Global Monetary Spillovers: Shocks and Vulnerabilities

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Motivation

- The spillovers to emerging market economies (EMs) from shifts in U.S. monetary policy are enhanced by EMs own vulnerabilities
  - Ahmed et al. (2017), Iacoviello and Navarro (2018), Hoek et al. (2020)
  - Akinci and Queralto (2020)

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- Open Questions:
  - How does the *real macroeconomic effect* of a U.S. monetary policy on EMs differ depending on the context in which U.S. tightening is taking place?
  - How does the source of U.S. monetary actions interact with countries' vulnerabilities in determining how U.S. monetary changes transmit to EMs?

What We Do

- Incorporate key EM vulnerabilities into an open economy DSGE model:
  1. Fragile private sector balance sheet positions due to currency mismatch
  2. Inability to invoice exports in their own currency
  3. Unanchored inflation expectations due to imperfect CB credibility

What We Do

- Incorporate key EM vulnerabilities into an open economy DSGE model:
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- Investigate consequences of these features for spillovers from U.S. monetary policy when U.S. policy changes are driven by:
  - Stronger U.S. demand, or
  - Sudden shift in policymakers' preferences towards inflation stabilization (i.e., a more-hawkish U.S. policy stance)

Outline

Are Inflation Expectations Anchored in EMs?

- Regress the first diff. of inflation expectations on the first diff. of a 3-year moving average of headline inflation (Levin, Natalucci and Piger (2004))

$$\Delta \mathbb{E}_t \pi_{t+h,i} = \alpha_i + \beta_i \Delta \bar{\pi}_{t,i} + \epsilon_{t,i}$$

  - $\mathbb{E}_t \pi_{t+h,i}$ is h-period-ahead survey inflation expectations at time t in country i
  - $\bar{\pi}_{t,i}$ is a three-year moving avg. of CPI inflation in country i ending at time t

- Long term (6-10 years ahead) inflation expectations data collected by Consensus Economics, starting from early 1990s

Empirical Results - I

Table: 6- to 10-year-ahead expectations (1993-2019)

	(1) IT adv.	(2) IT eme.	(3) IT and non-IT eme.
$\Delta\bar{\pi}_{it}$	0.0477	0.153**	0.187***
	(1.57)	(2.91)	(5.03)
Constant	-0.00571	-0.0430	-0.0309
	(-1.48)	(-1.33)	(-1.16)
Observations	400	1010	1412

Dependent variable is $\Delta\mathbb{E}\pi_{i,6,t}$. Linear interpolation to quarterly freq.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

IT-AE: Australia, Canada, New Zealand, Sweden, United Kingdom.
IT-EM: Brazil, Chile, Columbia, Czech, Hungary, Korea, Mexico, Peru, Philippines, Poland, Thailand, Turkey.
Non-IT-EM: Argentina, Indonesia, Malaysia, Romania, Singapore, Slovakia, Taiwan, Ukraine.

Empirical Results - II

Table: 6- to 10-year-ahead expectations (2004-2019)

	(1) IT adv.	(2) IT eme.	(3) IT and non-IT eme.
$\Delta\bar{\pi}_{it}$	0.0222	0.0857*	0.0629*
	(0.67)	(2.28)	(2.22)
Constant	-0.000985	-0.00947	0.00260
	(-0.26)	(-0.60)	(0.11)
Observations	312	798	1122

Dependent variable is $\Delta\mathbb{E}\pi_{i,6,t}$. Linear interpolation to quarterly freq.

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Main Takeaway

- Expectations are better anchored in the more recent period compared to their crisis-prone times in the past, but are still correlated with "headline" inflation
  - Potential implication: Countercyclical monetary policy is not prevalent in many EMs (see, Kaminsky, Reinhart and Vegh (2004))

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Baseline Model

- **EM banks** issue domestic currency and dollar-denominated debt – financial frictions for the latter are more severe (as in Akinci and Queralto (2020))

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- **EM Firms** borrow from banks to finance their purchase of capital
- **Monetary policy in each country** (π_t : domestic inflation, x_t : output gap):

$$R_{t+1}^n = \left(R_t^n\right)^{\gamma_r} \left(\beta^{-1} \pi_t^{\gamma_\pi} x_t^{\gamma_x}\right)^{1-\gamma_r} \varepsilon_t^r,$$

Baseline Model: Capital Market Imperfections

- UIP deviations: $\mu_t^* \equiv \hat{r}_t - (\hat{r}_t^* + \mathbb{E}_t \{\Delta \hat{s}_{t+1}\})$
- Credit Spreads: $\mu_t \equiv \mathbb{E}_t \hat{r}_{kt+1} - \hat{r}_t$
- Bank Net worth : $\hat{n}_t \approx \sigma_b \{\phi [(\hat{r}_{kt} - \hat{r}_t) - x (\hat{r}_t^* - \Delta \hat{s}_t - \hat{r}_t)] + \hat{r}_t + \hat{n}_{t-1}\}$
  - where s_t is the value of U.S. dollar per unit of home currency.

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- **Perfect capital markets** $\rightarrow \mu_t = \mu_t^* = 0$ and net worth irrelevant
- **Imperfect capital markets** $\rightarrow \mu_t$ & $\mu_t^* > 0$ and rise with lower net worth
  - Three-way interaction between net worth, credit spread, and currency values

Baseline Model: New Keynesian Phillips Curve

- Prices are sticky *ala* Calvo
- Firms who are not setting prices optimally index their prices to past inflation ("backward indexation" in NKPC)
- Rational expectations
  - NKPC in the baseline model:

$$\hat{\pi}_t = \frac{\kappa}{1+\beta\iota_p}\left(\hat{mc}_t - \hat{p}_{dt}\right) + \frac{\iota_p}{1+\beta\iota_p}\hat{\pi}_{t-1} + \frac{\beta}{1+\beta\iota_p}\mathbb{E}_t\left\{\hat{\pi}_{t+1}\right\}$$

where $\kappa \equiv \frac{(1-\xi_p)(1-\beta\xi_p)}{\xi_p}$

Model with Imperfect Central Bank Credibility

Allow for a belief mechanism that is a hybrid of adaptive and rational expectations (as in Arias et al. (2016) and Gertler (2017)):

$$\tilde{\mathbb{E}}_t \left\{ \hat{\pi}_{t+1} \right\} = \iota \pi_t^D + (1 - \iota) \mathbb{E}_t \left\{ \hat{\pi}_{t+1} \right\}$$

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where

$$\pi_t^D = (1-\zeta)\overline{\pi_t} + \zeta \overline{\pi}_t^{CB}$$

$$\overline{\pi}_t = \frac{1}{k}\sum_{j=0}^{k-1} \hat{\pi}_{ct-j}$$

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- ι captures a degree of adaptive expectations
- ζ captures a degree to which private agents assign weight to Central Bank communication on inflation guidance (For now, $\zeta = 0$)

Outline

I. Vulnerable EMs featues higher dollar borrowing

- Higher ratio of dollar debt than nonvulnerable economies

Table: Calibration Targets

Variables	**Non-vulnerable**	**Vulnerable**	**U.S.**
Real interest rate	2.275	3.4	2
Foreign funding ratio	5	25	–
Leverage	5	5	4
Noncore funding ratio	6	30	–
Credit Spread	200	200	75
Exports/GDP	14	14	9

II- Vulnerable EMs feature dominant currency pricing

- Forced to price their exports in dollars, whereas producer country pricing applies to the exports of non-vulnerable economies
  - Each EM firm j sets dollar price $P^*_{Mt}(j)$, s.t. Calvo friction
  - U.S. exporters practice Producer Currency Pricing
  - Casas, Díez, Gopinath, Gourinchas & Plagborg-Møller '17

III. Vulnerable EMs features Imperfects CB credibility

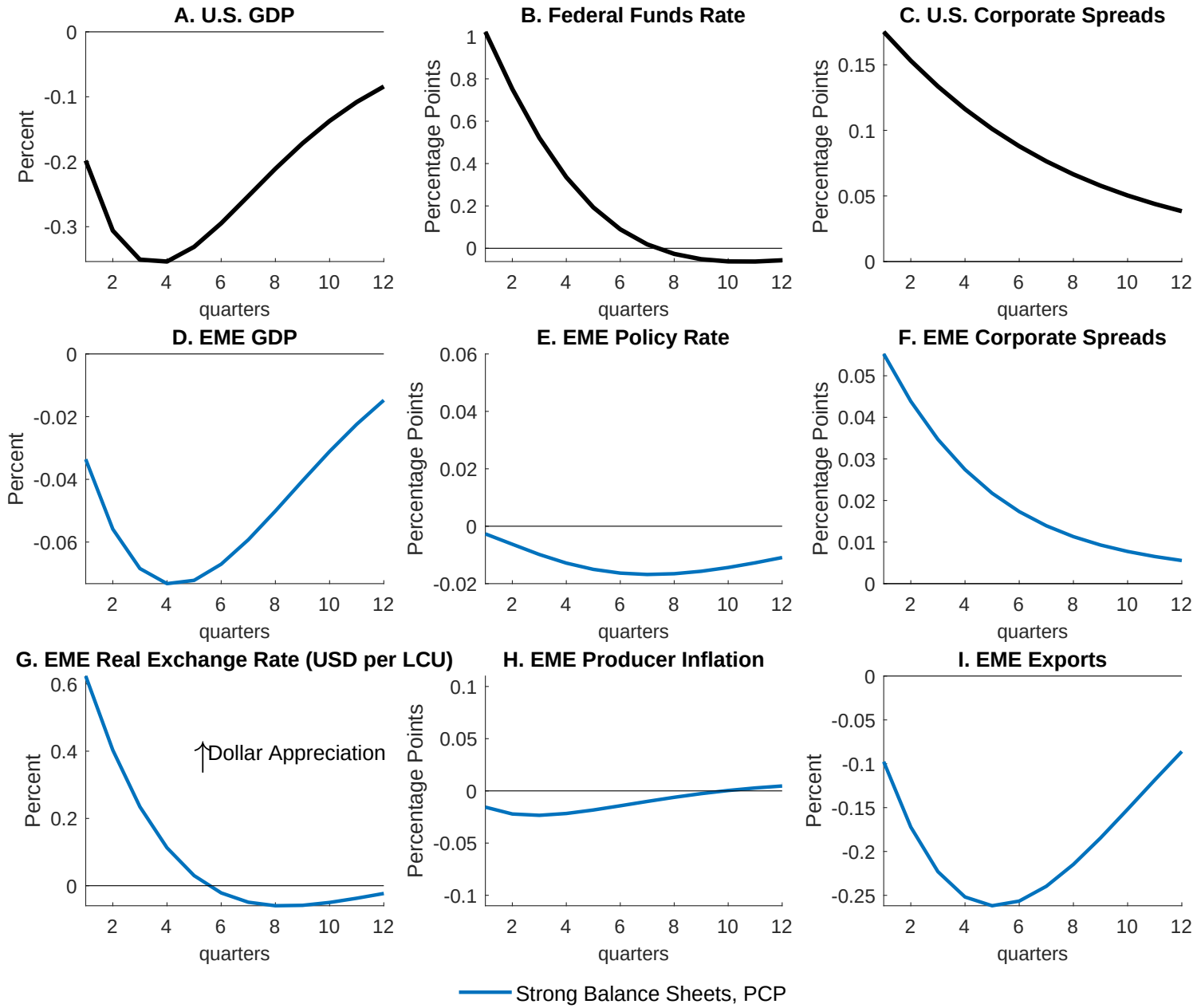
- Adaptive Expectations and indexation to "Headline" inflation

$$\hat{\pi}_t = \frac{\kappa}{1+\beta}\left(\hat{mc}_t - \hat{p}_{dt}\right) + \frac{1}{1+\beta}\hat{\pi}_{ct-1} + \iota\frac{1}{k}\sum_{j=0}^{k-1}\hat{\pi}_{ct-j} + \frac{\beta(1-\iota)}{1+\beta}\mathbb{E}_t\left\{\hat{\pi}_{t+1}\right\}$$

- Exchange rate stabilization motive in their monetary policy rule (fairly small)

Outline

Figure: U.S. Monetary Shock and Country Vulnerabilities



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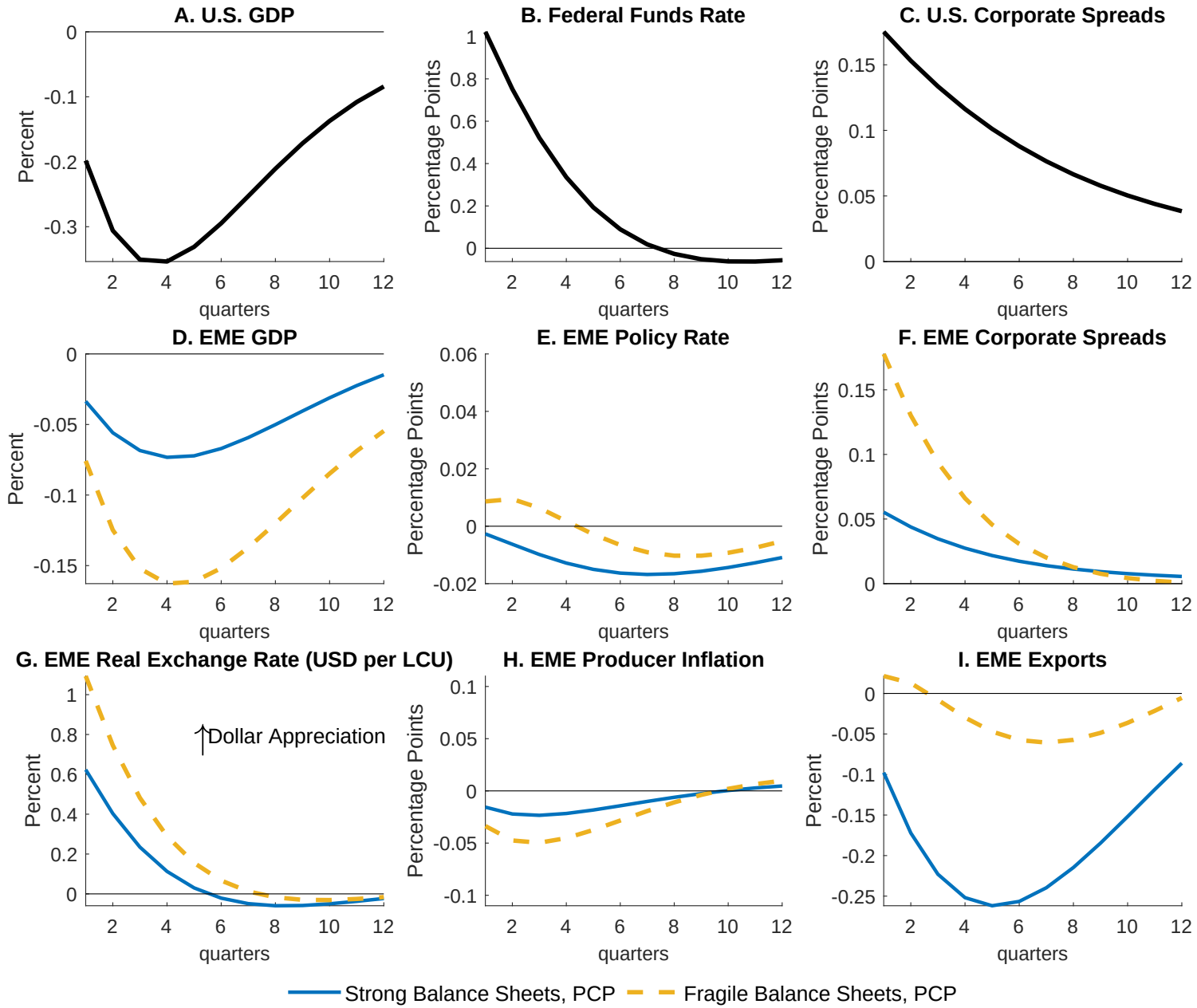

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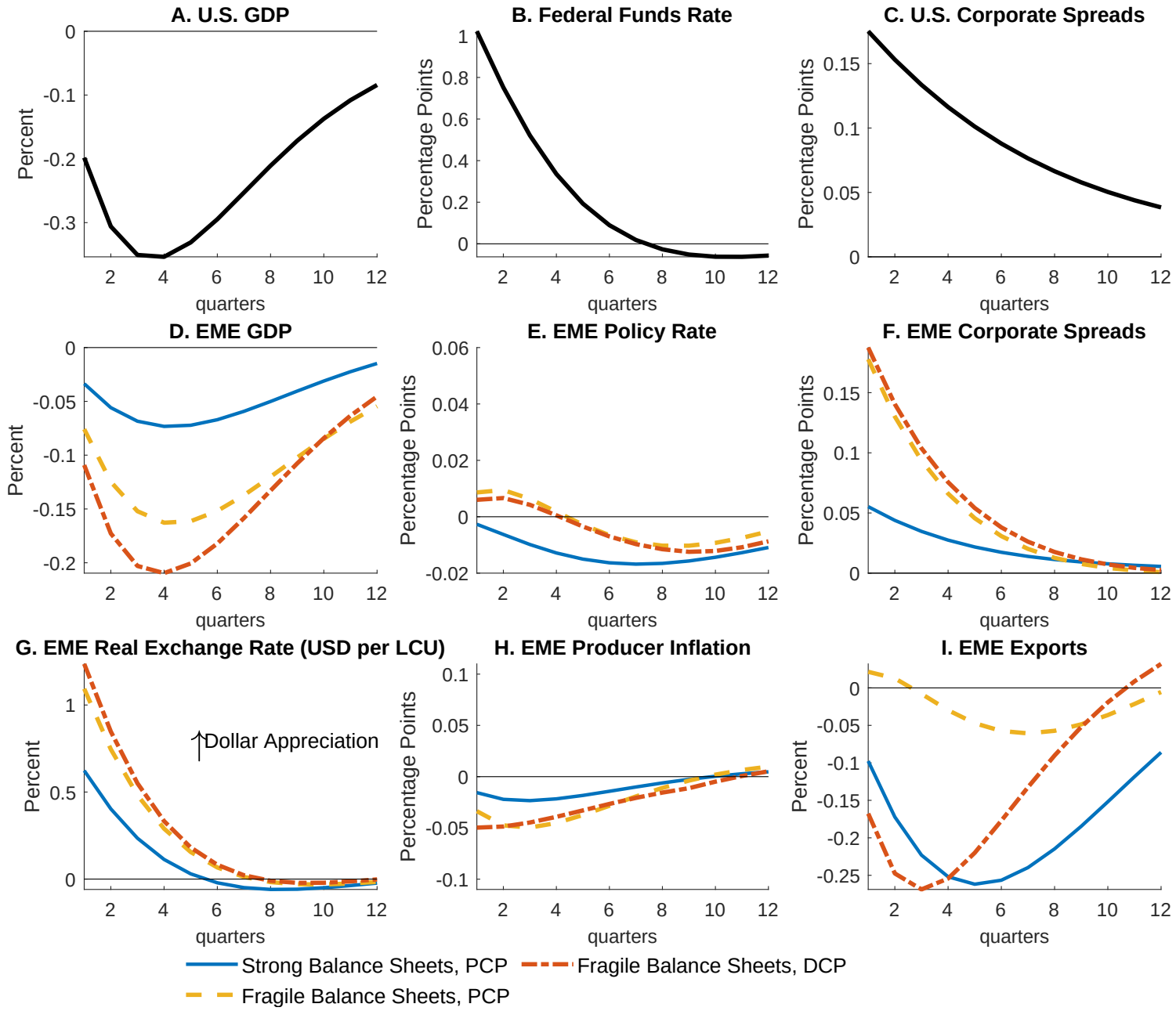

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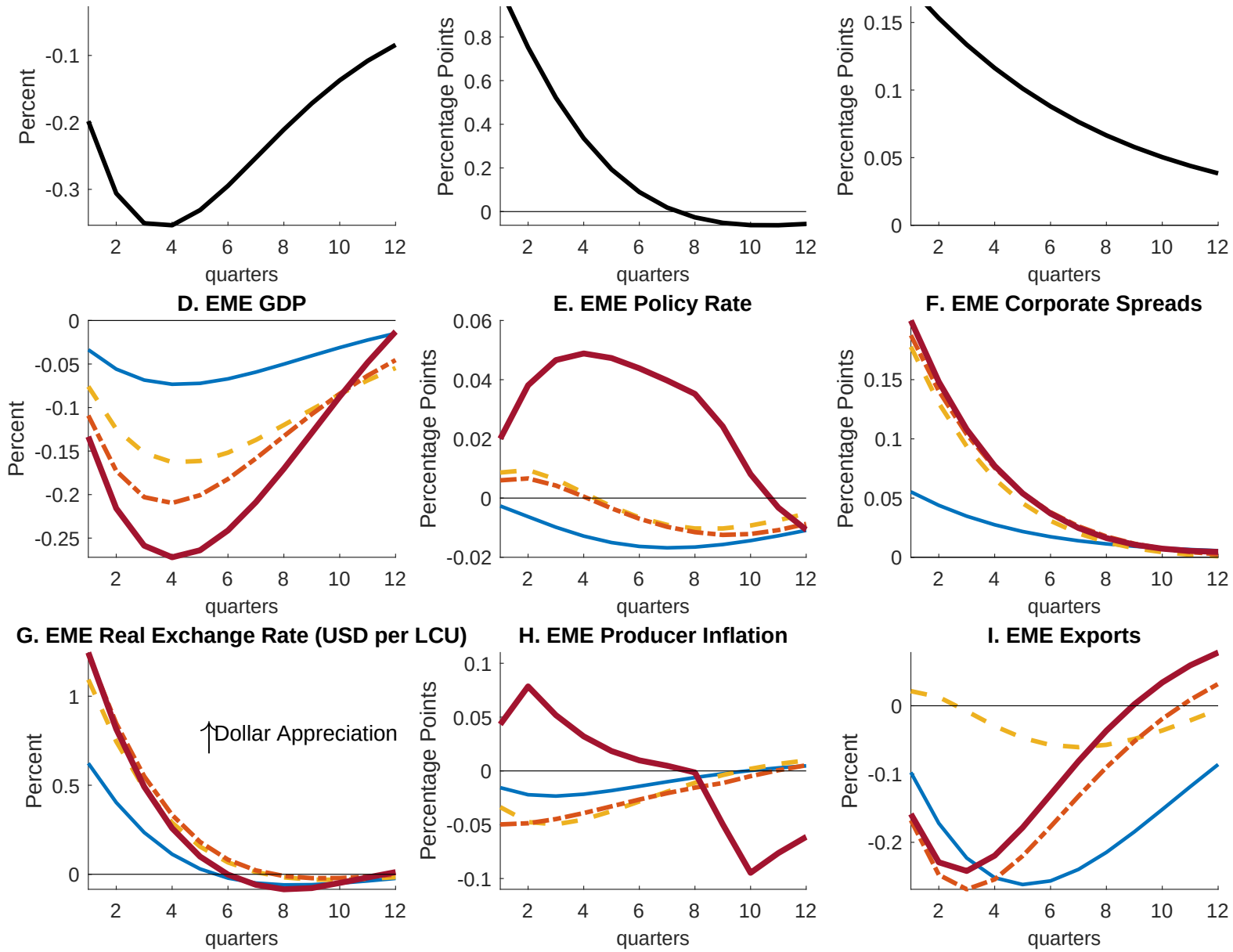

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Figure: U.S. Monetary Tightening Driven By Stronger U.S. Aggregate Demand

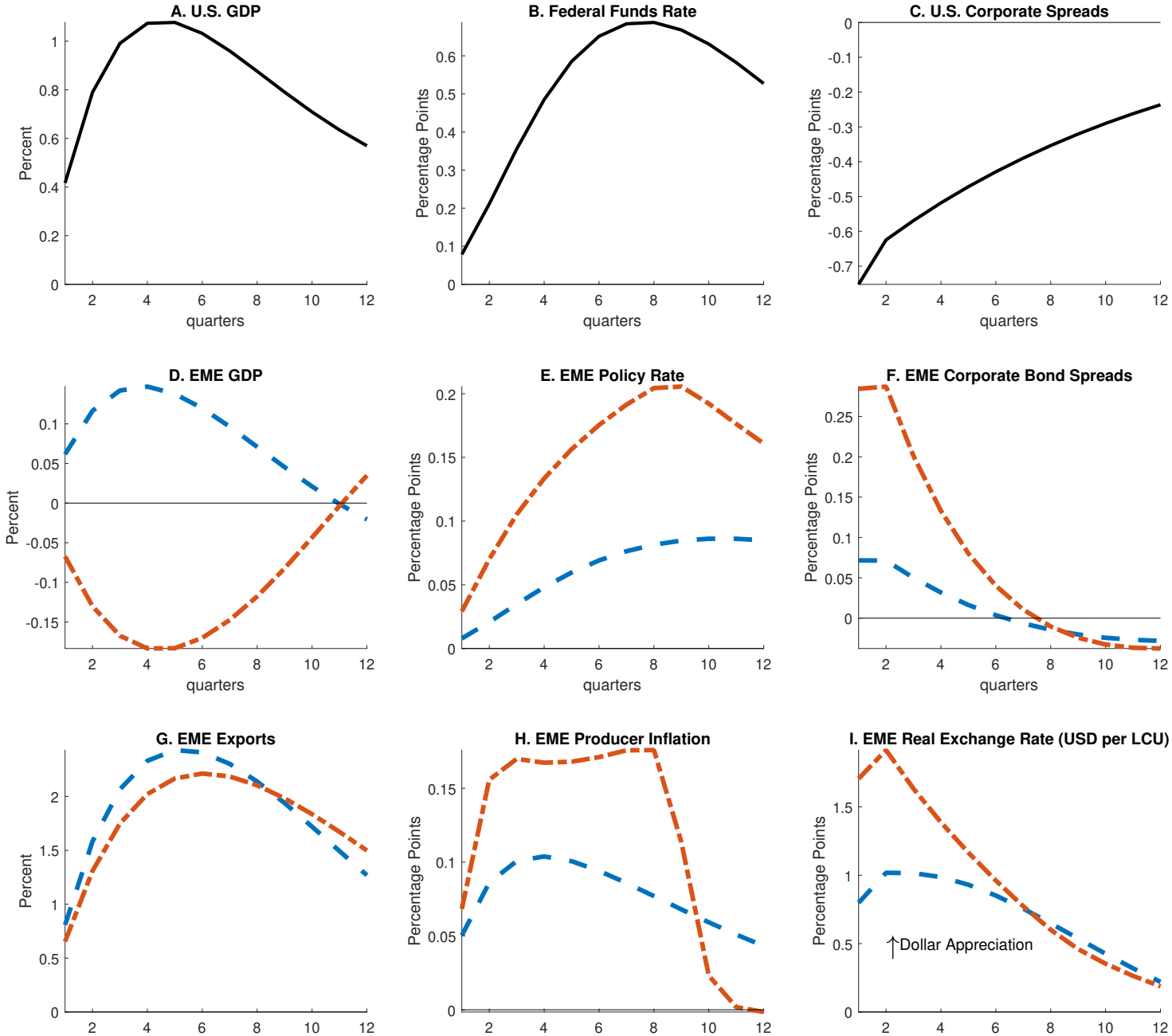
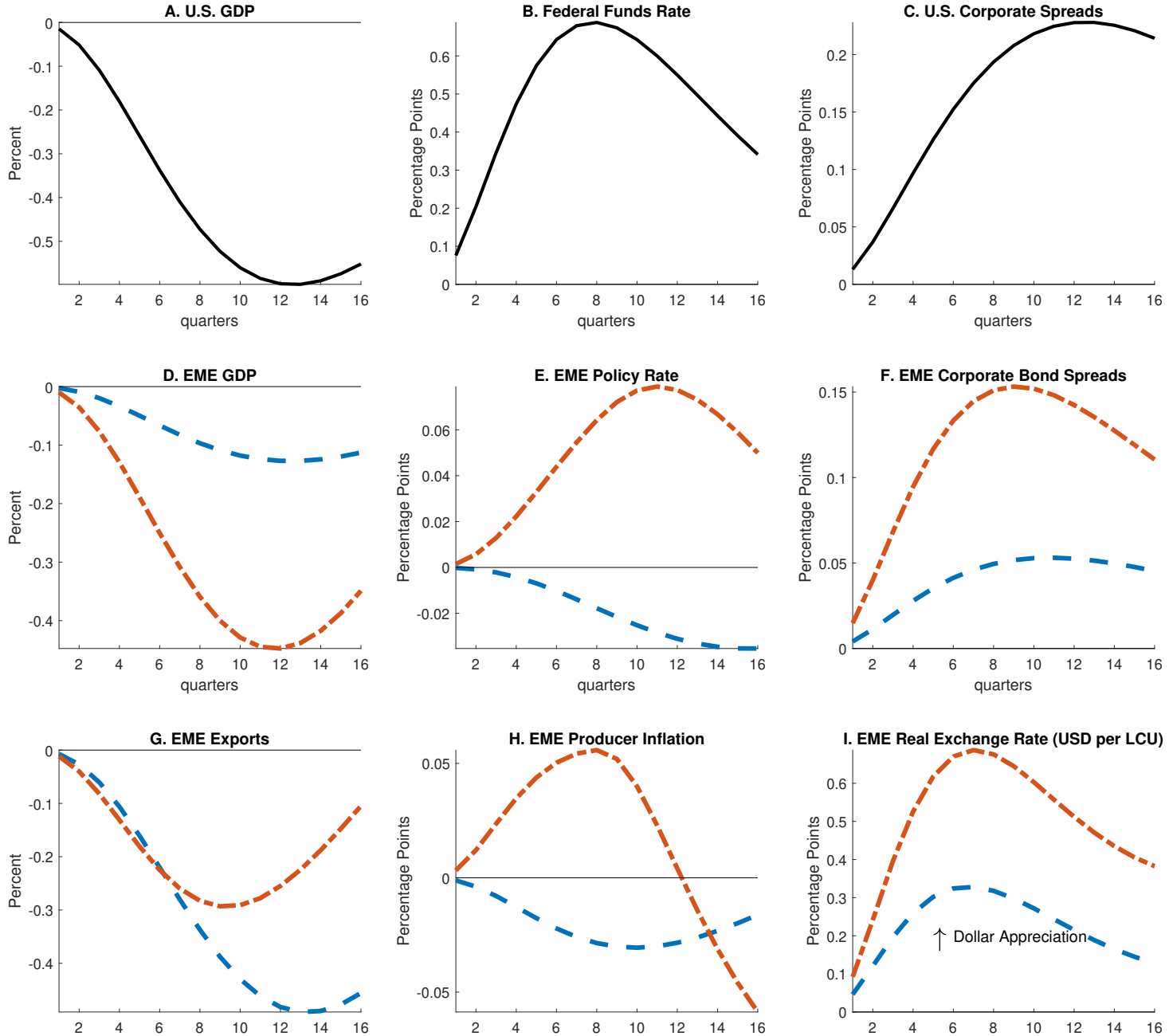


Figure: U.S. Monetary Tightening Driven By More-Hawkish Policy Stance



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The Role of Better Central Bank Communication

- Consider Central Bank Inflation guidance has a larger weight in expectation formation, due to, for example, better communication ($\zeta \neq 0$):

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- Important step forward towards ability to implement "countercylical" policies