discussion of Cogley, Sargent and Surico

The Return of the Gibson Paradox

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Conference in honor of Warren Weber
Summary

• The Gibson Paradox has returned
  – Gibson Paradox: negative or zero long-run relationship between the interest rate and rate of inflation.
  – It has returned in the sense that the relationship was positive 1965-1985 and flipped negative or zero after 1995.

• Result documented in two ways:
  – Estimated time-varying VAR.
  – DSGE models estimated over the two periods.

• Use DSGE model to uncover economic reason for the return of the Gibson paradox.
  – Change in monetary policy and in a parameter governing the private economy.
What ‘Long Run’ Does Not Mean Here

• It does not mean....

  – ‘steady state’.
  – A negative relationship between $R$ and $\pi$ in steady state would be truly hard to explain.
    • I am not aware of interesting theories with the property $\pi \uparrow, R\downarrow$. 
The Concept of ‘Long Run’ Here

• Lucas (‘Two Illustrations of Quantity Theory’, AER, 1980) low-frequency idea
  – First, smooth data for \( \beta \) close to, but less than unity:

\[
\pi_t(\beta) = \frac{1 - \beta}{1 + \beta} \sum_{k=-\infty}^{\infty} \beta^{|k|} \pi_{t+k}, \quad R_t(\beta) = \frac{1 - \beta}{1 + \beta} \sum_{k=-\infty}^{\infty} \beta^{|k|} R_{t+k}
\]

  – Second, perform regression

\[
R_t(\beta) = a\pi_t(\beta) + \epsilon_t
\]

  – In practice, authors exploit connection between \( a \) and features of the spectrum of \( (R_t, \pi_t) \) at frequency zero (Whiteman (1984)).

• The return of the Gibson paradox: \( a \) flipped from positive in early post-war, to negative more recently.
Long run relationship between $R$ and $\pi$ (with 68% posterior probability intervals)

Long-run relationship between $R$ and $\pi$ implied by VAR with time-varying coefficients.

Posterior mode of parameter, $a$. 
At the same time, there has been a decline in inflation persistence
US Annual Inflation

first order autocorrelation, 1968-1983 = 0.96

first order autocorrelation, 1995-2007 = 0.75
Reduced Form ‘Explanation’

• Suppose

\[ \hat{R}_t = R_{\text{real}} + E_t \pi_{t+1} \]

• If \( \pi \) is a random walk, then

\[ R_t = R_{\text{real}} + \pi_t \rightarrow \text{corr}(R_t, \pi_t) = 1 \]

• If \( \pi \) is iid, then

\[ R_t = R_{\text{real}} + \text{constant} \rightarrow \text{corr}(\text{constant}, \pi_t) = 0 \]

• This story leaves details unspecified:
  – Real rate held constant.
  – What are the economics behind the changes that have occurred?
Remarks

• Long-standing theme in time series analysis:
  – Long run relationships are hard to pin down in the data.

• With a specific statistical model, long-run relationships may appear easy to pin down.
  – Lag length and other restrictions set up a link between high frequency component of the data (easy to estimate) and low frequency component of the data.

\[
y_t = \hat{\rho} y_{t-1} + \varepsilon_t
\]

identified from high-frequency, first order autocorrelation in data

zero-frequency spectral density

\[
\widehat{S(0)} = \frac{\sigma_\varepsilon^2}{(1 - \rho)^2}
\]

– Difficulty of pinning down long-run relationships is manifested in a lack of robustness...not necessarily in large prob. intervals.
Robustness of Inference About $a$

- Would like to see robustness of Gibson Paradox finding to:
  - Including more variables in the VAR analysis.
  - Including more lags in the VAR (say lags = 4 rather than 2).

- Concern:
  - When I apply Lucas’ inefficient (but, presumably, robust) procedure, fail to find Gibson Paradox.
  - When I estimate a different DSGE model, fail to find Gibson Paradox.
Applying Lucas’ Procedure

USA - Original Data for 2nd Quarters, 1965-1985

USA - Smoothed Data ($\beta=0.9$) for 2nd Quarters, 1965-1985

USA - Original Data for 2nd Quarters, 1995-2011

USA - Smoothed Data ($\beta=0.9$) for 2nd Quarters, 1995-2011

No sign here of Gibson Paradox
DSGE-based Estimate of $a$

- In the paper, C-S-S estimate a simple NK model without capital over 1995-2007 period:
  
  
  The C-S-S model estimated over the earlier period has positive $a$, the two models have the same steady state $(R_t, \pi_t)$.
  
  - At posterior mode, $a=-0.278\ (-1.4,1.2)$

  
  - At posterior mode, $a=1.15$
Conclusion

• The C-S-S paper suggests that interesting changes in the low frequency relationship between inflation and the interest rate have occurred.

• They provide an interesting economic interpretation of why the changes happened.

• This work is in the best tradition of using equilibrium models to interpret data.

• Still, would like to see a defense of robustness.