"From many series, one cycle: improved estimates of the business cycle from a multivariate unobserved components model" by Fleischman and Roberts

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What the paper does

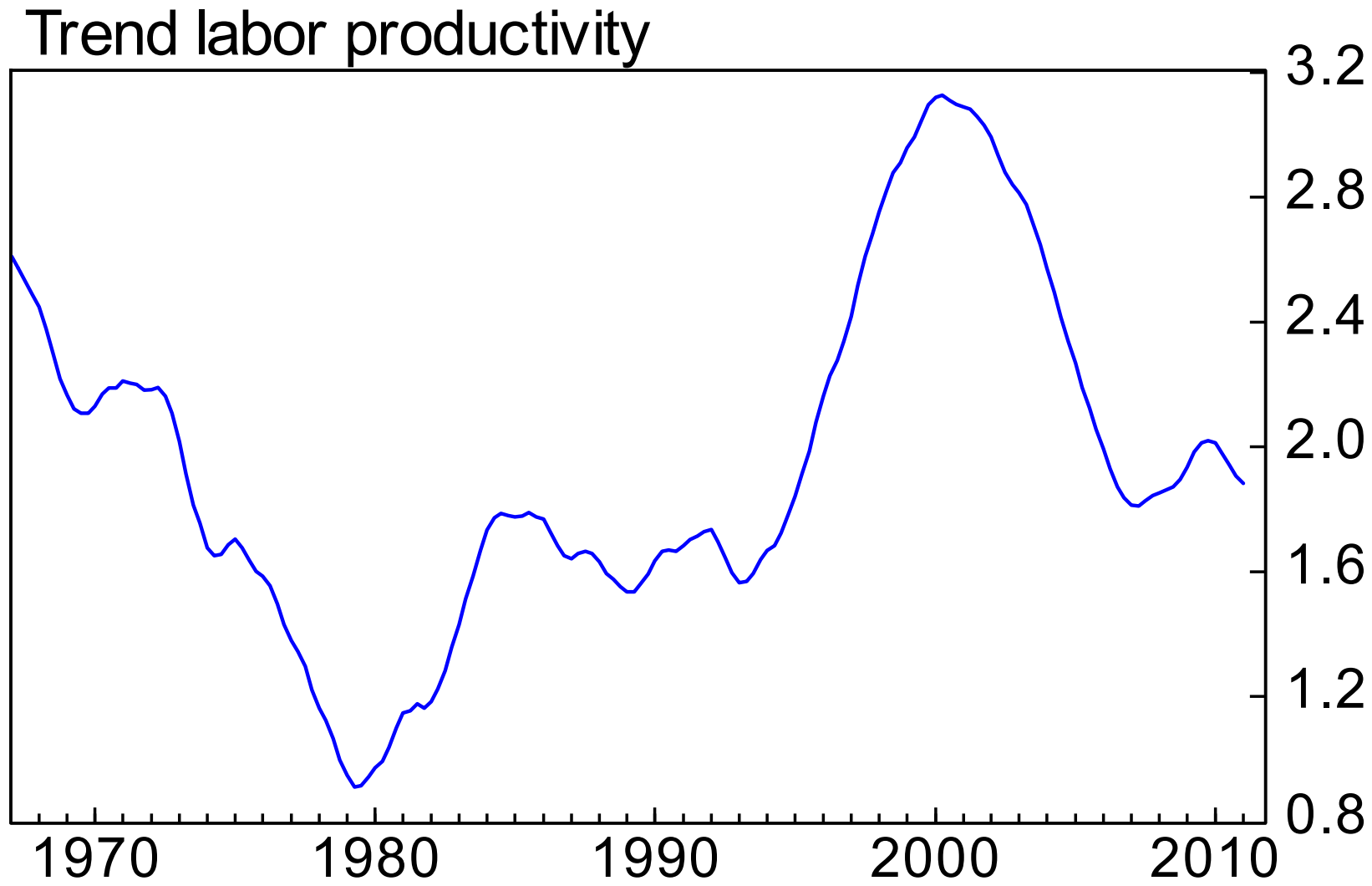
Goal: to measure potential or natural output.

Approach: cycle as a latent variable, many series.

Innovation: 4 output, 4 labor market, one price series;
6 trends and measurement errors;
an accelerationist Phillips curve.

Findings: employment variables inform cycle,
inflation useful too via PC effect.

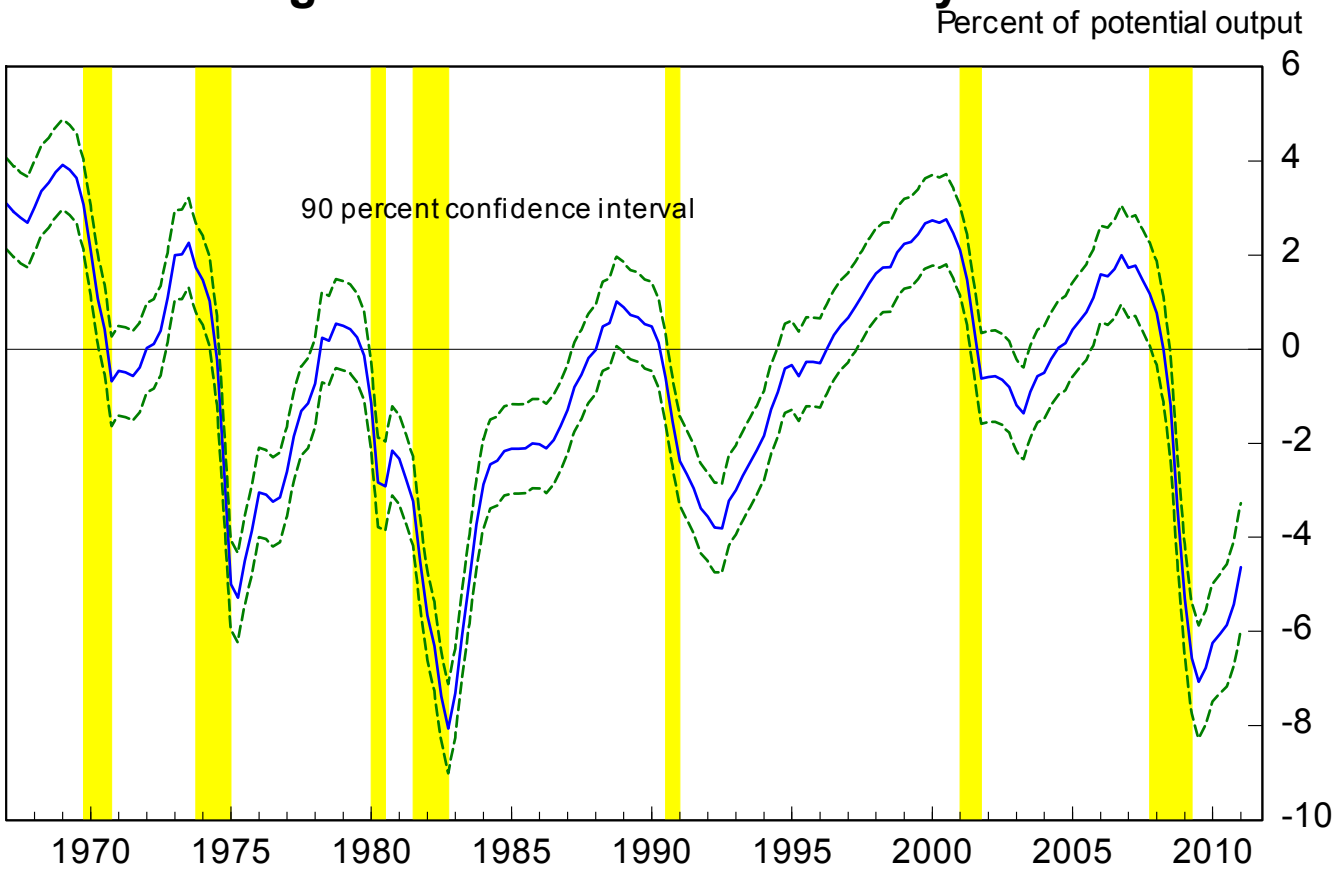
1. Cycles and trends not so distinct



1. Cycles and trends not so distinct

- Sum of AR(2) coefficients is 0.96.
- Autocorrelation of measurement error is 0.88 (0.04)

Figure 1: Model Estimate of Cycle



2. Employment is driving the cycle

1. But cycle affected employment series with 3 lags, output series had to be contemporaneous.

$$GDP_t = cyc_t + GDO_t^{*} + u_{1t} \qquad NFBP_t = \lambda_{10}\, cyc_t + NFBO_t^{*} + u_{3t}$$

$$GDI_t = cyc_t + GDO_t^{*} + u_{2t} \qquad NFBI_t = \lambda_{10}\, cyc_t + NFBO_t^{*} + u_{4t}$$

$$ENFB_t = \lambda_{20}\, cyc_t + \lambda_{21}\, cyc_{t\text{-}1} + \lambda_{22}\, cyc_{t\text{-}2} + ENFB_t^{*} + u_{5t}.$$

$$WW_t = \lambda_{30}\, cyc_t + \lambda_{31}\, cyc_{t\text{-}1} + \lambda_{32}\, cyc_{t\text{-}2} + WW_t^{*} + u_{6t}.$$

$$ER_t = \lambda_{40}\, cyc_t + \lambda_{41}\, cyc_{t\text{-}1} + \lambda_{42}\, cyc_{t\text{-}2} + ER_t^{*} + \alpha\, \mathrm{EEB_t} + u_{7t}.$$

$$LP_t = \lambda_{50}\, cyc_t + \lambda_{51}\, cyc_{t\text{-}1} + \lambda_{52}\, cyc_{t\text{-}2} + LP_t^{*} - \alpha\, \mathrm{EEB_t} + u_{8t}.$$

2. Could use many, many more series.

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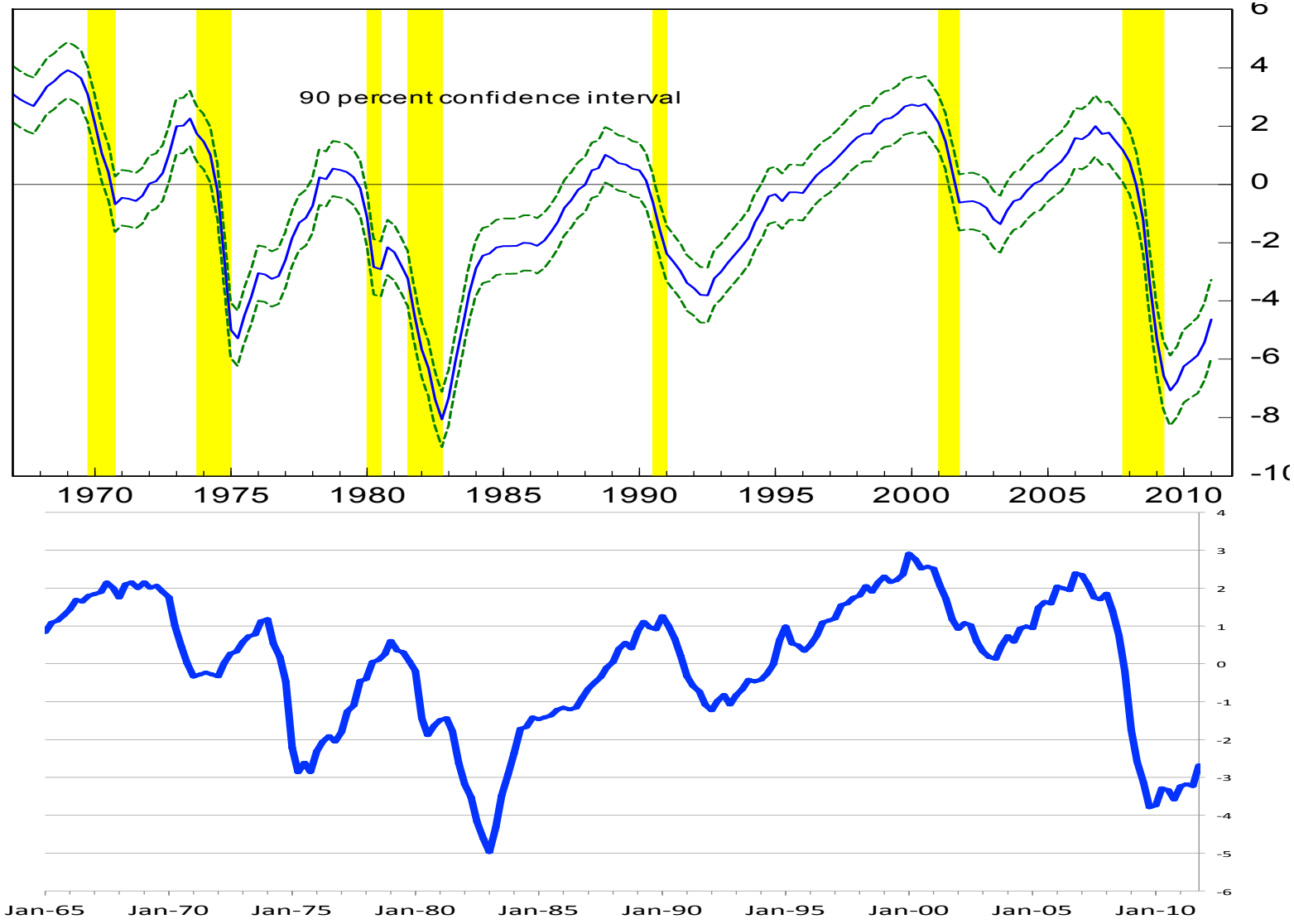

3. Lags and parameter stability

Specification choice a little judicious

- 10 lags in PC, 3 lags in labor market, AR(2) cycle.
- Strong cointegrating relations.

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Stability in a sample that goes from 1965 to 2011

- Great moderation on volatility
- Drastic change in the cyclicality of labor productivity
- Jobless recoveries
- Phillips curve breakdown

$$DCPIX_t = A(L)DCPIX_{t\text{-}1} + \beta_{11}(L)drpe_{t\text{-}1} + \beta_{12}(L) \text{ x } d85_t \text{ x } drpe_{t\text{-}1}$$

$$+ \beta_2(\mathrm{L})\, drpi_t + \theta\, (\lambda_{50}\, cyc_t + \lambda_{51}\, cyc_{t\text{-}1} + \lambda_{52}\, cyc_{t\text{-}2}) + u_{9t}$$

5. Using a two-sided smoother

Table 8: Cycle Revisions

	Final Cycle	QRT Revision		Revision Ratios		QRT vs. Final	
Model	Std. dev.	Std. dev.	RMSE	NS	NSR	Corr	OPS
Baseline	1.73	0.98	0.98	0.56	0.56	0.83	0.20
CPIX, ER, GDP, GDI	1.61	1.05	1.06	0.65	0.66	0.78	0.26
CPIX, ER, GDP	1.77	1.13	1.14	0.64	0.65	0.78	0.25
Kuttner (CPIX, GDP)	1.39	1.01	1.01	0.73	0.73	0.76	0.27
Watson (GDP)	2.03	1.48	2.16	0.73	1.07	0.75	0.14
Clark (GDP)	2.23	2.04	2.38	0.92	1.07	0.42	0.37

Notes: Final cycle is the 2-sided estimate using the full 1963:Q2 to 2011:Q1 sample period; QRT estimates from extending ending date from 1988:Q1 to 2008:Q4; QRT revisions are $final_t - QRT_t$; NS is the ratio of the standard deviation of the QRT revision to the standard deviation of the final cycle estimate; NSR is the ratio of the RMSE of the QRT revision to the standard deviation of the final cycle estimate; Corr is the simple correlation of the QRT and final estimates; OPS is the percent of the sample period where the QRT and final estimates of the cycle have different signs.

6. The EEB variable

Federal and state emergency and extended benefits programs paid.

$$ER_t = \lambda_{40}\, cyc_t + \lambda_{41}\, cyc_{t\text{-}1} + \lambda_{42}\, cyc_{t\text{-}2} + ER_t^{*} + \alpha\, \mathrm{EEB}_t + u_{7t}$$

$$LP_t = \lambda_{50}\, cyc_t + \lambda_{51}\, cyc_{t\text{-}1} + \lambda_{52}\, cyc_{t\text{-}2} + LP_t^{*} - \alpha\, \mathrm{EEB}_t + u_{8t}.$$

Estimated $\alpha = -0.07$.

Benefits have no effect on employment, just shift people in and out of labor force.

6. The EEB variable

I think this is a bad idea for many reasons:

1) No effect on total employment?
2) No effect on output?
3) This is no longer a “potential output”, before effect of policy.
4) It is also not a measure of “potential output” pre-monetary policy, otherwise would have included other fiscal policies.
5) “…enacted on ad hoc basis…”

Conclusion

Pushing further our measurement of potential output and output gaps.

Difficult topic.

Rule of thumb: look at the unemployment rate.

Okun's law will eventually fall into place.