Do firms react to monetary policy in developing countries ?

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23/11/2023 - Paris (Banque de France)

OUTLINE

INTRODUCTION

- The return of inflation has led to monetary tightening in many developed and developing countries

- Need to understand the channels through which monetary policy affects prices and economic activity

- The transmission of monetary policy in developing countries remains an open question

MONETARY POLICY TRANSMISSION IN DEVELOPING COUNTRIES

- Limitations on the effectiveness of monetary policy
  - Transmission of monetary policy mainly through banks
  - But transmission is hampered by
    1. Limited impact of central banks on banks' liquidity needs: excess liquidity, low competition, etc.
    2. Limited impact of the bank's decision on macroeconomic activity due to limited banking development

- Mixed empirical evidence
  1. Macroeconomic time series: Absence of a robust effect
  2. Case studies: Document a real effect but cannot be generalized

Aim of this paper:
Provide new evidence on the effectiveness of monetary policy in developing countries using firm-level surveys

WHAT WE DO AND WHAT WE FIND

- We compare perceptions of financial access for managers surveyed just before and just after a change in monetary policy.

- We document an effect of monetary policy when the federal funds rate changes significantly (more than 100-150 points).

- Effect is
  - Symmetric (both increases and decreases)
  - Stronger for firms with a prior relationship with a bank
  - Stronger for countries with competitive banking markets, less excess liquidity and independent central banks

- Finally, we show that monetary policy affects not only perceptions but also the manager's decision to apply for a loan.

RELATED LITERATURE AND CONTRIBUTIONS

1. Provide evidence that combines internal and external validity
   - Recent papers attempt to isolate the effects of monetary policy by exploiting specific events (Abuka et al., 2019:JDE; Berg et al., 2019:JAE).
   - But these papers suffer from low external validity.

2. Focus on the demand side of monetary policy
   - Studies often focus on supply-side shocks by suppressing demand-side changes (Jimenez et al, 2012:AER, 2014:QJE)
   - Borrower discouragement is a major driver of firms' lack of access to credit

3. Examining the heterogeneity of monetary policy
   - Limited evidence on the differential impact of MP on firms on firms (Ottonello and Winberry, 2020:ECMA; Cloyne et al., 2023:JEEA)
   - Lack of knowledge for developing countries

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DATA

1. Monetary policy events
   - Hand-collected information on policy rate changes in developing countries
   - Sources: Central bank publications
   - We extract
     - Exact day of event
     - Direction of change (hike vs. cut)
     - Previous and new policy rate

2. World Bank Enterprise Surveys (WBES)
   - Firm-level survey of a representative sample of private firms, covering more than 180,000 firms in 154 countries (October 2022)
   - We extract two main variables
     1. Managers' perception of finance as an obstacle to their business
     2. Day of interview

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SAMPLE

1. Window around an event
   - We restrict the sample to firms surveyed within a 60-day window before and after each monetary policy change (event)
   - Reason: To isolate the impact of MP by allowing these firms to share common macroeconomic conditions
   - Temporary sample: 52,732 firms from 63 countries

2. Eliminate overlap
   - Additional filter: A company may only be associated with 1 event (▸ Example)
     - Goal is to clarify definition of control and treatment groups
     - Without this restriction, a company can be in both control and treatment groups (for two different events)
   - Final sample: **29,012 firms** from 63 countries (96 surveys) and **177 events**

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EMPIRICAL MODEL

Baseline equation (DID with a continuous treatment)

$$Y_{i,e,d} = \delta_e + \beta_0 Post_{e,d} + \beta_1 Post_{e,d} \times \Delta IR_e + \gamma \mathbf{X}_i + \varepsilon_{i,e,d} \quad (1)$$

i, e, and d denote respectively firm, event, and day of the interview

1. Dependent variable ($Y_{i,e,d}$): firms' perception of access to finance as an obstacle to the current operations of the establishment

2. Treatment variables
   - $Post_{e,d}$: 1 if a firm i is surveyed after the event
   - ΔIR_e: absolute change of key policy rate in basis points

3. Other variables
   - δ_e: Monetary policy fixed effects
   - $\mathbf{X}_i$: Firm-level control variables (e.g., size, age, sector, etc.)

Expected effects: $\beta_1 > 0$ and $\beta_0 = 0$

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IDENTIFICATION STRATEGY

Identification strategy assumes that firms surveyed before and after

1. Face common macroeconomic conditions
   - Cannot be tested
   - But several robustness checks give us confidence in this assumption

2. Are similar in their characteristics
   - There is no reason to expect that the survey design to be affected by a change in monetary policy
   - Perform a balance test that confirms the absence of difference for their observable characteristics (except for sole proprietorship)

   ▶ Balance test

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MAIN RESULTS

Table: Main results

	(1)	(2)
Post	0.0324	0.00135
	(0.68)	(0.04)
Post $\times \Delta$(IR)	0.000621***	0.000688***
	(3.10)	(6.43)
Controls	No	Yes
Event FE (δ_e)	Yes	Yes
Observations	29,021	23,751
Adjusted R^2	0.120	0.296

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MAIN RESULTS

Main results

1. A change in MP affects managers' perceptions of credit constraints in developing countries

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MAIN RESULTS

Figure: Marginal effect of Post dummy per level of change in monetary policy

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MAIN RESULTS

Main results

1. A change in MP affects managers' perceptions of credit constraints in developing countries

2. The effect occurs only when the rate change is substantial, i.e. more than 100-150 basis points

3. Symmetric effect (hikes and cuts)

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MAIN RESULTS

Figure: Effect of monetary policy change by week
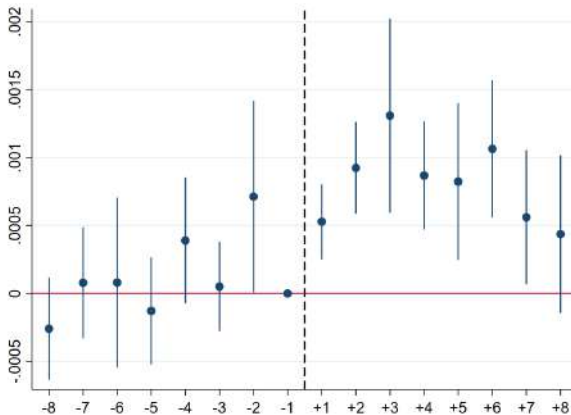
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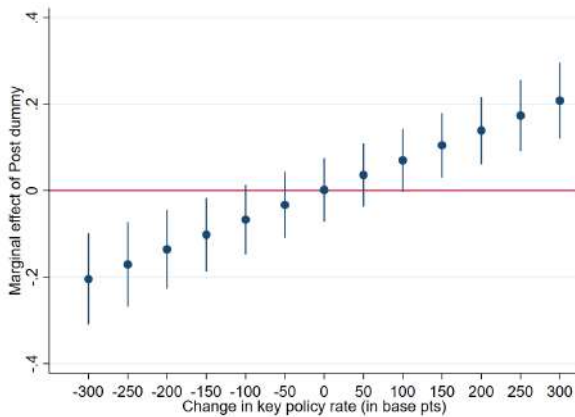
Main results

1. A change in MP affects managers' perceptions of credit constraints in developing countries

2. The effect occurs only when the rate change is substantial, i.e. more than 100-150 basis points

3. Symmetric effect (hikes and cuts)

4. The effect is most pronounced in the first month after the MP decision and tends to dissipate thereafter

5. We find no anticipation effect

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ROBUSTNESS CHECKS

We perform a series of robustness checks

1. Alternative windows (30, 45, 75, 90 days) ▸ Table

2. Alternative measures of dependent and interest variables ▸ Table

3. Taking into account the time elapsed since the last event ▸ Table

4. Alternative econometric specification ▸ Table

5. Sample dependence
   - Exclude events with insufficient number of observations ▸ Table
   - Exclude country by country ▸ Table

6. Falsification tests by considering other obstacles ▸ Table

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HETEROGENEITY ANALYSIS

- The interest of the heterogeneity analysis is to better understand when MP is most effective in shaping perceptions

- Firms are more likely to be sensitive to monetary policy when
  1. They rely on formal credit to finance their activities
  2. The transmission of monetary policy is effective (i.e., lenders, mostly banks in developing countries, respond to monetary policy)

- We examine both aspects by focusing on
  1. Firm-level characteristics (size, age, etc.)
  2. Country-level characteristics (financial system and CB independence)

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HETEROGENEITY ANALYSIS

Extension of the baseline model (triple difference framework)

$$\begin{aligned}
Y_{i,e,d} = \delta_e + &\beta_0 Post_{e,d} \\
&+ \beta_1 Post_{e,d} \times \Delta IR_e \\
&+ \beta_2 Post_{e,d} \times Z_{i/c} \\
&+ \beta_3 Post_{e,d} \times \Delta IR_e \times Z_{i/c} + \gamma \mathbf{X}_i + \varepsilon_{i,e,c,d}
\end{aligned} \quad (2)$$

- where $Z_{i/c}$ is the moderator effect at the firm (*i*) or country (*c*) level
- Expected results
    - β_1 is the effect of the event when the moderator $Z_{i/c}$ equals 0
    - β_3: Positive if the moderator $Z_{i/c}$ increases the effect of monetary policy changes on perceptions (negative if $\beta_3 < 0$)
    - β_0 and β_2 are not expected to be different from 0

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HETEROGENEITY ANALYSIS

Main results of the heterogeneity analysis

1 Firm-level characteristics ▸ Table
- Less financially constrained firms (old, large, male owned) and firms with a prior relationship with a bank (less financially constrained) are more sensitive to MP
- Implication: MP may affect the intensive margin (loan terms) more than the extensive margin (likelihood of getting a loan)

2 Country-level characteristics
- **1** Financial system ▸ Table
  - Significant effect (as predicted): Competition, excess liquidity (remittances)
  - Unclear (non-linear) effect: banking development
  - No effect: Share of foreign-owned banks
- **2** Central bank independence (credibility) ▸ Table
  - No effect if *de jure* measure
  - Strong effect if *de facto* measures

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FROM PERCEPTIONS TO BEHAVIORS

- What's about the impact of MP on manager's decision (behaviors)?

- We run the following model to provide an answer

$$Pr(Y_{ict} = 1) = \Phi(\alpha_c + \beta\Delta(IR)_{ct} + \Gamma C_{ct} + \Omega F_i) \qquad (3)$$

  - where i, c, and t refer to firm i in country c in year t
  - Y_{ict} is a dummy equals to one if a firm applied for a loan in year t
  - $\Delta(IR)_{ct}$ is the change in the policy rate in country c from the end of year $t-1$ to the end of year t
  - α_c is a country FE, and other variables are firm (F_i) and country (C_{ct}) controls

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FROM PERCEPTIONS TO BEHAVIORS

Table: Effect of MP on manager's behavior

	(1)	(2)
Δ(IR)	-0.000063**	-0.000134***
	(0.000026)	(0.000046)
Controls	Yes	Yes
Country FE (α_c)	Yes	Yes
Sample	All	Rest.
Observations	35,684	28,072
Mean(Y)	0.371	0.376

- Results meet expectations
- Empirical model is only indicative
    - Major limitation : we cannot know when a firm applied (before or after a monetary policy change)
    - Downward bias is expected (some controls are considered as treated)

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CONCLUSION

- Paper adopts a new approach to shed light on the effectiveness of monetary policy in developing countries
  - Focus on the demand side (potential borrowers)
  - Examine changes in perceptions over a limited window around an event
  - Take advantage of the cross-country nature of the database, rather than focusing on a single event

- Main findings
  1. Firms respond to MP in developing countries when policy rate changes are sufficiently important (100 or 150 BP)
  2. The effect of MP is symmetric
  3. It is stronger for firms with a prior relationship with a bank and in countries with competitive banking markets and an independent CB
  4. We also show an effect on behavior (decision to apply)

- Beyond our paper
  - Our work is a first attempt to use (reconstructed) high frequency and survey data to analyze the impact of monetary policy in developing countries
  - Future work could follow this path to better identify the effects of short-term policy

THANK YOU FOR YOUR ATTENTION

SAMPLE

Panel B: Two (non-overlapping) events

Panel C: Two overlapping events

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IDENTIFICATION STRATEGY

Table: Balance test

	Before	After	Coefficient	p-value	Obs.
	(1)	(2)	(3)	(4)	(5)
Size	81.45	98.96	11.39	0.118	28,813
Age	18.53	18.22	-0.823	0.081	26,920
Female	0.295	0.288	-0.011	0.194	27,449
Manag Exp	17.58	17.22	-0.011	0.968	28,361
Foreign	0.081	0.083	0.005	0.398	29,021
State	0.014	0.008	-0.002	0.069	29,021
Manufacturing	0.045	0.049	-0.004	0.854	29,021
Listed	0.183	0.193	0.007	0.259	28,918
Partnership	0.308	0.285	0.004	0.577	28,918
Sole Prop.	0.161	0.159	-0.031	0.027	28,918
Multiplant	0.223	0.217	-0.008	0.384	28,279
Export	0.545	0.550	0.008	0.486	28,712
Other constraints	1.214	1.231	0.042	0.297	29,020

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Table: Alternative windows

	30	45	60	75	90
Post	0.028	-0.000	0.00135	0.00577	0.0182
	(1.01)	(-0.01)	(0.04)	(0.14)	(0.43)
Post x Δ(IR)	0.00054***	0.00065***	0.00069***	0.00063***	0.00051***
	(2.62)	(6.44)	(6.43)	(5.02)	(3.11)
Obs.	19123	22021	23751	23930	23982
# countries	63	63	63	63	60
# events	217	174	149	138	114

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Table: Alternative dependent and interest variables

$Y \rightarrow$	Alt. dependent var.			Alt. treatment var	
	Dummy	Dummy	Rel.	Scale	Scale
$\Delta(IR)$	Abs.	Abs.	Abs.	Rel.	Rel.
Method	OLS	Probit	OLS	OLS	OLS
	(1)	(2)	(3)	(4)	(5)
Post	-0.0050	0.0071	-0.0045	0.0366	0.0099
	(-0.47)	(0.16)	(-0.12)	(0.78)	(0.25)
Post $\times \Delta(IR)$	0.00010*	0.00069***	0.00065***	0.0034***	0.0029***
	(1.68)	(3.53)	(4.82)	(5.37)	(5.13)
Event FE	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	No	Yes
Obs.	23,751	23,751	23,751	29,021	23,751

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Table: Duration since the last event

Duration (days) →	120	150	180	210	240
Panel A: $\Delta(IR) > 100pp$					
-Post	-0.0581	-0.0735	-0.0735	-0.0735	-0.0813
-Post*Hike	0.120	0.132*	0.138*	0.142*	0.150**
-Post*Threshold	-0.128	-0.156**	-0.156**	-0.156**	-0.216***
-Post*Hike*Threshold	0.279**	0.359***	0.382***	0.379***	0.438***
Panel B: $\Delta(IR) > 150pp$					
Duration (days) →	120	150	180	210	240
-Post	-0.0604	-0.0813	-0.0813	-0.0813	-0.0813
-Post*Hike	0.124	0.145*	0.150**	0.150**	0.150**
-Post*Threshold	-0.190***	-0.215***	-0.216***	-0.216***	-0.216***
-Post*Hike*Threshold	0.385***	0.410***	0.438***	0.438***	0.438***
Panel C: $\Delta(IR) > 200pp$					
Duration (days) →	120	150	180	210	240
-Post	-0.0673	-0.0867	-0.0867	-0.0867	-0.0867
-Post*Hike	0.136*	0.156**	0.156**	0.156**	0.156**
-Post*Threshold	-0.182***	-0.622***	-0.622***	-0.622***	-0.622***
-Post*Hike*Threshold	0.443***	0.884***	0.884***	0.884***	0.884***

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Table: Alternative empirical methods

	Ord. Probit (1)	OLS (2)	OLS (3)
Post	0.0032	-0.0171	-0.0157
	(0.09)	(-0.50)	(-0.44)
Post $\times \Delta(IR)$	0.00080***	0.00076***	0.00072***
	(7.55)	(7.11)	(7.15)
Control	Yes	Yes	Yes
FE	Event	Year	Ctry-year
Obs.	23,751	23,751	23,751

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Table: Sample dependence

	Threshold					Weighted obs.
	50	100	150	200	250	
	(1)	(2)	(3)	(4)	(5)	(6)
Post	0.00165	0.00544	-0.00218	-0.0111	-0.00640	-0.0108
	(0.04)	(0.14)	(-0.05)	(-0.26)	(-0.14)	(-0.26)
Post x∆(IR)	0.00070***	0.00071***	0.00072***	0.00075***	0.00073***	0.00053**
	(6.26)	(5.98)	(5.96)	(6.14)	(6.07)	(2.46)
Obs.	22,823	20,837	19,061	17,157	14,964	23,751

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Table: Country exclusion

Country	*Post*		$Post \times \Delta(IR)$	
excluded	β_0	$t_{\beta 0}$	β_1	$t_{\beta 1}$
Kazakstan	0.0318	1.02	0.00065***	5.86
Russia	-0.0262	-0.83	0.00065***	7.62
Kenya	0.0089	0.23	0.00066***	6.24
Uganda	0.0039	0.10	0.00067***	6.19
Mongolia	0.0051	0.14	0.00067***	6.39
Baseline	**0.0014**	**0.04**	**0.00069*****	**6.43**
Ukraine	-0.0028	-0.07	0.00070***	6.49
Argentina	0.0035	0.09	0.00070***	6.31
Pakistan	-0.0032	-0.08	0.00071***	6.47
Tunisia	-0.0024	-0.06	0.00072***	6.60
Moldova	-0.0057	-0.15	0.00073***	6.67
Turkey	0.0035	0.10	0.00080***	4.08

Countries are rnaked according to whether their exclusion affects the coefficient associated with β_3. Table reports only the five countries for whose exclusion reduced (top of the table) or increased (bottom) the most coefficient β_3.

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Table: Falsification tests

| Obstacle | *Post* | | *Post* $\times \Delta(IR)$ | | Obs. | R2 | Aver. |
	Coef.	t	Coef.	t			
All (average)	0.0312	(0.66)	0.00018	(0.69)	23,781	0.210	1.181
Tax (rate)	0.1170	(1.34)	-0.00008	(-0.20)	23,482	0.159	1.722
Corruption	0.0412	(0.49)	0.00006	(0.15)	22,974	0.180	1.625
Pol instability	0.0403	(0.67)	0.00025	(0.58)	23,332	0.238	1.584
Electricity	0.0215	(0.35)	0.00036	(1.21)	23,651	0.168	1.510
Workforce	0.0527	(0.94)	0.00059***	(4.15)	23,250	0.133	1.228
Tax (adm)	0.0978*	(1.87)	-0.00015	(-0.35)	23,385	0.122	1.227
Transport	0.0167	(0.26)	-0.00005	(-0.13)	23,410	0.100	1.112
Crime	-0.0011	(-0.02)	0.00008	(0.27)	23,484	0.144	0.997
Business Lic	0.0446	(0.91)	0.00000	(0.01)	23,042	0.122	0.965
Land	0.0525	(0.87)	0.00059**	(2.35)	22,796	0.106	0.934
Labor Reg.	0.0097	(0.17)	0.00040	(1.83)	23,518	0.164	0.924
Custom	0.0093	(0.22)	0.00007	(0.22)	21,453	0.137	0.901
Telecom	-0.0275	(-0.57)	0.00022	(0.85)	14,339	0.161	0.842
Courts	-0.0392	(-1.40)	0.00010	(0.78)	22,163	0.156	0.809

Table: Heterogeneity: Firm characteristics

Z → Var. type	(1) Size Cont.	(2) Age Cont.	(3) Foreign Dummy	(4) Multi-plant Dummy	(5) Female Dummy	(6) Has a loan Dummy
$Post \times \Delta(IR)$	0.000607***	0.000441***	0.000662***	0.000697***	0.000811***	0.000468***
	(5.62)	(2.79)	(6.25)	(6.38)	(7.32)	(2.75)
$Post \times \Delta(IR) \times Z$	0.000001*	0.000013*	0.000220	-0.000256	-0.000589***	0.000427*
	(1.94)	(1.69)	(0.44)	(-1.24)	(-2.75)	(1.80)
Observations	23514	23514	23514	23514	23514	23037
Adjusted R^2	0.296	0.296	0.296	0.296	0.296	0.299

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Table: Heterogeneity: Financial system characteristics

	(1)	(2)	(3)	(4)
Z $\rightarrow$	Priv. Credit to GDP	Conc. ratio	Foreign banks	Remittance
Var. type	Cont.	Cont.	Cont.	Cont.
Post x $\Delta(IR)$	0.00094***	0.00307***	0.00091	0.00102***
	(3.12)	(2.63)	(0.67)	(6.90)
post x $\Delta(IR)$*Z	-0.00001	-0.00003**	-0.00000	-0.00016*
	(-0.99)	(-2.00)	(-0.04)	(-1.93)
Observations	23,502	21,808	8,072	23,514
Adjusted R-squared	0.296	0.294	0.252	0.297

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Table: Heterogeneity: Central bank independence

	(1)	(2)	(3)	(4)
Z →	CBIE	TOR	TOR decade	Irregular turnover
Var. type	Cont.	Cont.	Cont.	Dummy
Post x $\Delta(IR)$	0.001	0.002***	0.001***	0.001***
	(1.31)	(3.75)	(3.56)	(4.77)
Post x $\Delta(IR)$*Z	-0.001	-0.005***	-0.004*	-0.001***
	(-0.76)	(-2.67)	(-1.66)	(-4.48)
Observations	14531	15507	15410	15410
Adjusted R-squared	0.269	0.258	0.260	0.260

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