

TESTING SUPERNEUTRALITY WHEN MONEY GROWTH IS ENDOGENOUS

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ABSTRACT

We develop a structural vector-auto-regression (SVAR) model to test for long-run super-neutrality when money growth may be endogenous. An identified exogenous permanent increase in inflation is estimated to have a positive and statistically significant long-run effect on output for the United States. This finding rejects superneutrality in favor of a Mundell-Tobin effect. We further show that previous approaches which treated money growth as exogenous resulted in downwardly-biased estimates of the output effects from permanent increases in inflation. Our overall conclusion is that Mundell-Tobin effects are likely more prevalent than was once perceived.

SKETCH OF STRUCTURAL VAR MODEL

- Based on Friedman's famous dictum that a permanent movement in "inflation is always and everywhere a monetary phenomenon" we equate inflation and money growth.
- We use long-run restrictions to identify structural shocks to technology and inflation in a three-variable SVAR consisting of the natural log of output per hour, inflation, and the natural log of output.
- We estimate this model on quarterly US data over multiple sample periods and study the long-run responses to technology and inflation shocks.
- We focus on the long-run inflation response to productivity shocks (i.e. endogenous money growth) and the long-run output response to inflation shocks (super-neutrality vs. Mundell-Tobin).

MAIN FINDINGS

- We estimate that technological improvements generally lead to permanent reductions in inflation, suggesting that money growth is in fact endogenous (Table 1).
- The endogeneity of low-frequency inflation to productivity is consistent with the Federal Reserve's *productivity misperceptions* in the 1970's and the *growth gamble* in the 1990's.
- After accounting for the endogenous response of long-run inflation to productivity changes, we estimate that exogenous permanent increases in inflation increase output, consistent with Mundell-Tobin effects (Table 2).
- In samples that money growth is endogenous, the long-run output response to a permanent increase in inflation is biased downward in a bi-variate SVAR consisting only of inflation and output (Figure 1).

BASELINE SVAR MODEL: LONG-RUN RESPONSES

Table 1: Long-Run Inflation Response to a 1 pp. Productivity Shock

	Sample Period			
	1948-1992	1948-2019	1960-1992	1960-2019
Point Estimate	-0.04	-0.04	-0.30*	-0.23*
90% Error Band	(-0.46,0.38)	(-0.35,0.25)	(-0.66,0.06)	(-0.47,0.01)

Estimates from a 3 variable model with $[\Delta \ln(y/h), \Delta \pi, \Delta \ln(y)]$ that allows for the Federal Reserve to endogenously respond to changes in productivity

** Zero is excluded from the 90% error band

* Zero is excluded from the 68% error band

Table 2: Long-Run Output Response to a 1 pp. Inflation Shock

	Sample Period			
	1948-1992	1948-2019	1960-1992	1960-2019
Point Estimate	0.41**	0.50**	0.56**	0.62**
90% Error Band	(0.12,0.69)	(0.23,0.79)	(0.09,0.1.02)	(0.15,1.10)

Estimates from a 3 variable model with $[\Delta \ln(y/h), \Delta \pi, \Delta \ln(y)]$ that allows for the Federal Reserve to endogenously respond to changes in productivity

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ENDOGENOUS VS. EXOGENOUS MONEY GROWTH

