

Obtaining early signals about US-recessions: an application of a new and efficient multivariate real-time filter (MDFA)

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Abstract:

This paper proposes a new approach to the detection of US recessions that seeks to replicate the recession dates declared by the Business-Cycle Dating Committee (BCDC) of the National Bureau of Economic Research (NBER). Releases of recession dates by the BCDC are typically delayed by 6 to 18 months. We propose a Multivariate Direct Filter Approach (MDFA) and apply it to a 'standard' small set of economic variables. The MDFA inherits an optimality property originally derived for the univariate DFA¹ (Direct Filter Approach). More precisely, it can be shown that the filter minimizes the (unobservable) mean-square filter error up to a smallest possible error term. Besides this desirable theoretical efficiency property the new multivariate filter extends the scope of the (univariate) DFA by accounting efficiently for cointegration, for lead-lag relations among time series and by accounting for practically relevant questions about 'direct' vs. 'indirect' filtering. We then compare its real-time performance in recession dating to that of indicators proposed by Chauvet/Piger (2008), by Chauvet (1998) and Chauvet/Hamilton (2005), to the CFNAI (Chicago Fed National Activity Index) and to the ADS-index (Aruoba-Diebold-Scotti (2008)). Our new filter is both fast and reliable. It anticipates the last seven recessions from 1969 to 2009 by an average of 3.5 months after including data publication lags and the last recession is signalled with only a two month delay in February 2008. Revisions in the filter due to data-updating are small because the filter assigns most of the weight to data that is either unrevised (total civilian employment) or that is only slightly revised (manufacturing and trade sales, employment on non-agricultural payroll) whereas industrial production or income series receive little weight.

Keywords: US Business Cycle, Real-time signal extraction, multivariate filtering, data revisions, efficiency

JEL classification: C32, C61, E32, E37

¹ The DFA outperformed X-12-ARIMA, TRAMO/SEATS, Dainties, HP- and CF-filters in real-time signal extraction applications based on business survey data (2005,2006) and on output-gap measures for US-GDP and Euro-GDP's (2008). A forecasting method relying on the DFA won the NN3 (2007) and NN5 (2008) forecasting competitions, outperforming winner and runner-up of the prestigious M3 competition, X-12-ARIMA, Forecast-pro, Autobox, and a whole bunch of latest developments in non-linear forecasting approaches (<http://www.neural-forecasting-competition.com>). It seems reasonable to assign part of the observed performance gains to the inherent efficiency of the approach.