

Reset Price Inflation and the Impact of Monetary Policy Shocks

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WEB APPENDIX

The SW (2007) model is estimated using the following seven quarterly time-series:

- i) Price inflation
- ii) Real Consumption = (Personal consumption expenditures)/Deflator
- iii) Real Wage = (Hourly compensation)/Deflator
- iv) The federal funds rate
- v) Hours = (Employment to population ratio, 16+)*(Average weekly hours)
- vi) Real output = GDP/Deflator
- vii) Real Investment = (Fixed Private Investment)/Deflator

Series (ii), (iii), and (v) to (vii) are logged; all series are seasonally adjusted. The data sources employed by SW are listed in their appendix. We focus here on how we modify their series, especially in order to construct monthly/bimonthly series, listing any additional data sources.

SW define price inflation by the rate of growth in the GDP deflator. They also use the GDP deflator as the deflator to define real consumption, real wages, real output, and real investment in lines (ii), (iii), (vi), and (vii) above. Even for the quarterly series, our procedure for defining inflation and deflating departs from SW. We define price inflation by the rate of growth in the personal consumption deflator. This is available from the BEA's NIPA accounts, Table 2.4.4 (http://www.bea.gov/iTable/index_nipa.cfm, denote forward as NIPA). We do so because the variable defined as the price level in SW's model is the price of consumption goods. (The model incorporates shocks to the investment technology that cause the consumption and investment deflator to differ.) To be consistent with the model, we define real wages and real consumption deflating by the personal consumption deflator. We define real output, like SW, deflating by the GDP deflator. To define real investment we deflate nominal fixed investment by the NIPA deflator for fixed investment (NIPA Table 1.5.4).

Starting from these seven quarterly series, we then construct monthly counterparts. In doing so, we always constrain the quarterly aggregates of our monthly series to match exactly their quarterly counterparts—that is, in creating monthly series we are only allocating the quarterly series to their monthly components *within* each quarter. We are not creating any differences at the quarterly level.

Constructing monthly series for the first five series above is a brief step. In fact, the first three series reflect only monthly available series: the personal consumption deflator (NIPA Table 2.8.4), personal consumption expenditures (NIPA Table 2.8.5), and the hourly compensation measure in SW (average hourly earnings for hourly and non-supervisory workers from BLS Current Employment Survey). The fourth, the federal funds rate, is available daily.

The fifth series, hours, is also largely based on monthly series. The employment to population series is a monthly BLS series. The index for average weekly hours that SW use is quarterly, employed by the BLS for calculating multifactor productivity--see <http://www.bls.gov/mfp/>). It reflects weekly hours for hourly-paid workers, adjusted for an estimate of the average workweek for salaried workers relative to that for hourly weighted by the share of salaried workers in employment. Average hours for hourly-paid workers and the shares of hourly and salaried workers are each available monthly. The estimate for relative hours of salaried workers derives from the relative workweeks reported by salaried and hourly workers in the CPS. Since the CPS is available monthly, we were able to mimic construction of this factor at the monthly frequency.

This leaves construction for monthly real output and investment. For these series, we follow Stock and Watson's (2010) estimates for distributing GDP, and its components, to months within a quarter. See http://www.princeton.edu/~mwatson/mgdp_qdi.html for a description of their methodology as well as the data series.

Once we have the monthly time series, we construct their bimonthly counterparts through simple time-aggregation and then use these series to estimate the SW model. As in Smets-Wouters (2007), some of the parameters are fixed in the estimation procedure. Most of these parameters – the exogenous spending / GDP ratio, the steady-state mark-up in the labor market, and the curvature parameters for the Kimball aggregators in the goods and labor market – are fixed at the same values used in SW's quarterly estimation. On the other hand, the depreciation rate must be adjusted to a bimonthly basis – we set it to 0.017.