

## Revision of Seasonally Adjusted Data for Currency in Circulation

February 6, 2015

Bank of Japan

Currency Issue Department

The Bank of Japan has revised the seasonally adjusted data for Currency in Circulation. This revision is conducted every year around January, when the final figures for the whole of the previous calendar year become available.

Details of the current seasonal adjustment method are as follows.

1. The Bureau of Census X-12-ARIMA (Version 0.3) is used.
2. A multiplicative model and a logarithmic transformation are adopted for each series. The critical value for additive outliers and temporary changes depends on the length of the time-series data used for seasonal adjustment, which is the most recent 56 years, or 672 months, from January 1959 through December 2014. Seasonally adjusted figures for the months after December 2014 are calculated by applying the predicted seasonal factors, and the figures up to December 1958 remain unchanged.
  - Starting with the 2012 revision, data for the most recent 56 years are used instead of data from the beginning of the series (January 1955) to the most recent December.<sup>1</sup> This is because the number of data from the beginning of the series has reached the program limit with the X-12-ARIMA model.
3. Trading-day effects are adjusted by user-defined, day-of-the-week variables.

### Models Used for the Seasonal Adjustment

Indicator	ARIMA model <sup>2</sup>	Level shift and ramp	Trading-day adjustment	Length of the series
Banknotes in circulation (average amount outstanding)	(110)(011)	February 1989 From February through April 2002 From February through April 2005	None	From January 1959 through December 2014
Banknotes in circulation (amount outstanding at end of period)	(212)(011)	March 2002 March 2005	Yes	From January 1959 through December 2014

- Notes: 1. The maximum number of data that can be used when conducting the revision of seasonally adjusted data with X-12-ARIMA is 720 (monthly data covering 60 years). Among these, 48 data (monthly data covering four years) are used to compile projected figures.
2. The model for "banknotes in circulation (average amount outstanding)" has been revised.

**Inquiries**

Operations Support Group, Planning and Coordination Division, Currency Issue Department

Tel: +81-3-3277-2665