**Breaks**

Some tables in this website have been adjusted to eliminate breaks. Contrary to the tables with breaks, which include the observed data and corresponding breaks, all breaks have been eliminated from these tables. Unless otherwise indicated, the same elimination method has been applied in all adjusted tables.

Breaks are caused by several factors including the following:
- changes in the reporting population;
- takeovers and restructurings at banks;
- adjustments to the raising method;
- reclassifications from one sector to another (households sector compared to another sector);
- reclassifications from one type of instrument to another (shifts within deposit categories).

If it is not possible to use source data for the entire time series (e.g. in the event of resubmissions), eliminating the breaks requires additional adjustments to the data observed. The adjustments also result in reconciliation differences in detail items, subtotals and totals (e.g. total assets). On the other hand, eliminating the breaks greatly enhances the user-friendliness for individual series.

*Basic principles*
The following ranking is applied when eliminating breaks:
1) Adjustments based on data adjusted by reporting institutions (resubmissions)
2) Adjustments based on additional qualititative information (from reporting institutions or the market)
3) Multiplicational replacement for positions and flows
4) Tailored solutions

In principle, no adjustments are made for reconciliation differences resulting from multiplicational replacement of series. Maintaining the growth factors observed prevails in this case.

*Dataset adjustments*
The dataset of a table without breaks is adjusted several times based on revised reports submitted by reporting institutions (option 1). Any remaining breaks in the dataset are then adjusted using multiplicational replacement, which means that a break of 10% in period T will lead to positions and position changes that are 10% higher compared to the period before T (see Table 1).

*TABLE 1: Effective multiplicational replacement of a break*

|  | T-9 | T-8 | T-7 | T-6 | T-5 | T-4 | T-3 | T-2 | T-1 | T |
|---|---|---|---|---|---|---|---|---|---|---|
| **Position reported** | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 |
| ***Break*** |  |  |  |  |  |  |  |  |  | 10 |
| **Adjusted position** | 60.5 | 66 | 71.5 | 77 | 82.5 | 88 | 93.5 | 99 | 104.5 | 110 |
| **Growth (report)** |  | 9.09%. | 8.33%. | 7.69%. | 7.14%. | 6.67%. | 6.25%. | 5.88%. | 5.56%. | 5.26%. |
| **Growth (adjustment)** |  | 9.09%. | 8.33%. | 7.69%. | 7.14%. | 6.67%. | 6.25%. | 5.88%. | 5.56%. | 5.26%. |
| **Position change (report)** |  | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| **Position change (adjustment)** |  | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 |

Position changes comprise economic transactions, revaluations and other changes (e.g. amortisations and securitisations). Substantial securitisation (of e.g. residential mortgage loans) reinforces the multiplicational effect of position changes and derived transactions, while the size of the relevant securitisation is known. The impact can be mitigated by excluding securitisations of residential mortgages and corporate loans. This is done by removing securitisations from positions before eliminating the breaks (see also the technical annex, Formula 4). After the breaks have been eliminated from the derived transactions, the positions are recalculated with the most recent observation taken as the base period (Formula 6).

This method may result in adjustments to percentage changes or negative positions, as the break factor is not multiplied by the position change, but by the derived transaction. This method does enhance quality, however, since securitisation transactions do not increase by 10% in retrospect because the position increased by 10%. We have not yet observed negative positions.

*Technical annex to breaks adjustments*
*To determine a position change (SM), the following applies:*

$$SM_t = S_t - S_{t-1} \qquad\qquad\qquad (1)$$

*with*
*S = position observed*

*To determine the break (B) and the break factor (BF), the following applies:*

$$B_t = S_t - SB_t \qquad\qquad\qquad (2)$$

$$BF_t = \frac{S_t}{SB_t} \cdot BF_{t+1} \qquad\qquad\qquad (3)$$

*in which*
*S = position observed after the break[1]*
*SB = position observed before the break*

*Note: For the most recently observed period, $BF_{t+1}$ equals 1, and for periods where no breaks are observed the following applies: S = SB*

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[1] In other words, there is a double observation for period T, and the difference equals the size of the break.

*To determine the derived transaction (T), the following applies:*

$$T_t = SM_t + OM_t - HW_t - B_t \qquad\qquad (4)$$

in which
SM = position change
OM = other change (e.g. securitisations and amortisations (-))
HW = revaluation[2]
B = Break

*To calculate adjusted transactions (T'), the following applies:*

$$T' = T \cdot BF_t \qquad\qquad (5)$$

*in which*
*T = derived transaction*
*BF = break factor (for t = most recent observation, the following applies: BF = 1)*

*To calculate adjusted positions (S'), the following applies:*

$$S'_t = S'_{t+1} - T'_{t+1} + OM_{t+1} \qquad\qquad (6)$$

*in which*
*S' = adjusted position*
*T' = derived transaction*
*OM = other change*

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[2] Revaluations are not included in the adjustment to allow the "price index" (revaluation as a percentage of positions outstanding) to be maintained.