanism

	Old Approach	New Approach
Objectives	Price Stability	Financial Stability Price Stability
Policy Tools	Policy Rate	Structural Tools Cyclical Tools

Monetary Policy in Turkey

Interest Rate Corridor and Average Funding Rate
(Percent)

Methodology

$$\Delta i_t = \beta \Delta s_t + \gamma z_t + \epsilon_t$$

$$\Delta s_t = \alpha \Delta i_t + z_t + \eta_t$$

- Δi_t is the change in the policy rate.
- Δs_t is the change in the stock price.
- z_t a vector of exogenous variables which affect both ι_t and s_t.
- ϵ_t is the monetary policy shock.
- η_t is the asset price shock.
- The shocks ϵ_t and η_t are assumed to be serially uncorrelated and to be uncorrelated with each other and with the common shock z_t.

Methodology

$$\Delta\Omega = \Omega_P - \Omega_N = \frac{(\sigma_\epsilon^P - \sigma_\epsilon^N)}{(1-\alpha\beta)} \begin{bmatrix} 1 & \alpha \\ \alpha & \alpha^2 \end{bmatrix}$$

$$\text{let } \lambda = \frac{(\sigma_\epsilon^P - \sigma_\epsilon^N)}{(1-\alpha\beta)}$$

$$\text{then } \Delta\Omega = \lambda \begin{bmatrix} 1 & \alpha \\ \alpha & \alpha^2 \end{bmatrix}$$

- The impact of the policy change on the asset prices can be identified from the change in the covariance matrix
- λ shows the degree of heteroschedasticity that is present in the data.
- We estimate α and λ using GMM method.

Data

- We use daily data from the Istanbul Stock Exchange (ISE) (Stock return indices ISE 100, ISE Bank and individual indices for 16 banks).
- The policy rate is proxied by the yield on government bonds with one-month maturity, which is traded in a relatively more liquid market among the other alternative short rates.
- The sample covers the January 2005- January 2013 period with 99 policy decisions.
- The conventional and unconventional policy episodes include 65 and 34 MPC announcements, respectively.

Descriptive Statistics

| | Standard Deviations | | | | Correlations with the Policy Rate | | | |
| | Full Sample (Jan05-Jan13) | | Conventional Period (Jan05-Apr10) | | Full Sample (Jan05-Jan13) | | Conventional Period (Jan05-Apr10) | |
	Policy Days	Nonpolicy Days	Policy Days	Nonpolicy Days	Policy Days	Nonpolicy Days	Policy Days	Nonpolicy Days
Policy Rate	0.32	0.15	0.32	0.15	-	-	-	-
Stock Returns								
ISE 100	2.14	1.82	2.16	1.85	-0.33	-0.12	-0.40	-0.10
ISE Bank	2.65	2.26	2.65	2.28	-0.31	-0.12	-0.37	-0.12
AKBNK	3.47	2.65	3.78	2.62	-0.18	0.05	-0.24	0.07
ALTNF	3.44	3.54	3.60	3.45	-0.29	0.06	-0.32	0.07
DENIZ	3.46	3.51	3.60	3.71	-0.10	0.03	-0.15	-0.02
FNBNK	3.24	2.38	3.42	2.54	-0.11	0.06	-0.13	0.10
GARAN	3.12	3.11	3.37	3.21	-0.27	0.12	-0.36	0.14
ISCTR	3.18	2.50	3.45	2.50	-0.27	0.14	-0.35	0.21
KLNMA	2.90	2.34	3.05	2.40	-0.13	0.05	-0.20	0.11
SKBNK	3.56	3.63	3.87	3.84	-0.26	0.06	-0.32	0.08
TEBNK	3.42	2.68	3.69	2.83	-0.14	0.10	-0.18	0.08
TEKST	3.70	2.78	3.96	2.94	-0.38	0.09	-0.50	0.12
TSKB	2.92	2.70	3.02	2.77	-0.32	0.14	-0.45	0.23
YKBNK	2.65	2.81	2.74	2.89	-0.22	0.14	-0.26	0.16
ALBRK	2.27	1.85	2.29	1.69	-0.14	0.03	-0.19	0.13
ASYAB	2.44	2.79	2.51	3.02	-0.18	0.05	-0.30	0.14
HALKB	3.67	2.63	4.18	2.68	-0.16	0.03	-0.31	0.11
VAKBN	3.28	2.79	3.67	2.92	-0.30	0.07	-0.36	0.07

Estimation Results and Diagnostic Tests: Full Sample
(January 2005-January 2013)

	$\hat{\alpha}_{ES}$		$\hat{\alpha}_{GMM}$		$\hat{\lambda}_{GMM}$		OIR Test	GMM vs. ES	Number of Obs.
ISE-100	-2.14***	(0.64)	-2.77***	(0.79)	0.084***	(0.022)	0.42	1.85	99
ISE-BANK	-2.54***	(0.80)	-3.31***	(0.89)	0.085***	(0.021)	0.58	3.58*	99
AKBNK	-2.00*	(1.08)	-2.91**	(1.20)	0.082***	(0.022)	0.89	2.99	99
ALNTF	-3.11***	(1.04)	-4.16***	(1.51)	0.075***	(0.021)	0.24	0.93	99
DENIZ	-1.02	(1.08)	-1.55	(1.10)	0.078***	(0.022)	0.10	9.99***	99
FNBNK	-1.07	(1.01)	-1.43	(1.14)	0.081***	(0.022)	2.81*	0.51	99
GARAN	-2.67***	(0.94)	-4.00***	(1.06)	0.077***	(0.022)	0.12	7.67***	99
ISCTR	-2.68***	(0.96)	-4.47***	(1.36)	0.082***	(0.022)	0.51	3.51*	99
KLNMA	-1.06	(0.91)	-1.97**	(0.90)	0.087***	(0.022)	1.38	32.1***	99
SKBNK	-2.91***	(1.08)	-4.07***	(1.30)	0.074***	(0.020)	0.12	2.56	99
TEBNK	-1.45	(1.07)	-2.59**	(1.09)	0.081***	(0.022)	1.02	28.4***	99
TEKST	-4.38***	(1.08)	-8.16***	(2.00)	0.093***	(0.020)	0.84	5.01**	99
TSKB	-2.98***	(0.87)	-4.39***	(1.35)	0.077***	(0.021)	0.02	1.88	99
YKBNK	-1.82**	(0.81)	-2.68***	(0.90)	0.075***	(0.022)	0.56	4.85**	99
ALBRK	-1.03	(1.00)	-2.04**	(0.83)	0.054***	(0.019)	1.52	3.23*	68
ASYAB	-1.31	(0.80)	-1.65**	(0.75)	0.082***	(0.025)	0.89	1.44	83
HALKB	-2.17	(1.59)	-3.06*	(1.82)	0.053***	(0.018)	0.91	1.04	70
VAKBN	-3.01***	(1.04)	-4.30***	(1.11)	0.083***	(0.024)	0.13	10.7***	88

Notes: The standard errors are in parentheses. ***, ** and *, indicate the significance levels at 1%, 5% and 10% levels respectively. GMM over-identification test has a $\chi^2(1)$ distribution. $F_{1,T-1}$ distribution is used for the Hausman-type biasedness test.

Estimation Results: Conventional Policy Episode
(January 2005-April 2010)

	$\hat{\alpha}_{ES}$		$\hat{\alpha}_{GMM}$		$\hat{\lambda}_{GMM}$		OIR Test	GMM vs. ES	Number of Obs.
ISE-100	-2.69***	(0.73)	-3.26***	(0.89)	0.098***	(0.029)	0.04	1.24	65
ISE-BANK	-3.11***	(0.89)	-3.66***	(0.99)	0.098***	(0.029)	0.05	1.67	65
AKBNK	-2.88**	(1.38)	-4.15***	(1.42)	0.104***	(0.031)	1.18	16.6***	65
ALNTF	-3.45***	(1.29)	-4.74***	(1.82)	0.092***	(0.029)	0.05	0.99	65
DENIZ	-1.67	(1.34)	-1.82*	(1.09)	0.094***	(0.030)	0.04	0.03	65
FNBNK	-1.31	(1.19)	-2.62**	(1.26)	0.103***	(0.031)	2.78*	10.4***	65
GARAN	-3.81***	(1.17)	-5.37***	(1.16)	0.093***	(0.030)	0.06	91.9***	65
ISCTR	-3.75***	(1.20)	-6.21***	(1.54)	0.104***	(0.030)	0.39	6.47**	65
KLNMA	-1.44	(0.99)	-2.64***	(0.96)	0.104***	(0.030)	0.40	25.3***	65
SKBNK	-3.85***	(1.38)	-5.26***	(1.55)	0.087***	(0.026)	0.13	4.22**	65
TEBNK	-2.10	(1.37)	-3.32**	(1.33)	0.100***	(0.031)	0.87	14.4***	65
TEKST	-6.16***	(1.30)	-9.49***	(1.90)	0.106***	(0.021)	0.11	5.81**	65
TSKB	-4.22***	(0.99)	-5.76***	(1.33)	0.081***	(0.025)	0.40	2.97*	65
YKBNK	-2.21**	(0.98)	-3.05***	(1.06)	0.090***	(0.030)	0.46	4.42***	65
ALBRK	-1.43	(1.30)	-3.07***	(0.89)	0.068**	(0.027)	1.56	2.91*	33
ASYAB	-2.13**	(0.90)	-2.85***	(0.78)	0.099***	(0.038)	1.98	2.43	47
HALKB	-5.01**	(2.54)	-8.16***	(2.17)	0.062***	(0.026)	0.59	5.78**	35
VAKBN	-3.97***	(1.37)	-5.52***	(1.34)	0.109***	(0.035)	0.17	41.8***	53

Notes: The standard errors are in parentheses. ***, ** and *, indicate the significance levels at 1%, 5% and 10% levels respectively. GMM over-identification test has a $\chi^2(1)$ distribution. $F_{1,T-1}$ distribution is used for the Hausman-type biasedness test.

Estimation Results: Deviations of Individual Bank Returns from the ISE Bank

(January 2005 - April 2010)

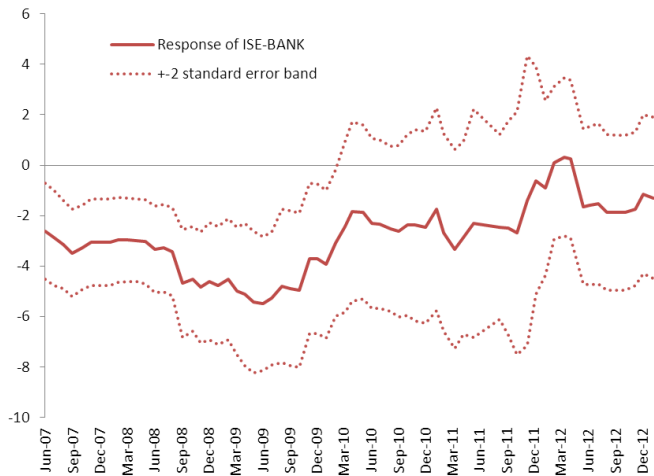|	$\hat{\alpha}_{ES}$		$\hat{\alpha}_{GMM}$		$\hat{\lambda}_{GMM}$		OIR Test	GMM vs. ES	Number of Obs.
AKBNK	0.233	(1.111)	-0.455	(0.800)	0.085***	(0.028)	1.033	0.795	65
ALNTF	-0.328	(1.175)	-0.502	(1.338)	0.086***	(0.028)	0.045	0.074	65
DENIZ	1.439	(1.137)	1.669**	(0.804)	0.078***	(0.028)	4.459**	0.082	65
FNBNK	1.783	(1.367)	2.524**	(1.085)	0.089***	(0.028)	0.278	0.795	65
GARAN	-0.736	(1.020)	-1.103	(0.922)	0.087***	(0.028)	0.415	0.707	65
ISCTR	-0.636	(0.908)	-1.375*	(0.815)	0.087***	(0.028)	0.016	3.432*	65
KLNMA	1.583	(0.959)	1.559***	(0.567)	0.083***	(0.028)	0.687	0.001	65
SKBNK	-0.746	(1.200)	-1.331	(1.105)	0.074***	(0.027)	1.313	1.558	65
TEBNK	1.022	(1.109)	1.224	(0.963)	0.086***	(0.028)	0.247	0.136	65
TEKST	-3.017***	(1.145)	-4.060**	(2.105)	0.086***	(0.028)	0.003	0.349	65
TSKB	-1.114	(1.164)	-1.762*	(1.063)	0.088***	(0.028)	0.258	1.855	65
YKBNK	0.895	(0.953)	0.845	(1.124)	0.086***	(0.028)	0.012	0.007	65
ALBRK	2.142	(1.572)	1.972	(1.237)	0.051**	(0.023)	0.546	0.031	33
ASYAB	1.507*	(0.885)	1.220*	(0.700)	0.102***	(0.035)	2.268	0.281	47
HALKB	-1.364	(1.811)	-4.328***	(1.346)	0.069***	(0.021)	2.691	5.980**	35
VAKBN	-0.299	(1.119)	-0.822	(1.099)	0.091***	(0.033)	1.251	5.962**	53

Notes: The standard errors are in parentheses. ***, ** and *, indicate the significance levels at 1%, 5% and 10% levels respectively. GMM over-identification test has a $\chi^2(1)$ distribution. $F_{1,T-1}$ distribution is used for the Hausman-type biasedness test.

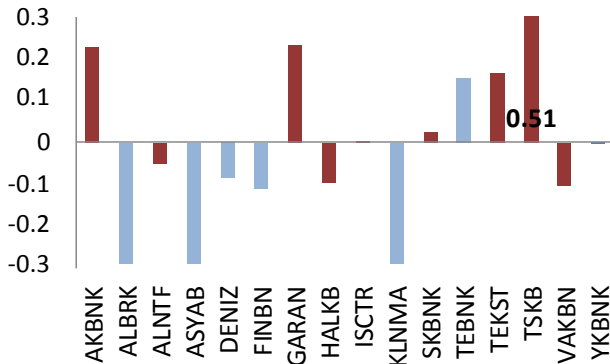|	$\hat{\alpha}_{ES}$		$\hat{\alpha}_{GMM}$		$\hat{\lambda}_{GMM}$		OIR Test	GMM vs. ES	Number of Obs.
ISE-100	-0.08	*(1.26)*	-0.10	*(1.17)*	0.050**	*(0.023)*	0.81	0.00	34
ISE-BANK	-0.45	*(1.69)*	-0.71	*(1.84)*	0.052**	*(0.024)*	1.00	0.12	34
AKBNK	1.27	*(1.38)*	1.08	*(1.83)*	0.034	*(0.021)*	1.18	0.03	34
ALNTF	-1.85	*(1.72)*	-1.77	*(1.72)*	0.041*	*(0.023)*	0.37	0.38	34
DENIZ	1.38	*(1.79)*	-0.34	*(3.21)*	0.043**	*(0.022)*	0.11	0.42	34
FNBNK	-0.15	*(1.99)*	1.44	*(2.11)*	0.047**	*(0.024)*	0.19	4.96**	34
GARAN	1.54	*(1.35)*	1.00	*(1.95)*	0.032	*(0.020)*	1.39	0.15	34
ISCTR	1.28	*(1.37)*	1.84	*(1.71)*	0.034*	*(0.020)*	0.33	0.29	34
KLNMA	0.33	*(2.10)*	3.05	*(2.23)*	0.046*	*(0.024)*	1.25	13.66***	34
SKBNK	0.55	*(1.41)*	1.38	*(1.37)*	0.043*	*(0.024)*	0.23	5.97**	34
TEBNK	0.95	*(1.46)*	-0.01	*(1.72)*	0.042*	*(0.024)*	0.23	1.09	34
TEKST	2.20	*(1.50)*	3.24*	*(1.74)*	0.044*	*(0.023)*	0.00	1.43	34
TSKB	1.63	*(1.60)*	3.40	*(2.42)*	0.045**	*(0.023)*	0.01	0.96	34
YKBNK	-0.39	*(1.49)*	-0.61	*(1.64)*	0.043*	*(0.024)*	0.14	0.11	34
ALBRK	-0.47	*(1.56)*	-0.35	*(1.60)*	0.044*	*(0.024)*	0.12	0.10	34
ASYAB	1.37	*(1.59)*	3.24	*(2.03)*	0.052**	*(0.024)*	0.69	2.18	34
HALKB	1.77	*(1.50)*	2.95	*(2.49)*	0.039**	*(0.020)*	0.06	0.36	34
VAKBN	0.15	*(1.33)*	0.04	*(1.43)*	0.042*	*(0.023)*	0.66	0.04	34

Notes: The standard errors are in parentheses. ***, ** and *, indicate the significance levels at 1%, 5% and 10% levels respectively. GMM over-identification test has a $\chi^2(1)$ distribution. $F_{1,T-1}$ distribution is used for the Hausman-type biasedness test.

Rolling Window GMM Estimates of the Response of ISE-BANK to Monetary Policy
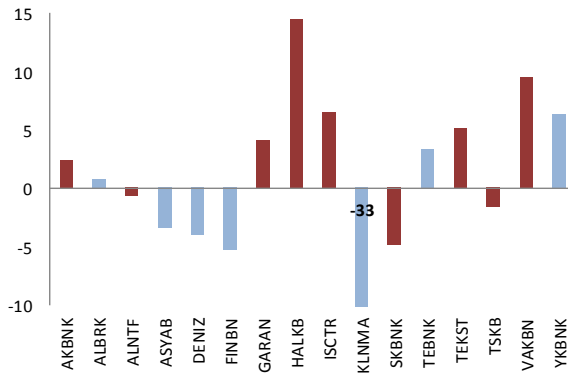

Notes: Each window includes 30 observations. The first window is January 2005-June 2007.

Interest Paid to Money Market Operations/Total Assets (%)

Note: The values for banks whose stock prices are affected more from monetary policy than the ISE-Bank are marked in dark red, others are marked in light blue.

Total Interest Payments/Total Interest Receipts (%)

Note: The values for banks whose stock prices are affected more from monetary policy than
the ISE-Bank are marked in dark red, others are marked in light blue.

Summary

- In the conventional policy episode of traditional inflation targeting, increases in the policy rate on MPC days lead to significant declines in stock returns of all individual banks.

- Comparing the results with the more widely applied event study method, we find that the event study gives biased results for most of the bank stock returns.

- We also detect heterogeneity in the responses of bank indices to MPC surprises.

- Aggregate and individual bank indices have stopped giving significant responses to the surprises on MPC meeting days during the unconventional policy episode.