

Price and Quantity Effects of Monetary Policy Actions and Statements in an Emerging Economy

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February 2022

Introduction

- Asset prices react to different types of information in policy statements
- Monetary policy in **AEs** has **multiple** dimensions
 - Effects assessed on asset prices
 - Spillover effects on EMs
- But not yet clear whether monetary policy in **EMs** has more than one dimension
 - EMs not constrained by ZLB

This Paper

- Does monetary policy in Mexico has **more than one** dimension?
 - Currency and bond yields in Mexico respond to surprises in **policy rate**
 - Do they also respond to changes in policy **statements**?
 - Do they respond to surprises about **future path** of policy rate?
- Relevant for central banks in EMs
 - No response → Less room to operate relative to AEs
 - Response → Deal with high inflation and spillovers from policies abroad

Main Results

- Monetary policy in Mexico has **two** dimensions: actions and words
 - Multidimensionality of monetary policy not exclusive to AEs
 - Deal with high inflation and tame spillover effects from policies abroad
- Banxico **manages expectations** about path of policy rate **via statements**
 - Even without being constrained by zero lower bound (ZLB)
- Banxico's **actions** and **words** influence asset prices *and* portfolio flows

Related Literature

- Identification of monetary policy surprises

Christiano, Eichenbaum, and Evans (1999); Kuttner (2001); Zettelmeyer (2004); Gürkaynak and Wright (2013); Lloyd (2018); Nakamura and Steinsson (2018)

- Multidimensionality of monetary policy in AEs

Gürkaynak, Sack, and Swanson (2005); Swanson (2018); Rogers, Scotti, and Wright (2018); Altavilla, Brugnolini, Gürkaynak, Motto, and Ragusa (2019)

- Effects of monetary policy on asset prices

Kearns and Manners (2006); Faust, Rogers, Wang, and Wright (2007); Hausman and Wongswan (2011); Kohlscheen (2014); Bowman, Londono, and Sapriza (2015); Kearns, Schrimpf, and Xia (2018); Ferrari, Kearns, and Schrimpf (2021)

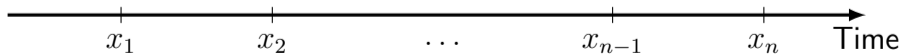
Roadmap

- Identification of monetary policy surprises
- Monetary policy dimensions
 - Selection, estimation, interpretation
- Effects of monetary policy
 - Asset prices
 - Portfolio flows

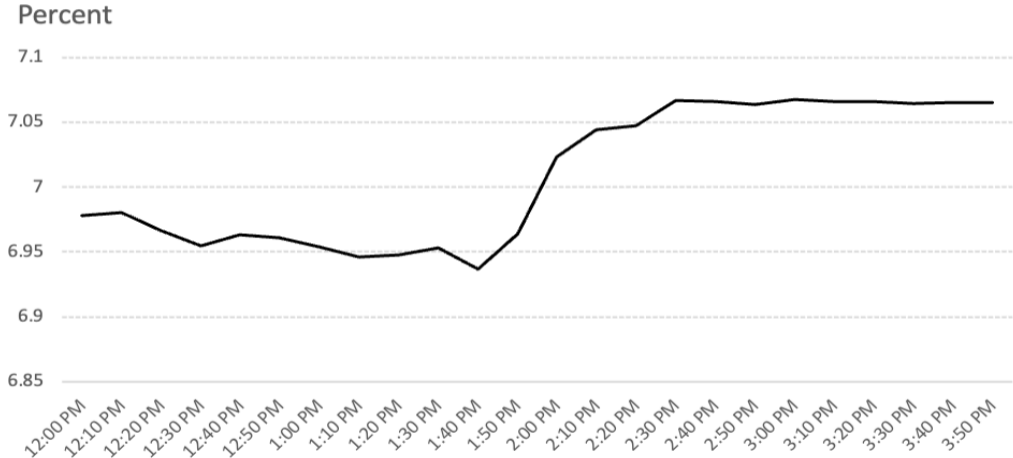
Identification of Monetary Policy Surprises

Monetary Policy Surprises

- Monetary policy intrinsically endogenous
- Event studies with high-frequency data isolate surprise component of decisions
 - **Strategy:** Intraday changes in asset prices around monetary policy events
 - **Assumption:** Changes in market expectations induced by policy announcements
 - **Outcome:** Clean and model-free (yet small) monetary policy surprises



10-Year Yield on June 24, 2021



Monetary Policy Surprises in Mexico

- Elsewhere, futures or overnight indexed swaps (OIS) on policy rate
 - In Mexico, swap market references TIE28D
 - Swaps with maturities up to 1 year
 - Inflation targeting adoption
 - Anchored inflation expectations
- } Forward-looking policies
- Considerations: timing change in 2015, usage of daylight saving time

Dataset

- Asset price changes in **30-minute** windows around **regular** policy announcements
 - **Surprises:** Swap rates (3M, 6M, 9M, 1Y)
 - **Effects:** Exchange rate (pesos per U.S. dollar), bond yields (2Y, 5Y, 10Y, 30Y)
 - **Robustness:** 50-minute and daily windows
- Sources:
 - Intraday data from Bloomberg
 - Daily portfolio holdings data from Banco de México
- Sample period: January 2011 to December 2021

Monetary Policy Dimensions

Monetary Policy Factors Drive Asset Price Changes

Following Gürkaynak et al. (2005), matrix X of asset price changes has factor structure

$$X = F\Lambda + \zeta,$$

- X : $T \times n$ matrix with T observations and n asset price changes
- F : $T \times k$ matrix with k unobserved factors
- Λ : $k \times n$ matrix of factor loadings
- ζ : white noise

Assessing the Number of Factors

- Cragg–Donald test:
 - Null: Variability observed in data mostly explained by k_0 factors ($k_0 < n$)
 - Wald statistic: Asymp. χ^2 with $(n - k_0)(n - k_0 + 1) / 2 - n$ degrees of freedom
 - Inference requires: $(n - k_0)(n - k_0 + 1) / 2 > n$
- Applied to:
 - Exchange rate and bond yields
 - Swaps with maturities up to 1 year → For interpretation

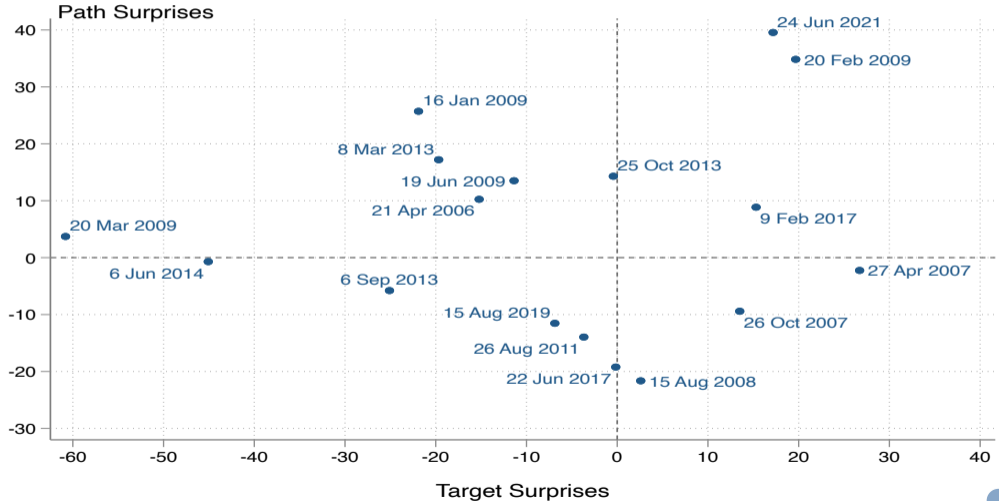
How Many Factors Drive Asset Price Changes in Mexico?

	Frequency	$H_0 : k = k_0$	Wald Statistic	Degrees of Freedom	p -value	Observations
Exchange Rate		0	29.56	10	0.001	56
	Intraday	1	10.07	5	0.073	56
		2	1.14	1	0.285	56
& Yield Curve		0	40.20	10	0.000	135
	Daily	1	18.93	5	0.002	135
		2	0.00	1	0.978	135
Swaps	Intraday	0	28.30	6	0.000	87
		1	7.21	2	0.027	87
	Daily	0	33.06	6	0.000	190
		1	9.35	2	0.009	190

Estimation and Interpretation of Factors

- Factors estimated by principal components on X comprised of changes in **swaps**
 - First two principal components (PCs) based on Cragg–Donald test
 - PCs are linear combinations and orthogonal but have no interpretation
 - Rotated and rescaled for **interpretation**
- Two types of monetary policy surprises as in Gürkaynak et al. (2005)
 - **Target** surprises: *current* policy rate
 - **Path** surprises: *future path* of policy rate linked to **statements**

Monetary Policy Dimensions



Statements and Path Surprises Are Linked

Date	Path	Description
21-Apr-2006	+	Statement announces an easing of monetary conditions but notes that ‘for the foreseeable future there is no space available for further easing.’
15-Aug-2008	-	Statement highlights that global inflationary pressures continue to rise but an improvement is foreseen in the medium term due to the prospects for lower global growth. Downside risks to the local economy have increased.
16-Jan-2009	+	Statement notes ‘a higher than expected upward trend in inflation in the last quarter’ and that ‘instability in financial markets continues to be a risk factor for the inflationary trend .’
20-Feb-2009	+	Statement indicates that ‘the strong financial turmoil represents a risk to the expected inflation path , even considering the greater contraction in demand and the reduction in commodities prices.’
19-Jun-2009	+	Statement indicates that ‘the Board considers that its easing cycle is close to an end .’
08-Mar-2013	+	Statement makes clear that the 50 basis point reduction in the policy rate ‘does not represent the beginning of an easing cycle .’
25-Oct-2013	+	Statement highlights that ‘no further cuts in the policy rate are appropriate in the foreseeable future .’
09-Feb-2017	+	Statement highlights the effects of the tightenings in 2016 and ‘ the ones required in 2017 ’ to counteract inflationary pressures.
22-Jun-2017	-	Statement drops reference to do ‘the necessary tightenings ahead ’ from the previous statement.
24-Jun-2021	+	Statement highlights additional shocks to those expected in headline and core inflation, and notes that their expected paths in the following quarters are higher than previously estimated.

Effects of Monetary Policy on Asset Prices

Contemporaneous Effects on Asset Prices

$$\Delta y_t = \beta_0 + \beta_1 Target_t + \beta_2 Path_t + \varepsilon_t,$$

Δy_t : intraday change in bond yields or exchange rate

$Target_t$ and $Path_t$: intraday monetary policy surprises

- Positive: Tightenings
- Negative: Easings

ε_t : error term

Asset Price Responses to Intraday Monetary Policy Surprises

	FX Returns		Δ 2Y Yield		Δ 5Y Yield		Δ 10Y Yield		Δ 30Y Yield	
Target	-2.31*** (0.82)	-2.31*** (0.79)	0.67*** (0.080)	0.68*** (0.083)	0.52*** (0.13)	0.43*** (0.099)	0.44*** (0.073)	0.44*** (0.072)	0.30*** (0.071)	0.30*** (0.072)
Path		-2.12 (1.57)		0.95*** (0.17)		1.00*** (0.21)		0.78*** (0.16)		0.69*** (0.19)
Constant	-9.17*** (3.21)	-9.17*** (3.19)	-0.32 (0.42)	-0.29 (0.32)	-0.56 (0.47)	-0.35 (0.37)	-0.60 (0.40)	-0.57* (0.33)	-0.79** (0.39)	-0.76** (0.34)
Obs.	87	87	71	71	56	56	71	71	71	71
R^2	0.26	0.28	0.72	0.84	0.39	0.64	0.55	0.69	0.37	0.53

Notes: Robust standard errors are shown in parentheses. *, **, *** asterisks respectively indicate significance at the 10%, 5% and 1% level.

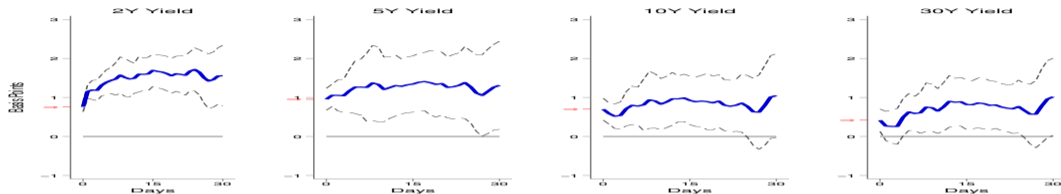
Persistence of Effects on Yields

- On-impact response with event studies, **persistence** with local projections

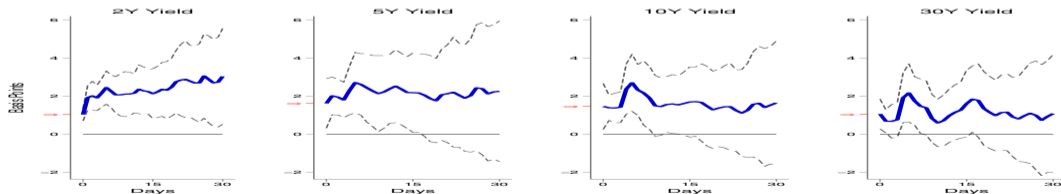
$$y_{t+h} - y_{t-1} = \alpha_h + \beta_h^1 Target_t + \beta_h^2 Path_t + \eta_h' z_{t-1} + u_{t+h},$$

- h : horizon in days with $h = 0, 1, \dots, 30$
- $Target_t$ and $Path_t$: factors on announcement days and zero otherwise
- z_{t-1} : vector of lagged variables to control for potential drivers of yields

Persistence of Yields to Monetary Policy Surprises



(a) Target Surprises



(b) Path Surprises

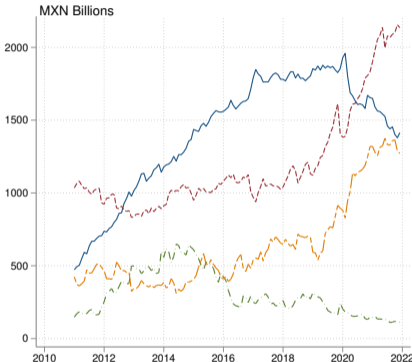
Notes: This figure plots the coefficient estimates and 95% confidence intervals for 1 basis point target and path tightening surprises for yield changes from close of day $t-1$ to day $t+h$, where t is a day with a monetary policy announcement and $h = 0, 1, \dots, 30$.

Effects of Monetary Policy on Portfolio Flows

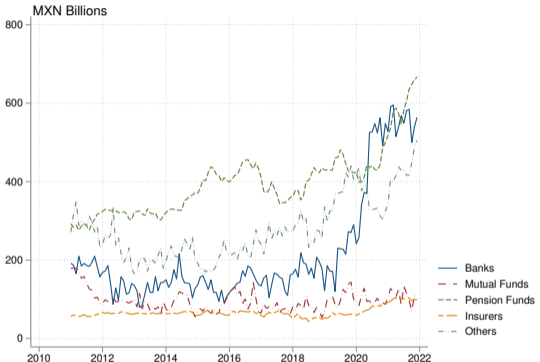
Daily Portfolio Flows

- So far, responses of asset *prices* to target and path surprises
 - But response of portfolio *flows* to understand **mechanism**
- Banxico collects daily data on value of holdings of government securities
 - Cetes, **Bonos**, Bondes, Udibonos, Bpas
- Data contains holdings by **domestic** and **foreign** investors
 - Domestic: banks, mutual funds, pension funds, insurers, other investors

Holdings by Nationality and Type of Investor



(a) Cetes and Bonos by Nationality



(b) Bonos by Type of Investor

Valuation Effects

- Changes in nominal value of bonos holdings due to a change in
 - Value of bonos
 - **Amount** of bonos → Effects on quantities
- Adjust for valuation effects: Deflate nominal value of bonos holdings
 - Daily percentage change in price: $-\text{duration} \times \Delta \text{ daily yield}$
 - Duration from par yields (Bloomberg) and average maturity (Banxico)
- Δ deflated value of holdings reflects Δ **amount** of bonos regardless of Δ price

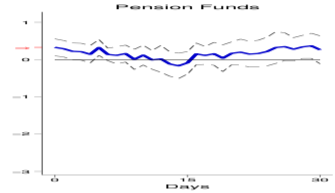
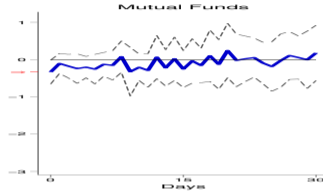
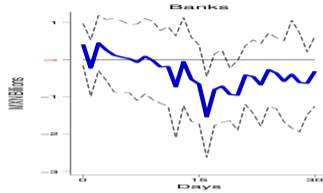
How Bonos Flows Respond to Target and Path Surprises?

- Persistence of effects analyzed with local projections:

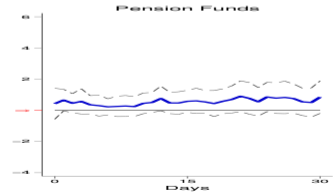
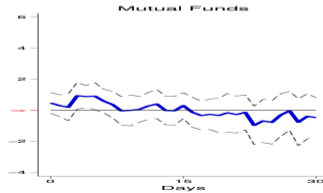
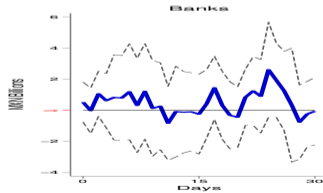
$$H_{t+h} - H_{t-1} = \alpha_h + \beta_h^1 Target_t + \beta_h^2 Path_t + \eta'_h z_{t-1} + u_{t+h},$$

- Dependent variable is daily change in (deflated) value of bonos holdings
- h : horizon in days with $h = 0, 1, \dots, 30$
- $Target_t$ and $Path_t$: intraday surprises on announcement days and zero otherwise
- z_{t-1} : vector of lagged variables to control for potential drivers of flows

Response of Bonos Flows to Target and Path Tightenings: I



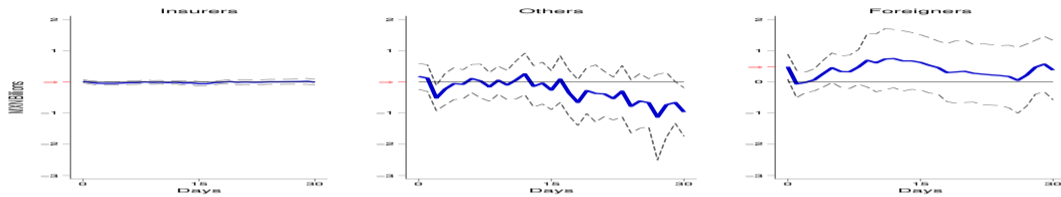
(a) Target Surprise



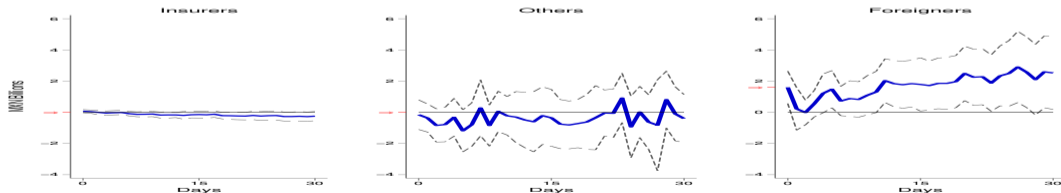
(b) Path Surprise

Notes: This figure plots the coefficient estimates and 95% confidence intervals for 1 basis point target and path tightening surprises for bonos flows from day $t - 1$ to day $t + h$, where t is a day with a monetary policy announcement and $h = 0, 1, \dots, 30$.

Response of Bonos Flows to Target and Path Tightenings: II



(a) Target Surprise



(b) Path Surprise

Notes: This figure plots the coefficient estimates and 95% confidence intervals for 1 basis point target and path tightening surprises for bonos flows from day $t - 1$ to day $t + h$, where t is a day with a monetary policy announcement and $h = 0, 1, \dots, 30$.

Conclusions

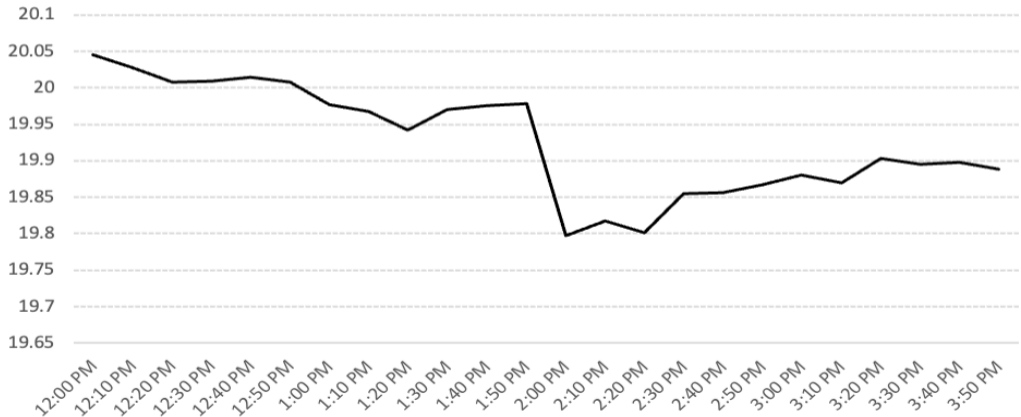
Conclusions

- Banxico conducts monetary policy by
 - Adjusting **current** level of policy rate
 - Managing expectations about **future path** of policy rate
- Target and path surprises influence asset prices *and* portfolio flows
- Path surprises improve implementation of monetary policy in EMs
 - Deal with high inflation and spillovers from policies implemented abroad

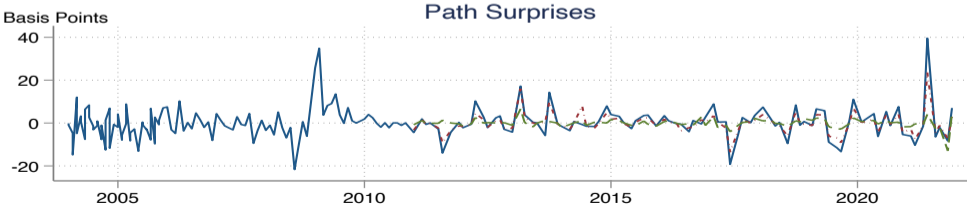
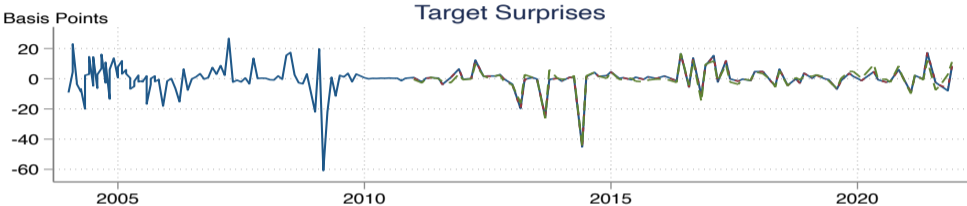
Appendix

Exchange Rate on June 24, 2021

MXN/USD



Monetary Policy Surprises in Mexico: Intraday vs. Daily Data



Response of Asset Prices to PRS: Intraday Data

	Δ FX		Δ 2Y Yield		Δ 5Y Yield		Δ 10Y Yield		Δ 30Y Yield	
PR Surprise	-2.22**	-2.22**	0.68***	0.68***	0.54***	0.54***	0.44***	0.45***	0.31***	0.32***
	(0.94)	(0.93)	(0.08)	(0.08)	(0.14)	(0.14)	(0.07)	(0.07)	(0.07)	(0.07)
PR Expected		0.0087		-0.032		-0.031		-0.033		-0.041*
		(0.24)		(0.02)		(0.02)		(0.02)		(0.02)
Observations	86	86	70	70	55	55	70	70	70	70
R-squared	0.23	0.23	0.73	0.74	0.38	0.41	0.55	0.57	0.38	0.42

Notes: Robust standard errors are shown in parentheses. *, **, *** asterisks respectively indicate significance at the 10%, 5% and 1% level.

Asset Price Responses to Daily Monetary Policy Surprises

	FX Returns		Δ 2Y Yield		Δ 5Y Yield		Δ 10Y Yield		Δ 30Y Yield	
Target	-2.16*** (0.76)	-2.16*** (0.68)	0.68*** (0.082)	0.68*** (0.090)	0.55*** (0.14)	0.36*** (0.077)	0.42*** (0.080)	0.42*** (0.088)	0.29*** (0.076)	0.29*** (0.085)
Path		-1.37* (0.71)		0.23** (0.12)		0.52*** (0.070)		0.28*** (0.11)		0.29*** (0.093)
Constant	-9.17*** (3.25)	-9.17*** (3.19)	-0.21 (0.39)	-0.26 (0.36)	-0.63 (0.46)	-0.33 (0.38)	-0.54 (0.41)	-0.60 (0.37)	-0.74* (0.40)	-0.81** (0.36)
Obs.	87	87	71	71	56	56	71	71	71	71
R^2	0.24	0.28	0.75	0.78	0.43	0.67	0.52	0.60	0.35	0.48

Notes: Robust standard errors are shown in parentheses. *, **, *** asterisks respectively indicate significance at the 10%, 5% and 1% level.