Updates on ADS Index Calculation

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The basic framework underlying the Aruoba-Diebold-Scotti Business Conditions Index (ADS Index, for short) is described in Aruoba, Diebold and Scotti (2009). We are, however, continually working to improve the ADS Index. To help users better understand the construction of the index, and the evolution of that construction, here we discuss various modifications and extensions incorporated subsequent to our 2009 paper. We catalog them in reverse chronological order.

August 28, 2009: Bureau of Economic Analysis Benchmark Revisions (#4)

– Today, the system underlying the ADS Index was re-estimated using full histories of all variables, including personal income less transfer payments and the full history of the index was extracted.

August 6, 2009: Bureau of Economic Analysis Benchmark Revisions (#3)

– Today, the Bureau of Economic Analysis released the revised full history of real manufacturing and trade sales. Our measure combines the SIC-based series covering 1967-1996 and the NAICS-based series covering 1997 onwards. Since these series have different base years in the benchmark revision we cannot compute the growth rate for January 1997 and treat it as missing. The ADS index is extracted using this revised vintage along with the previous vintages for other variables starting in 1995.

August 4, 2009: Bureau of Economic Analysis Benchmark Revisions (#2)

– Today, the Bureau of Economic Analysis released the revised history of real personal income less transfers starting only in 1995. The ADS index is extracted using this revised vintage along with the previous vintages for other variables starting in 1995.

July 31, 2009: Bureau of Economic Analysis Benchmark Revisions (#1)

– The Bureau of Economic Analysis started rolling out its benchmark revisions for the National Income and Product Accounts which will affect real GDP, real personal income less transfers and real manufacturing and trade sales. Today, the full history of real GDP was revised and the ADS index is extracted using this revised vintage along with the previous vintages for other variables. We continue to use the parameter values fixed on December 5, 2008 until the benchmark revisions are fully reflected in our source data for all affected variables.

January 9, 2009: Real-Time Updating of ADS Index version 1.0

– We update the ADS Index in real time, following the release of new and/or revised data on any of its component indicators, hour-by-hour throughout the week. In some weeks, initial claims are the only data released. Other weeks, however, contain releases of additional monthly or quarterly indicators. A typical week contains two or three component indicator releases, and hence two or three ADS Index vintage releases.

December 5, 2008: ADS Index version 1.0

– We now use six macroeconomic indicators to construct the ADS Index. Initial jobless claims are weekly, real GDP is quarterly, and the remaining four indicators are monthly: payroll employment, industrial production, real personal income less transfers, and real manufacturing and trade sales. All are important and widely-followed.

– Our sample now starts on February 29, 1960, which includes the recession of 1960-1961.

– We now log difference all variables except initial jobless claims. This growth rate transformation enables us to avoid our earlier-used polynomial detrending, which has certain

undesirable characteristics, and to make nearly-seamless contact with earlier work on which we build (e.g., Stock and Watson, 1989). The growth rate transformation also facilitates better handling of benchmark revisions, which typically affect levels more than growth rates. Of course the new approach also has costs; in particular, our aggregation of flow variables is now only approximate, as in Mariano and Murasawa (2003). On balance, however, we feel that the benefits of moving to the new approach exceed the costs.

– We now use cumulator variables as proposed by Harvey (1989, pp. 313-318) to handle temporal aggregation of flow variables. By cumulating values of the factor, the cumulator variables summarize all the information needed to construct aggregated flow variables. Specifically, we define the monthly cumulator variable as

$$\begin{aligned} C_t &= \zeta_t C_{t-1} + x_t & (1) \\ &= \zeta_t C_{t-1} + \rho_1 x_{t-1} + \rho_2 x_{t-2} + ... + \rho_p x_{t-p} + \varepsilon_t, & (2) \end{aligned}$$

where ζ_t is an indicator variable defined as

$$\xi_t = \begin{cases} 0 & \text{if } t \text{ is the first day of a month} \\ 1 & \text{otherwise,} \end{cases} \quad (3)$$

and x_t is our daily business conditions factor. Changing the aggregation period to weeks or quarters only requires adjusting the definition of ξ_t in an obvious way. The measurement equation for a generic flow variable, which replaces equation (8) of Aruoba, Diebold and Scotti (2009), is then

$$\tilde{y}_t^i = c_i^* + \beta_i C_t + \gamma_{i1} \tilde{y}_{t-D_i}^i + ... + \gamma_{in} \tilde{y}_{t-nD_i}^i + u_t^{*i}. \quad (4)$$

(Note that there is no need for polynomial trend terms, as discussed above.) We use three cumulator variables corresponding to weekly, monthly and quarterly observations. With three cumulator variables and an $AR(p)$ daily factor, we have $p + 3$ state variables.

– We re-estimated the model, with the modifications described here, and fixed the parameters.

– We update the ADS Index weekly, following the release of that week's new and/or revised

component indicator data.

References

[1] Aruoba, S.B., Diebold, F.X. and Scotti, C. (2009), "Real-Time Measurement of Business Conditions," *Journal of Business and Economic Statistics*, in press.

[2] Harvey, A.C. (1989), *Forecasting, Structural Time Series Models and the Kalman Filter*. Cambridge: Cambridge University Press.

[3] Mariano, R.S. and Murasawa, Y. (2003), "A New Coincident Index of Business Cycles Based on Monthly and Quarterly Series," *Journal of Applied Econometrics*, 18, 427-443.

[4] Stock, J.H. and Watson, M.W. (1989), "New Indexes of Coincident and Leading Economic Indicators," *NBER Macro Annual*, Volume 4. Cambridge, Mass.: MIT Press.