The treatment of securitisations and loan transfers when seasonally adjusting using X-12-ARIMA

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In January 2004, the Bank of England began publishing data seasonally adjusted using X-12-ARIMA. Prior to this, the Bank reviewed its method to adjust lending series that exclude the effects of securitisations. This article outlines the factors relevant to the adjustment of these series and the reasons behind the decision to adjust them independently.

Introduction

When a monetary financial institution (MFI[1]) transfers a loan portfolio to a UK resident special purpose vehicle (SPV[2]) in return for funds raised by the SPV via bond issuance, this is termed a securitisation. The bonds are secured on the loan portfolio and the income from these loans is used to pay the interest on the bonds. From the MFI's perspective, it has exchanged a portfolio of loans for liquid funds and therefore has the opportunity to re-lend the funds.

The article *'Impact of securitisation and loan transfer activity on M4 lending'*, published in the November 2004 issue of this publication,[3] gives further detail on securitisations and loan transfers and MFIs' business reasons for undertaking them. This article focuses on issues relating to the seasonal adjustment of securitisations, taking the aggregate M4 lending[4] series as an example.

The effect of securitisations and loan transfers

Securitisations and loan transfers affect the measured levels and flows of the M4 lending series. A version of M4 lending that excludes the effects of the former gives a clearer picture of the flow of net lending in a particular month. Users of these data then have a choice between two series – M4 lending, which measures the change in MFIs' exposure to the UK private sector, and M4 lending excluding the effects of securitisations and loan transfers, which measures the flow of MFIs' net lending to the private sector (thereby contributing to the change in private sector indebtedness).

Seasonal adjustment of these data

The Bank's previous seasonal adjustment method (GLAS) added the flows of securitisations and loan transfers to the unadjusted M4 lending data. The resulting series was then used to estimate seasonal factors that were applied to the original M4 lending series. A seasonally adjusted version of the series excluding securitisations was then obtained by adding the unadjusted flow of securitisations for each month. Securitisations needed to be treated in this way because they were large enough to have an adverse effect on the seasonal factors identified by GLAS.

The adoption of X-12-ARIMA as the Bank's new seasonal adjustment method provided a good opportunity to review the treatment of securitisations. Because X-12-ARIMA has built-in procedures to prevent non-seasonal events from affecting seasonal factors, it allows for greater flexibility in deriving the seasonally adjusted versions of series that exclude the effects of securitisations.

The new method also led the Bank to review its calculation of growth in M4 lending excluding securitisations. Such growth is best expressed as a percentage of the stock of all loans outstanding that were originated by MFIs, rather than of those that are currently on MFIs' balance sheets. The Bank does not obtain full data on repayments of loans that have been securitised, so in order to adjust the level of M4 lending, it assumed that loans would only be repaid while they were on an MFI's balance sheet.[5] The level of securitised loans was then merely an accumulation of securitisation flows in the past.

Treating securitisations in this way meant that we now had two individual non seasonally adjusted (NSA) series: the level of M4 lending and the level of M4 lending excluding securitisations. The seasonally adjusted versions of these series could then be created by either adjusting one of them, and deriving the second; or adjusting both of them independently.

Which of these methods to use depended upon whether or not securitisations had a seasonal pattern. If they were seasonal, then we should not derive seasonally adjusted M4 lending from the M4 lending excluding securitisations series (as this would create seasonality in
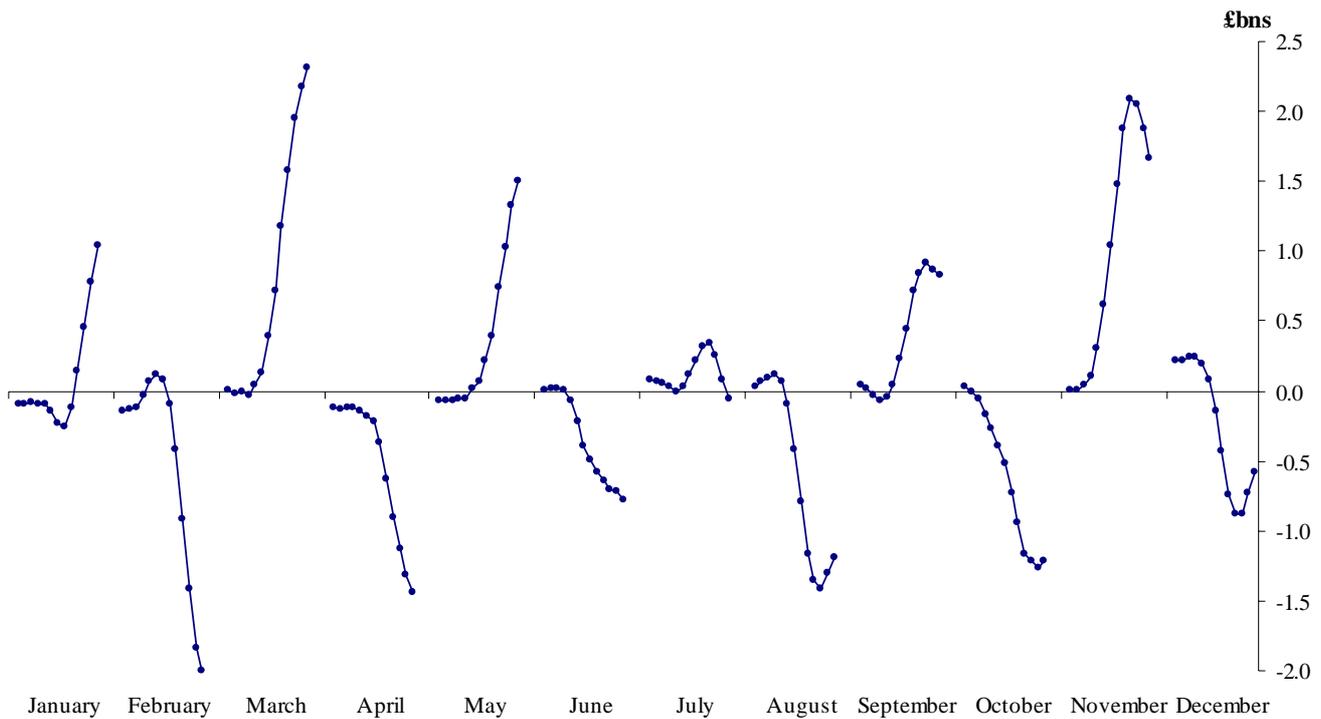
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[1] MFIs consist of banks (including the Central Bank) and building societies.
[2] An SPV is an entity set up for a specific and limited purpose; in this case, to be the entity to have legal ownership of the loan portfolio and to issue the related bonds.
[3] http://www.bankofengland.co.uk/statistics/ms/articles/artnov04.pdf
[4] M4 lending is a measure of MFIs' net sterling loans to and investments in the UK resident private sector.

[5] In reality, repayments on most loans continue while they are off the balance sheet of the MFI, and this assumption is being revisited. At present, given the series is young (large securitisations were not regularly taking place until the late 1990s) it is likely that this assumption is justifiable in the short-term, and empirical work is being undertaken to obtain a better estimate of the level of outstanding securitised loans.

Chart A: Seasonal factors for MFI securitisations and loan transfers

| January | February | March | April | May | June | July | August | September | October | November | December |

a supposedly seasonally adjusted series), unless we used a seasonally adjusted version of the securitisation flows. If securitisations were non-seasonal, we could either seasonally adjust both M4 lending series independently, or seasonally adjust only one series and derive the other using the NSA securitisations data.

The seasonality of securitisations

There is no obvious intuition to lead us to suspect seasonality in the timing of securitisations. In contrast, seasonality in a series such as credit card lending can be more readily anticipated and explained by expected spending patterns throughout the year. Whether a securitisation takes place may be the result of a number of factors. One major factor might be whether or not it is an advantageous time to issue the bonds associated with a securitisation, and it is not obvious why that might be seasonal, or what seasonal pattern it would follow.

X-12-ARIMA enables users to test whether or not a series is seasonal. Using X-12-ARIMA to test a series solely comprising the flow of securitisations showed that there was a large element of seasonality in this series, although this seasonality was changing strongly and therefore difficult to estimate with any precision. So the seasonally adjusted data would be of poor quality, which led the Bank to decide that the series should not be seasonally adjusted.

Chart A shows the seasonal factors identified for the securitisations series, which started in 1992. For each month, the seasonal factor identified for each year is shown consecutively. Where the line moves above 0 there is a greater prevalence of securitisations in that month, and vice-versa. For all months, it is clear that the seasonal factors become stronger over time.

Given the nature of financial innovation, the securitisations series has been developing over a number

of years and it is only since the late 1990s that large securitisations have been prevalent. This shortens the life of the series, in terms of the information needed to estimate seasonal factors. When more data become available, this seasonality may become strong enough, relative to the degree by which it is changing, to estimate seasonal factors reliably. Seasonally adjusting the data over a shorter period improves the stability of the seasonal factors, but not to the extent that they are of good quality.

The final outcome

Because securitisations appear to be seasonal, but cannot be seasonally adjusted reliably, we cannot derive one M4 lending series from the other, as that would introduce seasonality into the derived series. So both M4 lending series had to be adjusted independently. This method was applied to all series affected by securitisations.

The advantage of seasonally adjusting both types of series independently is that it does not matter whether or not the seasonality in a securitisations series can be determined accurately. X-12-ARIMA will remove seasonality if and when it is identifiable. In the interim, X-12-ARIMA may identify outliers where large securitisations affect a lending series and make prior adjustments for these automatically, allowing them to bypass the seasonal adjustment process. But the outliers used by X-12-ARIMA when seasonally adjusting are reviewed regularly, such that only the necessary ones remain.[6] So in the long run there is still sufficient flexibility for securitisation flows to influence the seasonal factors of the series.

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[6] Bank methods were developed such that series were not subject to excessive revision due to potential variability in the identification of a particular outlier, while allowing for some flexibility in the identification of outliers.