Investment Management Division

Remarks at ECB Conference on "Understanding Inflation"

Angel Ubide

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Is the Analytical Framework for Inflation Still Valid?

- The New Keynesian view on inflation
  - $\pi = \alpha * slack + \beta * expectations + \gamma * shocks\ (fx, oil, policy)$

- Fact #1: since the 1980s, α has declined, β has increased. Not a recent event.

- Fact #2: inflation forecasts are very noisy: standard dev of residual $\approx$ 1% => large vs inflation at 2% (Blanchard (2016)). Shocks dominate inflation outcome.

  => Is #1 + #2 why naïve or IMA(1,1) models dominate inflation forecasts outside recessions (Stock and Watson (2010))?

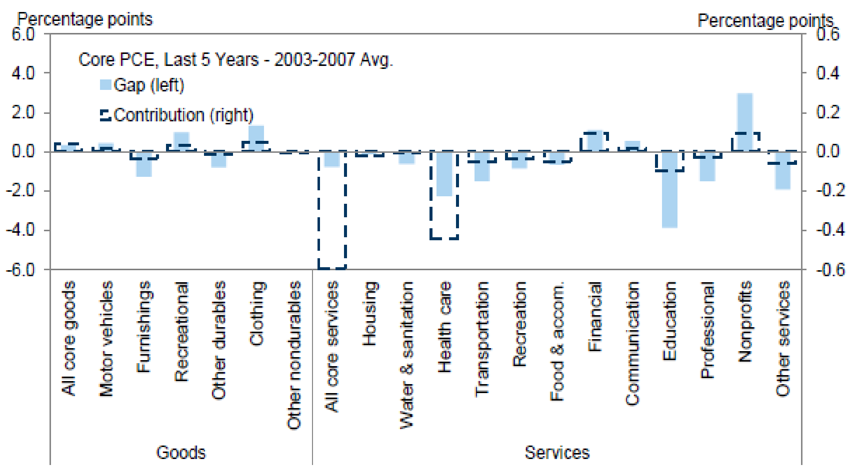
- Questions:
  - Is inflation weaker due to globalization or online retailing?
  - Is there still a Phillips Curve?
  - Have expectations drifted lower?

Sources: Investment Strategy Group.

Is Inflation Weaker due to Globalization or Online Retailing?

1. Decomposition of Shortfall in US Inflation

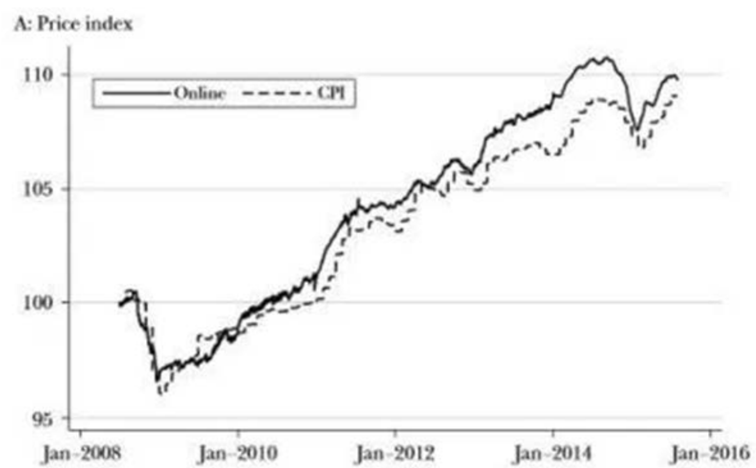
Exhibit 1: The Recent Inflation Shortfall Is Concentrated in Services Categories, Especially Health Care



Source: Department of Commerce, Goldman Sachs Global Investment Research

2. US CPI vs Online Price Index

Figure 2
United States

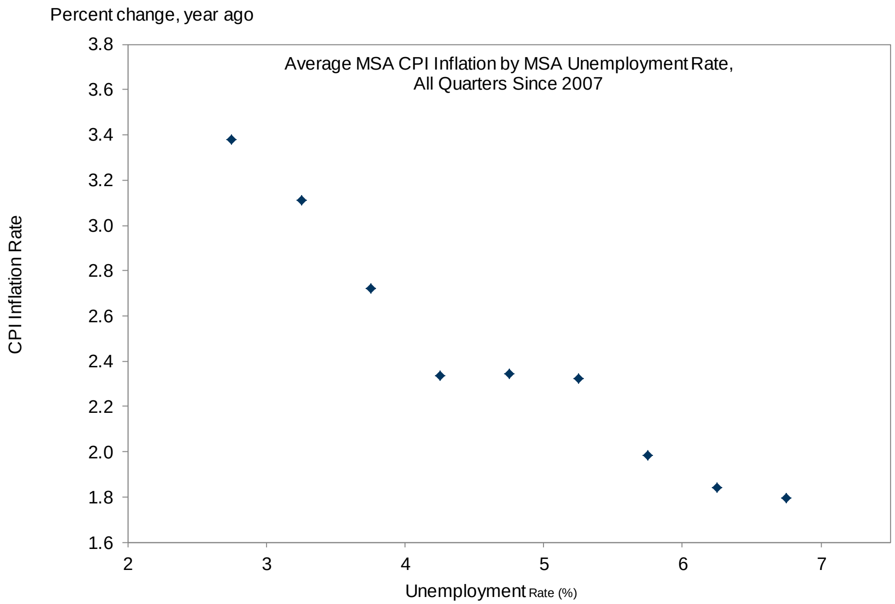


- US core inflation shortfall 2012-17 vs 2003-07 mostly in services (healthcare, education), not goods.
- Disinflationary impact of Emerging Markets on import prices peaked in late 1990s. Possible effects on wages.
- Online retail share in US still small (10 percent) but increasing. Inflation rates are similar.
- Cavallo (2017): online and offline prices identical 72 percent of time. If different, only about 4% lower. Similar price changes in size and frequency.
- Methodological changes have been scarce in last decade – but could add to downside risk.

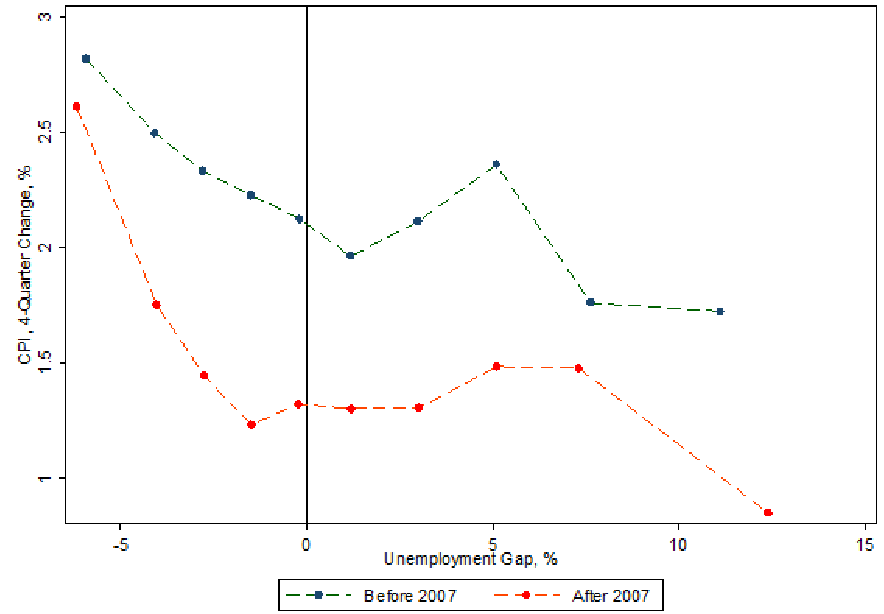
Sources: MIT, Billion Prices Project. http://www.mit.edu/~afc/papers/Cavallo_Online_Offline.pdf; GS Research US Daily: Is Inflation Structurally Lower (June 14, 2017)

Is there still a Phillips Curve?

1. US City Level Phillips Curve since 2007



2. Euro Area Regional Inflation by Unemployment Gap Decile (52 Regions in Germany, Italy, Spain)

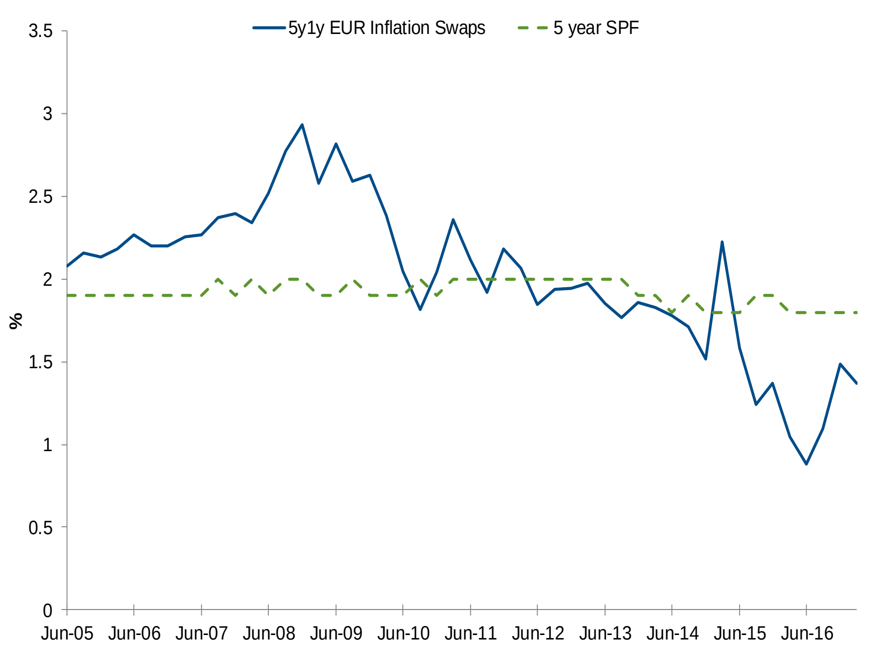


- It exists, and looks upward sloping.
  - US MSAs with lower unemployment tend to have higher inflation.
  - Euro area regions with lower unemployment tend to have higher inflation.
- In (w,u) space, similar slope but converges to lower wage growth - due to weaker productivity/weaker labour?
- A question is the markup – are high profits, or lower interest rates, allowing firms to compete for market share?

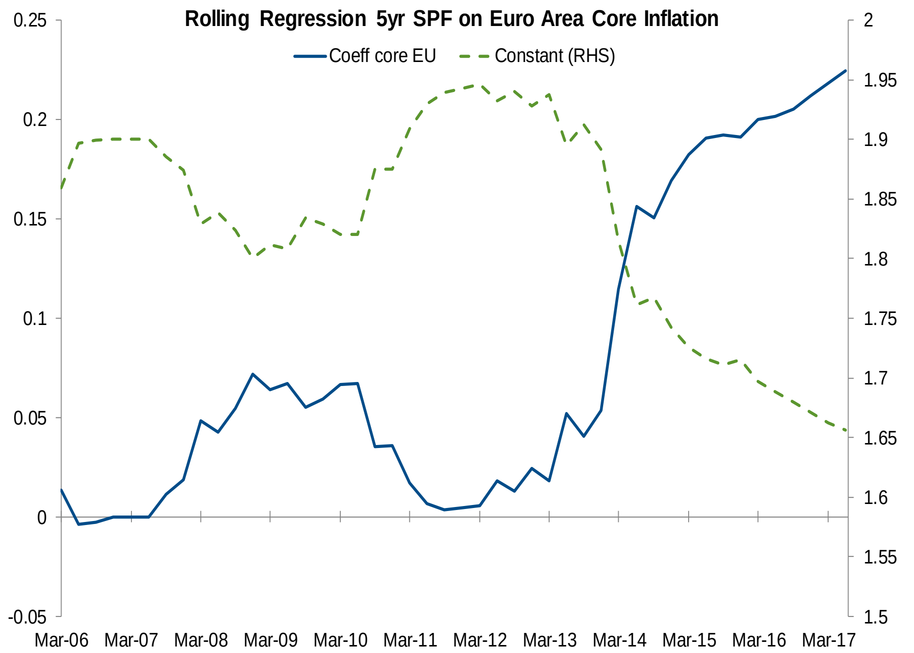
Sources: Investment Strategy Group, GS Research.

Have Inflation Expectations Drifted Lower?

1. Euro Area: Inflation Swaps vs SPF



2. Inflation expectations have become a bit more adaptive

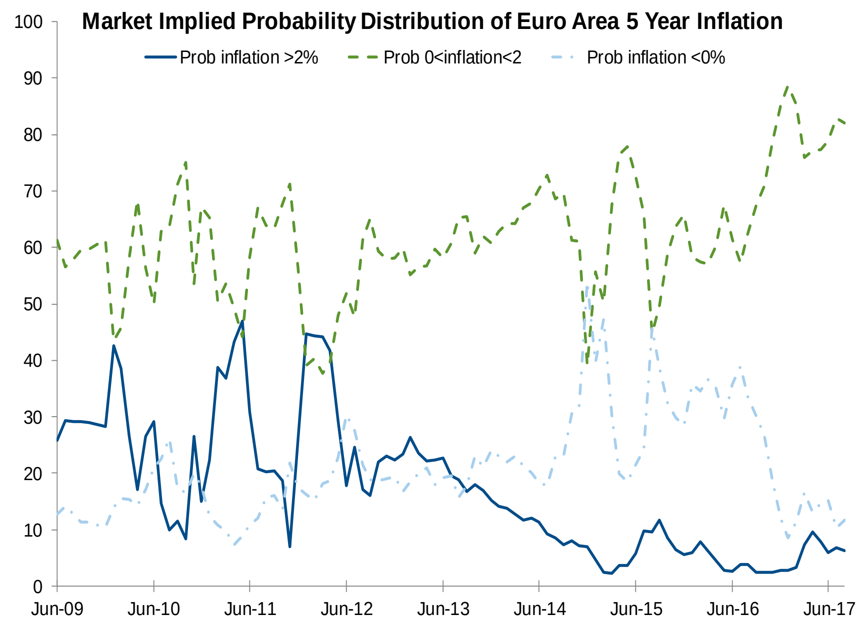


- It depends.
- Inflation term premium has shifted from positive to negative.
- Inflation expectations may have become more adaptive (Lyziak and Paloviita (2016)).
  - Large and persistent shocks (USD and oil); ZLB effect.
  - Asymmetry to negative news

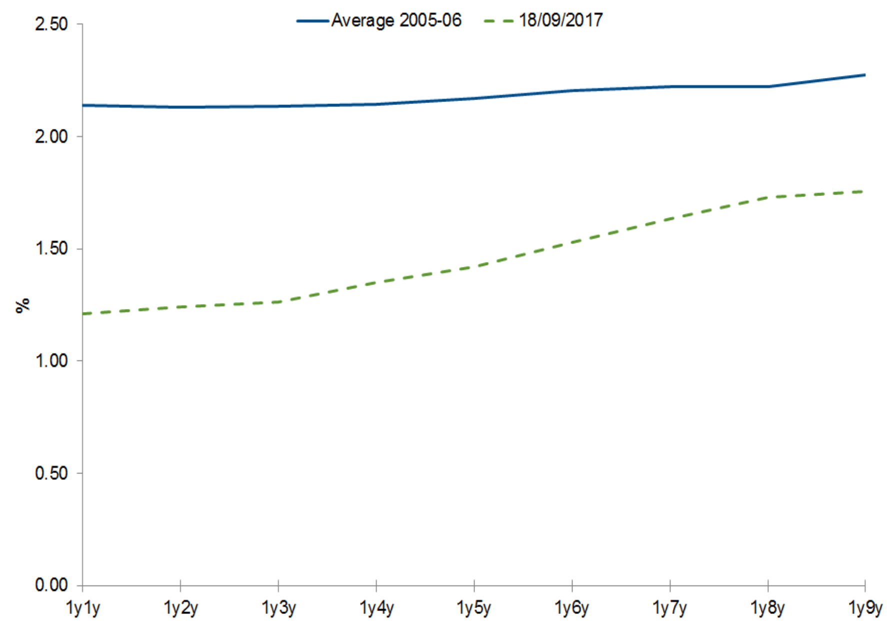
Sources: Investment Strategy Group.

Have Inflation Expectations Drifted Lower? (II)

1. Euro Area Probability Distribution of Inflation



2. Euro Area Term Structure of Inflation Expectations



- Compression of inflation distribution in the 0-2 range. Asymmetric versus 2%.
- Term structure of inflation expectations lower. Patience vs credibility vs risk premium.

Sources: Investment Strategy Group.

Some Tentative Conclusions

- No obvious direct evidence of structural change to dynamics of inflation
  - Inflation driven mostly by slack when it declines
  - Inflation driven mostly by expectations and shocks when it increases

- Phillips Curve still alive, maybe flatter and lower. Markups a question mark
- Inflation risk premium negative
- Inflation expectations more adaptive

- Can we tell why inflation is low? Diagnosis matters for policy.
  - Transitory but persistent shocks => risk they become permanent if expectations adaptive. Keep on easing to reduce slack.
  - Permanent shocks – to wage setting, markups, credibility of central bank commitment to targets. Need policy shifts to re-anchor expectations.

- Final thought. Expectations more forward looking since the 1980s => non-accelerationist Phillips Curve => U vs π, not U vs $\Delta\pi$. Boom needn't be followed by a bust. Low cost of overshooting.

Sources: Investment Strategy Group.