



Annual analysis of revisions to money and credit aggregates and effective interest rates data (2012-14)

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Each year the Bank publishes an analysis of revisions to monthly money and credit data and effective interest rates data produced by the Data and Statistics Division (DSD). This year's analysis shows that revisions can be considered as being immaterial for most series tested. This is the same broad conclusion as was reached in the 2016 analysis of 2011-13 data¹ and the 2015 analysis of 2010-12 data.²

The results are summarised in the following six tables. Tables 1 and 2 present the analysis of the size of revisions for money and credit and effective rates data, showing the mean revision and mean absolute revision. Tables 3 and 4 present the analysis for bias on the same series. For each series, a T-test is the first test conducted. This is the simplest test for bias, and is a function of the mean and standard deviation of the sample of revisions, and the number of observations. This test is properly valid only when the sample of revisions is independently and identically distributed; this condition fails if revisions are subject to autocorrelation or to non-constant variance (heteroskedasticity). Alternative tests for bias can also be used: for example, an adjusted t-test can be defined which takes into account any evidence of significant first order autocorrelation in the revisions; and there is the Newey-West test that in this case allows for heteroskedasticity and autocorrelation up to two lagged months. Tables 5 and 6 provide further analysis of the revisions, showing the root mean squared, ratio to mean revised data and ratio of variance for all series.

¹ For further details, see 'Annual analysis of revisions to money and credit aggregates and effective interest rates data (2011-13)', by Barney Greenish, Dennis Jeevarajasingham and Jas Sarai, Bank of England *Bankstats (Monetary & Financial Statistics)*, June 2016, available at: <http://www.bankofengland.co.uk/statistics/Documents/articles/2016/13jun.pdf>

² For further details, see 'Annual analysis of revisions to money and credit aggregates and effective interest rates data (2010-12)', by Timothy Boobier, Louise Johnston and Gayle Sansum, Bank of England *Bankstats (Monetary & Financial Statistics)*, June 2015, available at: <http://www.bankofengland.co.uk/statistics/Documents/articles/2015/1may.pdf>

Table 1: Revisions to money and credit aggregates, non-seasonally adjusted and seasonally adjusted data (one-month growth rate; or as stated) ^(a)

Series	Non-seasonally adjusted data		Seasonally adjusted data	
	Mean revision	Mean absolute revision	Mean revision	Mean absolute revision
Notes and coin	0.00	0.02	-0.01	0.18
Household Divisia money ^(b)	n.a.	n.a.	0.00	0.11
M4	-0.01	0.07	-0.01	0.19
M4, excluding intermediate OFCs	0.01	0.07	0.00	0.22
M4, retail	-0.01	0.06	0.00	0.10
M4, wholesale	0.01	0.19	0.01	0.52
M4, households	0.01	0.02	0.02	0.05
M4, PNFCs	0.01	0.12	0.01	0.36
M4, OFCs	-0.03	0.18	-0.08	0.53
M4, NIOFCs	0.01	0.37	-0.17	1.34
M4 lending	-0.01	0.07	0.00	0.12
M4. lending excluding intermediate OFCs	0.02	0.12	0.05	0.20
M4, lending to households	0.01	0.01	0.01	0.03
M4. lending to PNFCs	0.05	0.32	0.04	0.36
M4, lending to OFCs	-0.06	0.20	-0.03	0.26
M4, lending to NIOFCs	-0.07	0.67	0.00	0.85
Lending to individuals (secured)	0.03	0.03	0.03	0.03
Lending to individuals (CC)	0.09	0.18	0.11	0.19
Total value of all mortgage approvals, £mn	26 (0.2%)	27 (0.2%)	46 (0.33%)	176 (1.23%)
Number of mortgage approvals for house purchase, 000's	0.1 (0.1%)	0.1 (0.1%)	0.1 (0.2%)	0.7 (1.1%)
Net finance raised by PNFCs, £mn ^(c)	n.a.	n.a.	127.54	679.81

Definitions: see Annex

(a) Revisions calculated after two years to first estimates for the period 2012 to 2014. Net finance raised by PNFCs and total value of all mortgage approvals are reported as monthly flows, in £mn. Number of mortgage approvals for house purchase by number is reported in 000's. Figures in parentheses for certain series represent revisions expressed as a percentage of the mean of the revised published series over the period.

(b) Estimates for Household Divisia money were published as seasonally adjusted data only for the period covered.

(c) Estimates for net finance raised by PNFCs were published as seasonally adjusted data only for the period covered.

Table 2: Revisions to effective interest rates, by product and sector (annualised, percentage points), NSA ^(a)

Series	Mean revision	Mean absolute revision
Rates on outstanding businesses		
Interest bearing sight deposits (households)	0.00	0.01
Time deposits (households)	-0.01	0.01
Loans secured on dwellings to households	0.01	0.01
Credit card loans to households	0.38	0.39
Other loans to households	0.04	0.04
Overdrafts to households	-0.02	0.08
Interest bearing sight deposits (PNFCs)	0.00	0.01
Time deposits (PNFCs)	-0.02	0.03
Overdrafts to PNFCs	-0.01	0.04
Other loans to PNFCs	0.03	0.03
Interest bearing sight deposits (OFCs)	0.00	0.01
Time deposits (OFCs)	0.01	0.03
Other loans to OFCs	-0.02	0.03
Rates on new businesses		
New time deposits (households)*	-0.01	0.02
Loans secured on dwellings (new advances to households)*	0.00	0.00
Other loans (new advances to households)*	0.38	0.39
New time deposits (PNFCs)*	0.00	0.00
Other new loans to PNFCs*	0.03	0.06

Definitions: see Annex

(a) Revisions calculated after two years to first estimates for the period January 2012 to December 2014.

Table 3: Evidence for bias in money and credit aggregates, non-seasonally adjusted and seasonally adjusted data (based on one-month growth rates) ^(a)

Series	Non-seasonally adjusted data			Seasonally adjusted data		
	Evidence for bias: t-tests ^(b)	Evidence for bias: Newey West test	Conclusion on bias	Evidence for bias: t-tests ^(b)	Evidence for bias: Newey West test	Conclusion on bias
Notes and coin	no*	no	Unbiased	no*	no	Unbiased
Household Divisia money ^(c)	n.a.	n.a.	n.a.	no*	no	Unbiased
M4	no	no	Unbiased	no*	no	Unbiased
M4, excluding intermediate OFCs ¹	no	no	Unbiased	no*	no	Unbiased
M4, retail	no	no	Unbiased	no	no	Unbiased
M4, wholesale	no	no	Unbiased	no	no	Unbiased
M4, households	yes	yes	bias	no	no	Unbiased
M4, PNFCs	no	no	Unbiased	no	no	Unbiased
M4, OFCs	no	no	Unbiased	no*	no	Unbiased
M4, NIOFCs	no	no	Unbiased	no*	no	Unbiased
M4 lending	no	no	Unbiased	no	no	Unbiased
M4. lending excluding intermediate OFCs	no	no	Unbiased	no	no	Unbiased
M4, lending to households	yes	yes	bias	no	no	Unbiased
M4. lending to PNFCs	no	no	Unbiased	no	no	Unbiased
M4, lending to OFCs	no	no	Unbiased	no	no	Unbiased
M4, lending to NIOFCs	no	no	Unbiased	no	no	Unbiased
Lending to individuals (secured)	yes	yes	bias	yes	yes	bias
Lending to individuals (CC)	no	no	Unbiased	yes	yes	bias
Total value of all mortgage approvals, £mn	no	no	Unbiased	no	no	Unbiased
Number of mortgage approvals for house purchase, 000's	yes	yes	bias	no	no	Unbiased
Net finance raised by PNFCs, £mn ^(d)	n.a.	n.a.	n.a.	no	no	Unbiased

Definitions: see Annex

(a) Tests are assessed using a 95% confidence interval. Revisions calculated after two years to first estimates for the period 2011 to 2013. Net finance raised by PNFCs and total value of all mortgage approvals by value are reported as monthly flows, in £mn. Number of mortgage approvals for house purchase by number is reported in 000's.

(b) Evidence of bias is judged by the t-test when there is no significant evidence of first order autocorrelation of revisions according to a chi-squared test. Where autocorrelation is significant, the reported outcome represents the result of the adjusted t-test and is indicated as (*).

(c) Estimates for Household Divisia money were published as seasonally adjusted data only for the period covered.

(d) Estimates for net finance raised by PNFCs were published as seasonally adjusted data only for the period covered.

Table 4: Evidence for bias in annualised effective interest rates data, NSA ^(a)

Series	Evidence for bias: t-tests	Evidence for bias: Newey West test	Conclusion on bias
Rates on outstanding businesses			
Interest bearing sight deposits (households)	no*	no	unbiased
Time deposits (households)	no*	no	unbiased
Loans secured on dwellings to households	no*	no	unbiased
Credit card loans to households	no*	yes	inconclusive
Other loans to households	no*	yes	inconclusive
Overdrafts to households	no*	no	unbiased
Interest bearing sight deposits (PNFCs)	no*	no	unbiased
Time deposits (PNFCs)	no*	no	unbiased
Overdrafts to PNFCs	no*	no	unbiased
Other loans to PNFCs	no*	yes	inconclusive
Interest bearing sight deposits (OFCs)	no*	no	unbiased
Time deposits (OFCs)	no*	no	unbiased
Other loans to OFCs	no*	no	unbiased
Rates on new businesses			
New time deposits (households)*	no*	no	unbiased
Loans secured on dwellings (new advances to households)*	no	no	unbiased
Other loans (new advances to households)*	no*	yes	inconclusive
New time deposits (PNFCs)*	no	no	unbiased
Other new loans to PNFCs*	no*	no	unbiased

Definitions: see Annex

(a) Tests are assessed using a 95% confidence interval. Revisions calculated after two years to first estimates for the period January 2012 to December 2014.

(b) Evidence of bias is judged by the t-test when there is no significant evidence of first order autocorrelation of revisions according to a chi-squared test. Where autocorrelation is significant, this is indicated as (*), and the reported outcome represents the adjusted t-test.

Table 5: Measures of root mean square revision and mean square revision for money and credit aggregates, non-seasonally adjusted and seasonally adjusted data ^(a)

Series	Non-seasonally adjusted data			Seasonally adjusted data		
	RMSR (pp)	RMSR, ratio to mean of revised data	MSR, ratio to variance of revised data	RMSR (pp)	RMSR, ratio to mean of revised data	MSR, ratio to variance of revised data
Notes and coin	0.03	0.06	0.00	0.35	0.87	1.02
Household Divisia money ^(b)	n.a.	n.a.	n.a.	0.16	0.28	0.20
M4	0.16	-3.19	0.06	0.31	-6.99	0.18
M4, excluding intermediate OFCs	0.12	0.33	0.06	0.32	0.88	1.40
M4, retail	0.12	0.29	0.06	0.13	0.31	0.40
M4, wholesale	0.42	-0.43	0.04	0.70	-0.72	0.18
M4, households	0.04	0.11	0.01	0.06	0.18	0.32
M4, PNFCs	0.17	0.27	0.02	0.48	0.80	0.71
M4, OFCs	0.41	-0.41	0.03	0.84	-0.84	0.16
M4, NIOFCs	0.59	4.85	0.06	1.96	16.79	1.70
M4 lending (M4L)	0.16	-3.19	0.06	0.21	-0.80	0.11
M4. lending excluding intermediate OFCs	0.21	4.37	0.73	0.26	5.55	1.03
M4, lending to households	0.03	0.27	0.13	0.06	0.47	0.47
M4. lending to PNFCs	0.52	-3.94	0.93	0.49	-3.54	1.99
M4, lending to OFCs	0.54	-0.54	0.07	0.53	-0.53	0.07
M4, lending to NIOFCs	1.23	-55.56	0.42	1.24	-55.66	0.42
Lending to individuals (secured)	0.04	0.39	0.37	0.04	0.35	0.46
Lending to individuals (CC)	0.32	1.67	2.27	0.27	1.30	0.31
Total value of all mortgage approvals, £mn	55	0.00	0.00	238	0.02	0.01
Number of mortgage approvals for house purchase, 000's	0.10	0.00	0.00	1.02	0.02	0.02
Net finance raised by PNFCs, £mn ^(c)	n.a.	n.a.	n.a.	971	5.98	0.10

Definitions: see Annex

(a) Revisions calculated after two years to first estimates for the period 2011 to 2013. Net finance raised by PNFCs and total value of all mortgage approvals are reported as monthly flows, in £mn. Number of mortgage approvals for house purchase is reported in 000's.

(b) Estimates for Household Divisia money were published as seasonally adjusted data only for the period covered.

(c) Estimates for net finance raised by PNFCs were published as seasonally adjusted data only for the period covered.

Table 6: Measures of root mean square revision and mean square revision, effective interest rates, NSA ^(a)

Series	RMSR (pp)	RMSR, ratio to mean of revised data	MSR, ratio to variance of revised data
Rates on outstanding businesses			
Interest bearing sight deposits (households)	0.02	0.02	0.03
Time deposits (households)	0.02	0.01	0.00
Loans secured on dwellings to households	0.02	0.01	0.06
Credit card loans to households	0.54	0.03	3.71
Other loans to households	0.08	0.01	0.22
Overdrafts to households	0.26	0.03	0.25
Interest bearing sight deposits (PNFCs)	0.02	0.04	0.19
Time deposits (PNFCs)	0.05	0.04	0.02
Overdrafts to PNFCs	0.07	0.02	0.19
Other loans to PNFCs	0.05	0.02	1.16
Interest bearing sight deposits (OFCs)	0.03	0.04	0.05
Time deposits (OFCs)	0.06	0.05	0.10
Other loans to OFCs	0.05	0.03	0.16
Rates on new businesses			
New time deposits (households)*	0.03	0.02	0.00
Loans secured on dwellings (new advances to households)*	0.00	0.00	0.00
Other loans (new advances to households)*	0.66	0.09	1.20
New time deposits (PNFCs)*	0.01	0.03	0.01
Other new loans to PNFCs*	0.10	0.04	0.74

Definitions: see Annex

(a) Revisions calculated after two years to first estimates for the period January 2012 to December 2014.

Annex: Definitions

Money and credit series

Notes and coin – LPMVQVT (NSA), LPMVQUT (SA): Monthly 1 month growth rate of total sterling notes and coin in circulation outside the Bank of England (in percent).

Household Divisia money – LPMB6F7 (SA only): Monthly 1 month growth rate of monetary financial institutions' sterling divisia for household sector (in percent).

M4 – LPMVQKY (NSA), LPMVQJS (SA): Monthly 1 month growth rate of M4 (monetary financial institutions' sterling M4 liabilities to private sector) (in percent).

M4, excluding IOFCs – RPMB3D4 (NSA), RPMB68P (SA): Monthly 1 month growth rate of monetary financial institutions' sterling M4 liabilities to Private sector excluding intermediate OFCs (in percent).

M4, retail – LPMVQXX (NSA), LPMVQWW (SA): Monthly 1 month growth rate of monetary financial institutions' sterling retail M4 liabilities to private sector (in percent).

M4, wholesale – LPMVRKC (NSA), LPMVRGU (SA): Monthly 1 month growth rate of monetary financial institutions' sterling wholesale M4 liabilities to private sector (in percent).

M4, households – LPMVVIL (NSA), LPMVVHT (SA): Monthly 1 month growth rate of monetary financial institutions' sterling M4 liabilities to household sector (in percent).

M4, PNFCs – LPMVVIF (NSA), LPMVVHN (SA): Monthly 1 month growth rate of monetary financial institutions' sterling M4 liabilities to private non-financial corporations (in percent).

M4, OFCs – LPMVVHZ (NSA), LPMVVHH (SA): Monthly 1 month growth rate of monetary financial institutions' sterling M4 liabilities to other financial corporations (in percent).

M4 lending (M4L) – LPMBF38 (NSA), LPMVWVM (SA): Monthly 1 month growth rate of monetary financial institutions' sterling net lending to private sector (in percent).

M4, lending excluding IOFCs – RPMB3D5 (NSA), RPMB66P (SA): Monthly 1 month growth rate of

monetary financial institutions' sterling net lending to Private sector excluding intermediate OFCs (in percent).

M4L to households – LPMB3Z7 (NSA), LPMVWNM (SA): Monthly 1 month growth rate of monetary financial institutions' sterling net lending to household sector (in percent).

M4L to PNFCs – LPMB3Z6 (NSA), LPMVWNR (SA): Monthly 1 month growth rate of monetary financial institutions' sterling net lending (historical measure) to private non-financial corporations (in percent).

M4L to OFCs – LPMB3Z5 (NSA), LPMVWNM (SA): Monthly 1 month growth rate of monetary financial institutions' sterling net lending (historical measure) to other financial corporations (in percent).

Lending to individuals (secured) – LPMVTYD (NSA), LPMVTYF (SA): Monthly 1 month growth rate of total sterling net secured lending to individuals (in percent).

Lending to individuals (consumer credit) – LPMB3UJ (NSA), LPMVWAW (SA): Monthly 1 month growth rate of monetary financial institutions' sterling net consumer credit (excluding credit card) excluding securitisations to individuals (in percent).

Total value of all mortgage approvals, £mn – LPMVTVN (NSA), LPMVTVQ (SA): Monthly value of total sterling approvals for secured lending to individuals (in sterling millions).

Number of mortgage approvals for house purchase, 000's – LPMVTVU (NSA), LPMVTVX (SA): Monthly number of total sterling approvals for house purchase to individuals.

Net finance raised by PNFCs, £mn – LPMVYVV (SA only): Monthly amount of private non-financial corporations' sterling and all foreign currency funds raised from UK MFIs and capital markets (in sterling millions).

Effective interest rates series (outstanding business)

Please note that series codes changed from January 2016 data as part of changes from the ER Rolling Review. For further details, please see the article "Developments in Effective Rates statistics" in the *Bankstats* December 2015 edition.

Interest bearing sight deposits, households – CFMHSCV: Monthly average of UK resident monetary financial institutions' (excl. Central Bank) sterling weighted average interest rate, interest bearing sight deposits from households (in percent).

Time deposits, households – CFMHSCW: Monthly average of UK resident monetary financial institutions' (excl. Central Bank) sterling weighted average interest rate, time deposits from households (in percent).

Loans secured on dwellings to households – CFMHSDE: Monthly average of UK resident monetary financial institutions' (excl. Central Bank) sterling weighted average interest rate, loans secured on dwellings to households (in percent).

Credit card loans to households – CFMHSDG: Monthly average of UK resident monetary financial institutions' (excl. Central Bank) sterling weighted average interest rate, credit card loans to households (in percent).

Other loans to households – CFMHSDI: Monthly average of UK resident monetary financial institutions' (excl. Central Bank) sterling weighted average interest rate, other loans to households (in percent).

Overdrafts to households – CFMHSDH: Monthly average of UK resident monetary financial institutions' (excl. Central Bank) sterling weighted average interest rate, overdrafts to households (in percent).

Interest bearing sight deposits, PNFCS – CFMHSCT: Monthly average of UK resident monetary financial institutions' (excl. Central Bank) sterling weighted average interest rate, interest bearing sight deposits from private non-financial corporations (in percent).

Time deposits, PNFCS – CFMHSCU: Monthly average of UK resident monetary financial institutions' (excl. Central Bank) sterling weighted

average interest rate, time deposits from private non-financial corporations (in percent).

Overdrafts to PNFCS – CFMHSDB: Monthly average of UK resident monetary financial institutions' (excl. Central Bank) sterling weighted average interest rate, overdrafts to private non-financial corporations (in percent).

Other loans to PNFCS – CFMHSDC: Monthly average of UK resident monetary financial institutions' (excl. Central Bank) sterling weighted average interest rate, other loans to private non-financial corporations (in percent).

Interest bearing sight deposits, OFCs – CFMHSCR: Monthly average of UK resident monetary financial institutions' (excl. Central Bank) sterling weighted average interest rate, interest bearing sight deposits from other financial corporations (in percent).

Time deposits, OFCs – CFMHSCS: Monthly average of UK resident monetary financial institutions' (excl. Central Bank) sterling weighted average interest rate, time deposits from other financial corporations (in percent).

Other loans to OFCs – CFMHSDA: Monthly average of UK resident monetary financial institutions' (excl. Central Bank) sterling weighted average interest rate, other loans to other financial corporations (in percent).

Effective interest rates series (new business)

Time deposits, households – CFMBJ74: Monthly average of UK resident monetary financial institutions' (excl. Central Bank) sterling weighted average interest rate - new time deposits from households (in percent).

Loans secured on dwellings to households – CFMBJ95: Monthly average of UK resident monetary financial institutions' (excl. Central Bank) sterling weighted average interest rate, loans secured on dwellings, new advances to households (in percent).

Other loans to households – CFMBJ93: Monthly average of UK resident monetary financial institutions' (excl. Central Bank) sterling weighted average interest rate - other loans, new advances to households (in percent).

Time deposits, PNFCs – CFMBJ72: Monthly average of UK resident monetary financial institutions' (excl. Central Bank) sterling weighted average interest rate - new time deposits from private non-financial corporations (in percent).

Other loans to PNFCs – CFMBJ82: Monthly average of UK resident monetary financial institutions' (excl. Central Bank) sterling weighted average interest rate - other loans, new advances to private non-financial corporations (in percent).