Has Globalization Changed the Inflation Process?

Comments
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Overview

- Examine the relationship between inflation and domestic versus global economic factors.
- Motivation: Relationship between domestic inflation and domestic slack appears to have weakened.
- Is this because of increased globalization?
  - Trade.
  - Global supply chains.
  - Global growth and commodity price cycle.
  - Common monetary policy.

Broader Context

- Missing deflation puzzle during Great Recession in the U.S.
- Similar evidence of missing deflation during eurozone crisis.
- Missing inflation during the recent recovery and expansion?

Approach

- Global factor analysis.
- Phillips curve estimation
- Trend-cycle decomposition of inflation.

Findings: Global Factor Analysis

- Global factor accounts for 40-50% of variation in CPI and PPI Inflation.
- Global factor accounts for only 20% of variation in both core and wage inflation.
- Post 2000:
  - Dramatic increase in importance of global factor for CPI (from 30 to 60 percent).
  - Suggests global cycle matters primarily for food and energy.

Phillips Curve Estimation

- Full-sample estimation:
  - Domestic and global output gaps are important determinants of both CPI and Core Inflation.
  - Real exchange rate and commodity prices have significant but economically modest effects.
- Post 2000:
  - World output gap and commodity price effects become much more important for CPI inflation.
  - World output gap and commodity price effects become much less important for Core inflation.
- Results are broadly consistent with global factor analysis.

Additional results:

- Price dispersion has positive effect but only matters in pre 2000 period – is this consistent with increased global competition?
- Domestic slack matters much less for core inflation during post 2000 period.
- Country level analysis results vary widely – hints at power of using cross-section for identification.
- Trend-cycle results also imply strong response of cyclical component to inflation expectations and domestic slack.
  - Can we distinguish inflation expectations from trend – two-sided filter?
  - World output gap only matters for core inflation and only in post-2000 sample – consistency with Phillips curve estimates?

Why is inflation process so hard to identify?

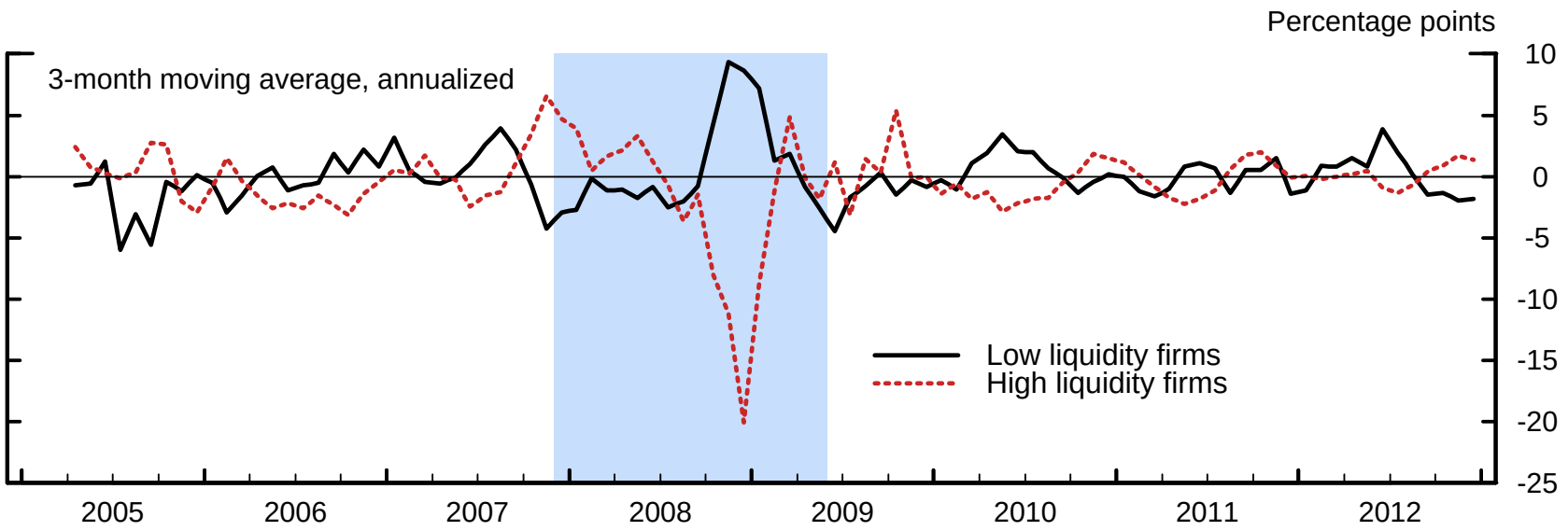
- Mix of supply and demand shocks drive inflation-output dynamics.
- Inflation expectations are sluggish and self-fulfilling.
- Country-level data may suffer from endogeneity with monetary policy (Tenreyro 2018).
- Financial factors cloud the relationship.

Financial factors and Inflation Dynamics:
Gilchrist and Zakrajsek (2010), Gilchrist, Schoenle, Sim and Zakrajsek (2012, 2018)

- Customer markets – sell more today and build customer base for tomorrow.
  - Reducing price is an investment in future market share.
- When financial conditions deteriorate, firms raise markups to increase current cash flow at the expense of future market share.
- Implications: financial frictions attenuate the relationship between economic slack and inflation – Phillips curve is flatter.

Relative Inflation

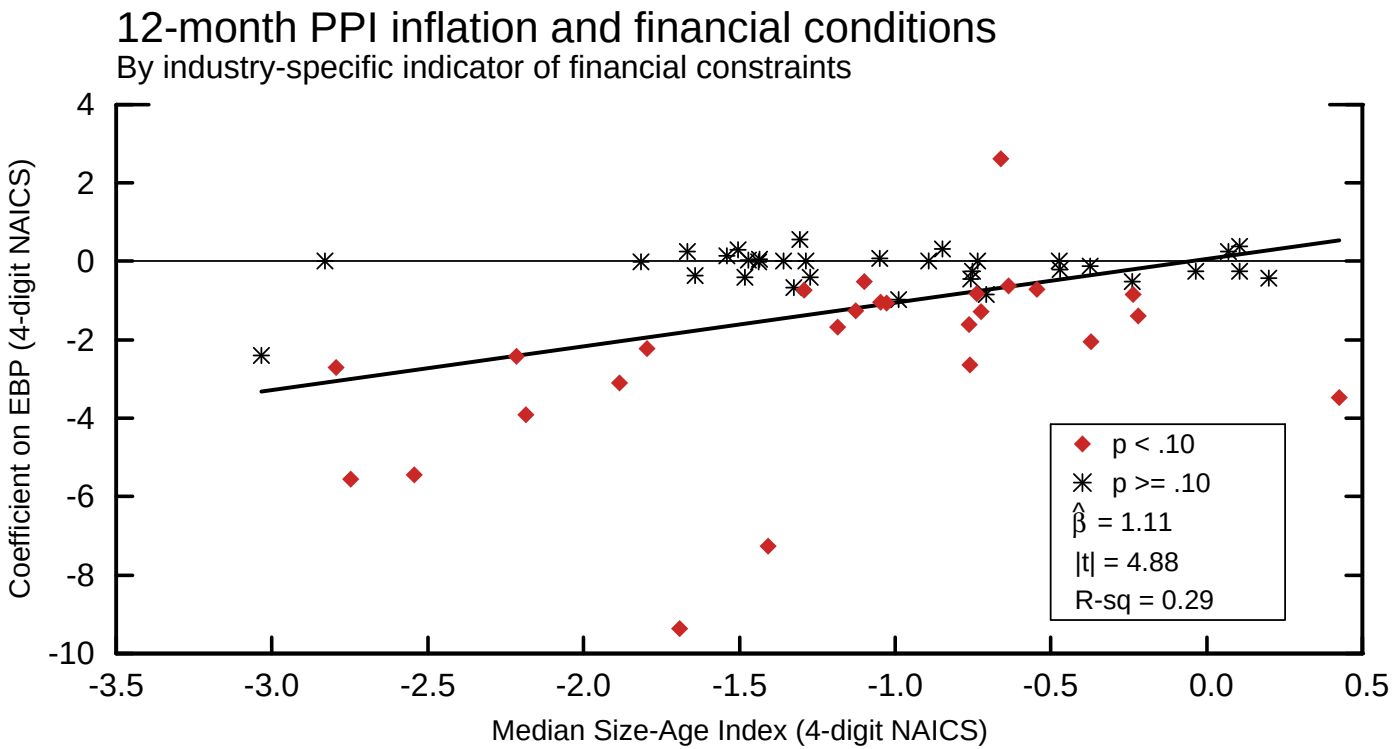
Financially unconstrained vs constrained firms



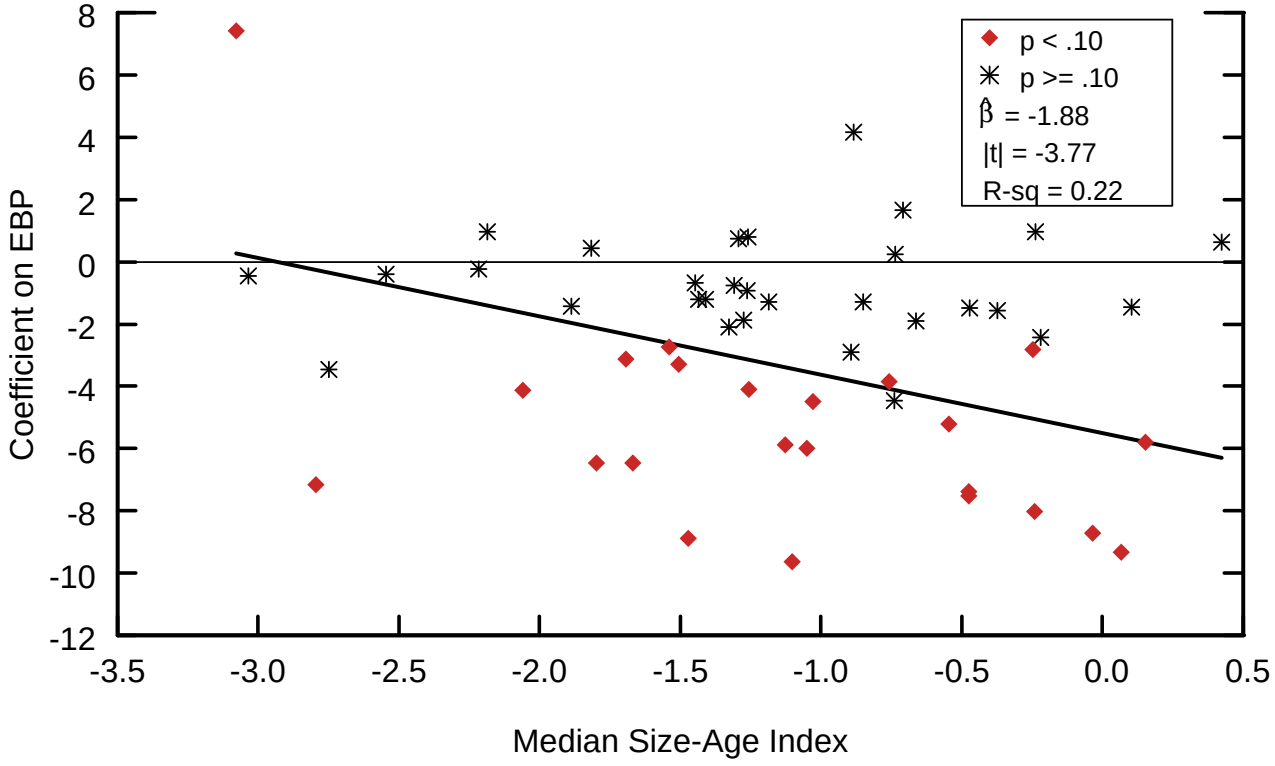
NOTE: Weighted average monthly inflation relative to industry (2-digit NAICS) inflation.

U.S. Industry-Level Inflation Response to EBP

Gilchrist and Zakrajsek (2010)



U.S. Industry-Level Output Response to EBP



Phillips Curve Estimates: U.S. Industry-Level Data

	1973-2014			1973-2006		
$(Y_{jt} - \bar{Y}_{jt})$	0.077	0.071	0.068	0.078	0.072	0.068
	(0.011)	(0.011)	(0.011)	(0.013)	(0.013)	(0.013)
EPB_t		-1.566	-3.505		-1.123	-2.966
		(0.143)	(0.375)		(0.197)	(0.502)
$EBP_t * SA_j$			3.506			3.381
			(0.627)			(0.847)
R^2	0.107	0.114	0.115	0.098	0.100	0.101

Note: SA_j varies between 0 (least constrained) to 1 (most constrained).

$$\pi_{jt+1} = \rho\pi_{jt} + \alpha(Y_{jt} - \bar{Y}_{jt}) + \beta EBP_t + \gamma EBP_t SA_j + \varepsilon_{j,t}$$

Euro area Inflation Dynamics

- Panel-versions of price and wage Phillips Curves:

$$\pi_{it} = \alpha_i + \beta\pi_{i,t-1} + \lambda(u_{it} - \bar{u}_{it}) + \phi\Delta\text{VAT}_{it} + \psi\mathbf{1}[i \in \,] + \epsilon_{it};$$

$$\Delta w_{it} = \alpha_i + \beta\pi_{i,t-1} + \lambda(u_{it} - \bar{u}_{it}) + \phi\Delta\tilde{z}_{it} + \psi\mathbf{1}[i \in \,] + \epsilon_{it};$$

- Countries: AUT, DEU, BEL, FIN, FRA, NLD, GRC, IRL, ITA, ESP, PRT
- Estimation period: 1970–2007

Estimated Euro Area Phillips Curves

Gilchrist, Schoenle, Sim and Zakrajsek (2018)

	Prices		**Wages**	
Explanatory Variables	(1)	(2)	(3)	(4)
$(u_{it} - \bar{u}_{it})$	-0.273	-0.529	-0.559	-0.659
	(0.117)	(0.127)	(0.096)	(0.118)
$\pi_{i,t-1}$	0.845	0.813	0.763	0.745
	(0.046)	(0.046)	(0.057)	(0.050)
$\Delta\tilde{z}_{it}$	.	.	0.689	0.668
Adj. R^2	0.839	0.845	0.858	0.872

NOTE: Time-clustered standard errors in parentheses.

Financial Conditions and PC Prediction Errors

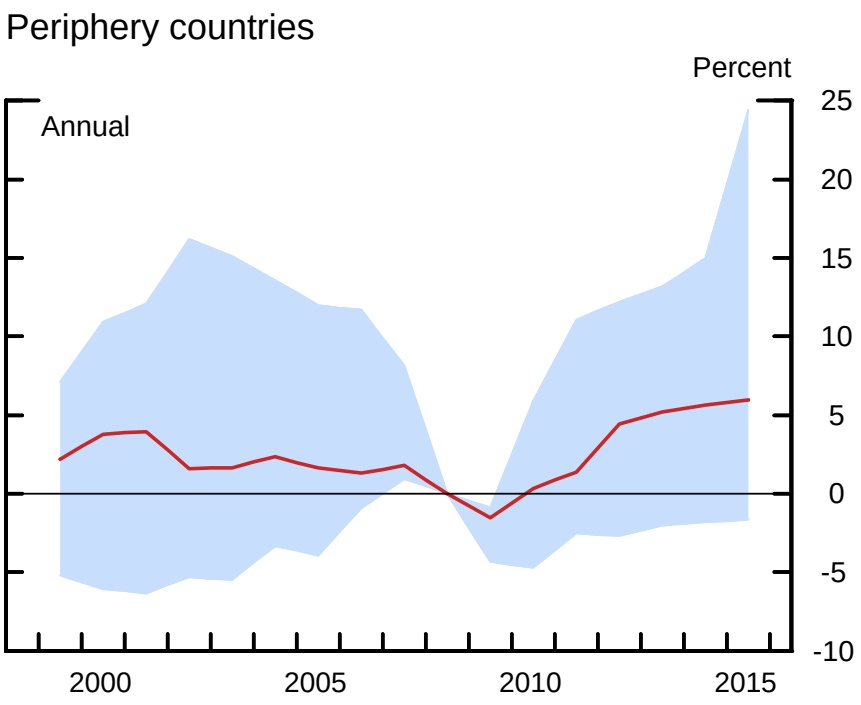
With time fixed effects, 2008–2013

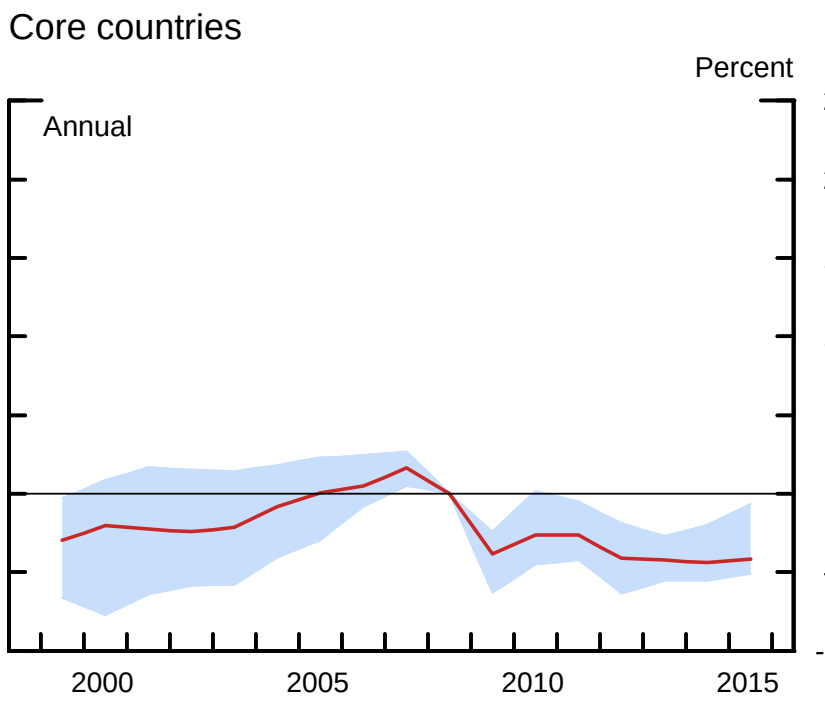
	Explanatory Variable		
PC Prediction Error	$\ln \text{CDS}_{i,t-1}$	$\ln \text{CDS}_{i,t-1} \times \mathbf{1}[i \in \text{P}]$	R^2
(1) Prices (homogeneous)	0.044	0.453	0.329
	$[-0.239, 0.327]$	$[0.092, 0.814]$	
(2) Prices (heterogeneous)	0.684	0.275	0.419
	$[0.369, 0.999]$	$[0.031, 0.519]$	
(4) Wages (homogeneous)	-1.364	-0.495	0.352
	$[-2.221, -0.506]$	$[-1.359, 0.369]$	
(5) Wages (heterogeneous)	-2.196	-1.469	0.542
	$[-2.731, -1.661]$	$[-2.550, -0.389]$	

NOTE: Bootstrapped 95% confidence intervals in brackets.

Price Markups

Euro area, 2000–2015





NOTE: The markup is equal to minus (100 times) the log or real unit labor costs (2008 = 1).
SOURCE: AMECO database.

Financial Conditions and Price Markups

Euro area, 2008–2013, with time fixed effects

Specification	Explanatory Variable: $\ln \text{CDS}_{i,t-1}$	Explanatory Variable: $\ln \text{CDS}_{i,t-1} \times \mathbf{1}[i \in \text{P}]$	R^2
A. *Aggregate markups*			
	-0.312	1.148	0.681
	$[-0.528, -0.095]$	$[0.926, 1.372]$	
B. *Sectoral markups*			
	-0.331	1.974	0.152
	$[-1.915, 1.254]$	$[1.244, 2.704]$	

NOTE: Bootstrapped 95% confidence intervals in brackets.

Summary

- Rich paper documenting relationship between inflation and domestic vs global factors.
- Domestic slack and inflation expectations are prime drivers of inflation in pooled-regressions.
- Global factors appear to primarily matter for CPI rather than core inflation.
- Financial factors and inflation attenuate inflation dynamics and help explain missing deflation – are there implications for the global financial cycle and inflation dynamics?