Article

Economic Statistics Transformation Programme: enhanced financial accounts (UK flow of funds) - 2017 matrix update

This is the annual update of the flow of funds matrices and includes new visualisations. This release incorporates the latest Blue Book publication published on the 31 October 2017.

Correction

27 November 2017

A correction has been made to the section on interpreting the heatmap visulisation (Section 4). This was due to a small error when we examined the data in the heatmap itself.

You can see the original content in the superseded version. We apologise for any inconvenience.

Table of contents

1 . Abstract

This article summarises the latest flow of funds matrices, which show the financial relationships between the various sectors of the UK economy.

Included in this article is a presentation of the latest from-whom-to-whom statistics, with experimental estimates for the majority of financial instruments from 1997 to 2016. These data are consistent with the data published in the Office for National Statistics publications UK Economic Accounts (UKEA Quarter 2 (Apr to June) 2017) and the UK National Accounts Blue Book 2017.

This article also introduces new visualisations for these statistics as well as an updated Sankey diagram (initially published in March 2016). These new visualisations are a result of ongoing development work aimed at making our data more accessible and informative for our users. We welcome further feedback on the way we present this data. We have also produced a refreshed suite of explanatory notes which are linked into Section 12 of this article.

Please contact us via FlowOfFundsDevelopment@ons.gov.uk if you would like to provide feedback.

2 . Introduction

We have ambitious plans to transform our economic statistics over the coming years, informed by our Economic Statistics and Analysis Strategy and with the aim of increasing the robustness and quality of the UK economic statistics. Office for National Statistics (ONS) and Bank of England (BoE) are working in partnership to deliver the UK's enhanced financial accounts (flow of funds) initiative. An important part of this work is to develop from-whom-to-whom estimates for financial account transactions and balance sheet levels, publishing the counterparty relationships for each financial instrument rather than the total asset and/or liability position for each institutional sector in isolation. These data were initially published in 2015 and updated in 2016.

This article includes data consistent with the ONS publications UK Economic Accounts (UKEA Quarter 2 (Apr to June) 2017) and the UK National Accounts Blue Book 2017.

The article introduces new visualisations, which have been designed to aid the understanding of this complex area. This article also provides greater granularity in the Experimental Statistics in the form of:

- providing from-whom-to-whom estimates for households (HH) and non-profit institutions serving households (NPISH) as separate institutional sectors for the first time

- providing a breakdown of loans data, showing short-term loans and long-term loans separately

Lastly, the article briefly highlights other areas of development within the enhanced financial accounts initiative, which will add further granularity and improve the quality and coverage of the flow of funds matrices in the future.

3 . Visualising flow of funds statistics

In an article published in March 2016, Office for National Statistics (ONS) introduced a new way to visualise flow of funds statistics. Sankey diagrams were used to visualise the counterparty relationships between institutional sectors. These visualisations have now been updated to incorporate data that are consistent with the Quarter 2 (Apr to June) 2017 published national accounts data. In addition a tooltip chart has been added to show the underlying time series data for each interaction in the Sankey. This tooltip chart can be toggled on and off using the buttons at the top of the Sankey.

Figure 1: UK Flow of Funds: Sector-to-sector interactions for financial balance sheets by financial instrument

Further explanation of the institutional sectors and financial instruments included in Figure 1 can be found on our website.

Interpreting Figure 1:

In the national accounts, all financial instruments have an economic owner – the people or entities that are considered to hold the asset – and all financial instruments (except monetary gold) have counterparty relationships – the people or entities that are considered to hold the liability. For example, when a private individual deposits cash in a bank account, the national accounts balance sheets record a number of things simultaneously, as follows:

- a decrease in the amount of cash the person holds as a financial asset

- an increase in the amount of cash the bank holds as a financial asset

- an increase in the amount of deposits the person holds as a financial asset

- an increase in the amount of deposits the bank holds as a financial liability

While the national accounts record the counterparties' transactions separately, the from-whom-to-whom accounts link the asset and liability holders.

The Sankey diagram in Figure 1 illustrates this example, where the private individual appears in the households (HH) sector on the right hand side and the bank appears in the monetary financial institutions (MFI) sector on the left. If you hover the mouse over the left hand side of the savings instrument in Figure 1, this shows the total amount of liabilities held by the MFI sector in deposits. If you hover over the right hand side of the savings instrument in Figure 1, this shows the total amount of assets in deposits held by each counterpart sector. From this figure we can see that the households are relatively small depositors with the majority of the deposits to the MFI sector made by entities outside of the UK.

There are also bar charts embedded within the interactive, known as a tooltip, which show the underlying time series data of each thread. In Figure 1, by hovering on the right hand side of the interactive, we can see that the total assets held by the households sector in deposits is £1,258 billion for 2016, for example.

4 . Introducing new visualisations of flow of funds statistics

As part of the ongoing programme of development, the flow of funds team has been working in partnership with the Office for National Statistics (ONS) Data Visualisation Team to design an alternative way to illustrate the flow of funds statistics. This article introduces two new visualisations, which we hope will help to illustrate the complex relationships within the from-whom-to-whom matrices. To further assist understanding, the Visual.ONS team has produced a blog, which provides additional information about these visualisations and what they show.

Heatmap

Heatmaps are used to visualise data through variations in colouring and shading. A scale is set to define the parameters of each colour and the individual cells are assigned a colour based on this scale.

In the context of flow of funds statistics, we can use each cell of the Heatmap to represent the relationship between the institutional sectors, which hold a proportion of the UK's financial holdings. This highlights which relationships hold the largest proportion of UK financial instruments when compared with the other counterparty relationships.

Figure 2: Heat map to illustrate the proportion of total financial instruments held in each counterparty relationship

Visualise this in a larger version

Notes:

1. PC = public corporations, PNFC = private non-financial corporations, MFI = monetary financial institutions, OFI = other financial institutions, ICPF = insurance corporations and pension funds, CG = central government, LG = local government, HH = households, NPISH = non-profit institutions serving households, RoW = rest of the world

Interpreting Figure 2:

The Heatmap is intended to identify which pairs of sectors hold the largest proportions of total financial instruments. This means that the sum of all cells will equate to 100%. The percentage scale in Figure 2 indicates that the largest proportion of total financial instruments held by a single counterparty relationship in 2016 is 10%.

So if we interpret Figure 2 directly, one of the darkest cells shows that out of the total financial holdings in the UK, 10.39% is held as an asset of monetary financial institutions (MFIs) and a liability of the rest of the world. One of the lightest cells shows that out of the total financial holdings in the UK, negligible amounts (0.0%) are held as an asset of the non-profit institutions serving households (NPISH) sector and a liability of the private non-financial companies (PNFC) sector.

Small multiples

In our second new visualisation we are introducing a matrix of small multiples. Each individual time series represents the institutional sector that holds the financial liabilities and the counterpart institutional sector that holds the financial assets for the combined total of all published transactions. The graphs can be displayed on the same scale or on different scales depending on the needs of the users.

Figure 3 – Small multiples to illustrate the total financial transaction relationships within the matrices published

Visualise this in a larger version

Notes:

1. PC = public corporations, PNFC = private non-financial corporations, MFI = monetary financial institutions, OFI = other financial institutions, ICPF = insurance corporations and pension funds, CG = central government, LG = local government, HH = households, NPISH = non-profit institutions serving households, RoW = rest of the world

Interpreting Figure 3:

The multiple graphs are displayed in a tabular form where each cell of the table represents an individual time series relationship, as described in numbers in the from-whom-to-whom matrices. By clicking on a specific cell, this will bring up a larger version of that particular time series and to return to the main matrix you need to click within the graph again. A user can also toggle the scaling at the top of the matrix as required.

5 . Changes to the flow of funds matrices

Background

This update includes four additional quarters of data for the year 2016, as well as updating the time series with the newly published data in the UK Economic Accounts (UKEA 2017) consistent with the UK National Accounts Blue Book 2017. A number of other changes have been implemented within the matrices in order to improve on the published information. These changes include:

- publishing the households (HH) and non-profit institutions serving households (NPISH) sectors separately

- publishing a breakdown of loans data (AF.4) into short-term (AF.41) and long-term (AF.42) loans

Separating households (HH) and non-profit institutions serving households (NPISH)

Previously, the institutional sectors households (HH) and non-profit institutions serving households (NPISH) have been presented as a single combined sector in the Blue Book and quarterly national accounts. Acknowledging user demand and as part of the implementation of the European System of Accounts 2010: ESA 2010, we now present these sectors separately within the accounts.

We first published separate accounts for HH and NPISH as part of the Blue Book 2017 consistent with UKEA on 30 September 2017. An article describing the impact of the separation on national accounts aggregates was also published.

We are publishing experimental from-whom-to-whom statistics for the HH and NPISH sectors separately for the first time. We are also publishing an updated version of the explanatory notes alongside this article, which will outline the data sources and methods used to produce Experimental Statistics for each financial instrument for HHs and NPISH as separate institutional sectors. These notes will be published shortly and links, once published can be found in the Relevant links section (section 12).

Producing data for the HH and NPISH sectors separately has shown that for all financial instruments, HHs have a much higher proportion of total financial assets and total financial liabilities. The impact of this change overall is illustrated in Tables 1 and 2 using 2015 data.

As part of the work to separate this in the national accounts there have been some revisions to the data underlying these tables. This has caused some larger changes between the two datasets as shown in the HH to private non-financial corporations (PNFCs) section in the tables. An article was published in April 2017 providing an overview of the [largest impacting methodological changes in calculating households and NPISH separate accounts](). Please note that blank cells in Tables 1 and 2 refer to areas where data is not currently available or where this relationship is not possible.

Table 1: Data published in August 2016 showing the combined household & non-profit institutions serving households data, 2015, £billion

Asset:	PC	PNFC	MFI	OFI	ICPF	CG	LG	HH+NPISH[2]	RoW	Unknown	Total
PC	0.8	0.1	4.1	0.1		2.6	0.4		2.3	0.3	10.7
PNFC	0.6	71.1	429.0	61.6	4.0	11.3	0.7		1230.8	81.9	1891.1
MFI	0.2	420.7	1868.4	1244.5	100.1	565.1	10.3	1266.5	4761.6	393.3	10630.8
OFI	20.7	63.3	1425.2	222.3	11.4	176.6	0.2	170.6	2481.7	900.4	5472.3
ICPF	3.1	1059.0	284.1	759.0	13.1	448.4	62.8	92.7	1072.1	363.3	4157.6
CG	4.7	10.8	24.8	33.5	1.3	0.5	64.6	115.3	85.3	1.4	342.2
LG	130.9	0.1	29.4	0.0	0.7	4.5		11.4	1.4	4.3	182.6
HH+NPISH[2]	0.0	4.0	1255.5	376.2	3731.1	206.9	0.2	2.4	192.5	340.7	6109.4
RoW	1.1	1135.8	4433.7	1809.6	102.0	522.3	6.3	30.5		2077.0	10118.1
Unknown	0.0	2035.5	672.4	1325.9	123.0	4.4	0.0	1.4	0.0		
Total	162.1	4800.4	10426.5	5832.7	4086.7	1942.5	145.4	1690.8	9827.7		

Source: Office for National Statistics

Notes:

1. PC = public corporations, PNFC = private non-financial corporations, MFI = monetary financial institutions, OFI = other financial institutions, ICPF = insurance corporations and pension funds, CG = central government, LG = local government, HH+NPISH = households and non-profit institutions serving households, RoW = rest of the world

2. This sector is separated in Table 2.

Table 2: New data showing the separated household & non-profit institutions serving households sectors, 2015, £billion

Liability:

Assets:	PC	PNFC	MFI	OFI	ICPF	CG	LG	HH[2]	NPISH[2]	RoW	Unknown	T
PC		0.1	9.9	0.1		3.3	0.4			2.3	1.2	
PNFC	0.6	71.1	429.3	57.5	3.8	11.8	0.7			1,202.3	80.6	1,8
MFI	0.2	411.3	1,866.3	1,239.2	105.4	32.3	10.3	1,257.4	8.9	4,763.3	936.3	10,6
OFI	0.5	172.3	1,405.7	233.1	15.0	225.1	0.0	162.2		2,214.2	680.5	5,1
ICPF	2.1	700.6	276.1	732.1	8.0	475.0	75.9	28.0	40.5	1,067.1	396.6	3,8
CG	4.7	11.3	26.6	34.1	1.3	0.5	65.3	107.2	7.6	85.3	0.9	3
LG	130.6	0.1	29.0	0.0	0.6	4.5		10.1	1.6	1.4	4.3	1
HH[2]	-0.0	275.3	1,271.3	269.3	3,277.7	138.0	1.8	2.4		172.9	135.9	5,5
NPISH[2]			24.0	0.2	0.6	0.1	0.1			48.0	97.6	1
RoW	1.1	2,114.7	4,436.7	1,543.2	89.0	648.7	6.3	24.4	6.1		1,047.0	9,9
Unknown	67.3	671.3	632.0	1,463.7	123.0	404.9	0.0	0.0	1.7	0.0		3,3
Total	207.2	4,428.1	10,407.0	5,572.6	3,624.5	1,944.1	160.8	1,591.6	66.3	9,556.7	3,380.6	

Source: Office for National Statistics

Notes:

1. PC = public corporations, PNFC = private non-financial corporations, MFI = monetary financial institutions, OFI = other financial institutions, ICPF = insurance corporations and pension funds, CG = central government, LG = local government, HH = households, NPISH = non-profit institutions serving households, RoW = rest of the world

2. These sectors are combined in Table 1.

Splitting loans data between short-term and long-term

Previously, we have published the experimental from-whom-to-whom statistics for loans (AF.4) at an aggregate level. However, recent development work in response to demand from external stakeholders has allowed us to provide further granularity for loans and separately publish estimates for short-term loans (AF.41) and for long-term loans (AF.42). Having this additional level of data will allow further analysis of these tables to take place and aid with understanding how the economy is working. Tables 3 and 4 show the new short- and long-term loan table and Figure 4 shows what this split of data shows.

Table 3: From-whom-to-whom balance sheet short-term loans statistics, 2016, £billion

Assets:	Liability: PC	PNFC	MFI	OFI	ICPF	CG	LG	HH	NPISH	RoW	Unknown	Total
PC												
PNFC												
MFI	2.0	353.7		683.7	21.9	3.5	10.3	150.8	8.7	1,097.1	0.0	2,331.8
OFI												
ICPF												
CG												
LG												
HH												
NPISH												
RoW		126.1		552.8	34.4	5.2		29.5	8.2		0.0	756.4
Unknown												
Total	2.0	479.9		1,236.6	56.4	8.8	10.3	180.3		1,097.1	0.0	

Source: Office for National Statistics

Notes:

1. PC = public corporations, PNFC = private non-financial corporations, MFI = monetary financial institutions, OFI = other financial institutions, ICPF = insurance corporations and pension funds, CG = central government, LG = local government, HH = households, NPISH = non-profit institutions serving households, RoW = rest of the world

Table 4: From-whom-to-whom balance sheet long-term loans statistics, 2016, £billion

	Liability:											
Asset:	**PC**	**PNFC**	**MFI**	**OFI**	**ICPF**	**CG**	**LG**	**HH**	**NPISH**	**RoW**	**Unknown**	**Total**
PC		0.1				0.0	0.4			0.7	0.8	2.0
PNFC	0.6			38.5		6.2	0.6			230.2		276.1
MFI		42.2		0.1				1,157.0		1.9	8.8	1,210.1
OFI		195.0		3.8			0.0	168.0		463.0	1.3	831.2
ICPF		88.8		51.4			5.6	27.0		11.5		184.3
CG	1.2	11.3					67.9	115.6	8.2	3.1	0.0	207.5
LG	5.7	0.1				0.5		11.1			0.0	17.3
HH		2.3		13.5	0.5	0.0		2.4			0.0	18.7
NPISH												
RoW	1.1	338.4		48.6	15.4	0.5	6.5				37.7	448.2
Unknown	46.9	0.8	0.0			0.8	0.1	0.0		0.0		48.7
Total	55.5	679.1	0.0	156.0	15.9	7.9	81.2	1,481.0		710.4	48.7	

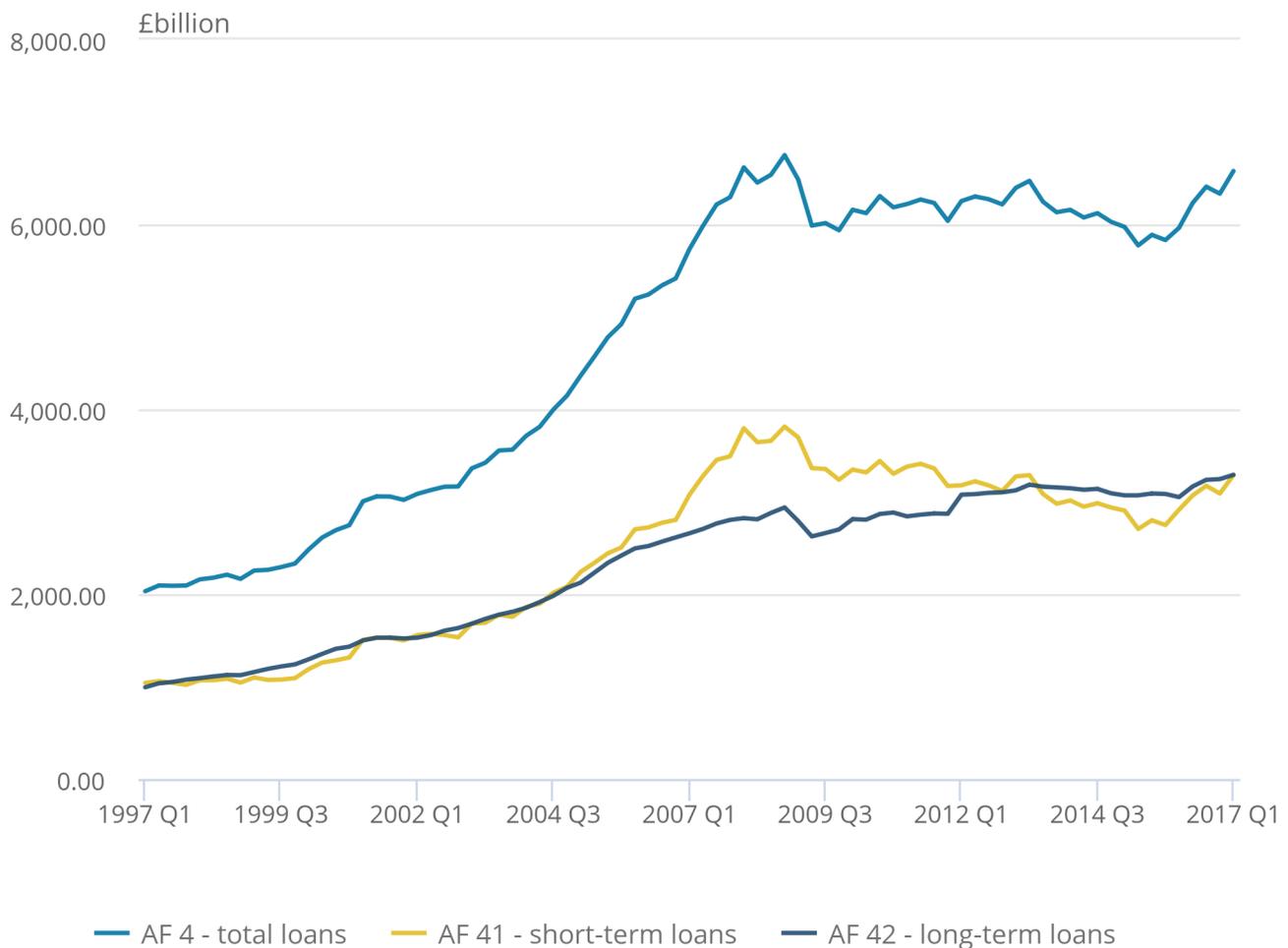Source: Office for National Statistics

Notes:

1. PC = public corporations, PNFC = private non-financial corporations, MFI = monetary financial institutions, OFI = other financial institutions, ICPF = insurance corporations and pension funds, CG = central government, LG = local government, HH = households, NPISH = non-profit institutions serving households, RoW = rest of the world

Figure 4: The separation of loan statistics into short-term and long-term loans over time

Quarter 1 (Jan to Mar) 1997 to Quarter 1 (Jan to Mar) 2017

Source: Office for National Statistics

Source: Office for National Statistics

Interpreting Figure 4:

Figure 4 shows the difference between the previously published AF.4 time series and its component AF.41 and AF.42. This split highlights that there was a drop in long-term loans in late 2008 to 2009 but that since the financial crisis this area has shown a steady recovery. On the other hand short-term loans have been a lot more volatile, with a slow reduction since the financial crisis, although in recent years there has been resurgence.

6 . Commercial data

Office for National Statistics (ONS) recently published an article on the progress of commercial data use. This article provided an update on the use of commercial data on borrowing acquired from the credit reference agency Equifax for the enhanced financial accounts initiative. Although these data are not included in this update of the flow of funds matrices, it is anticipated that these data will be included in the next set of flow of funds matrices in 2018.

7 . Expansion of the financial sub-sectors

In June 2017, work was published on how a new survey within Office for National Statistics (ONS) is being used to help further split the financial sectors to provide greater granularity . This work, although not yet implemented into these tables, will form part of the annual update for 2018. It will allow us to separate out the non-money market funds (NMMF) sector of the national accounts within the tables and marks a significant improvement in the sectorisation area. We also intend to publish separate Experimental Statistics for the Money Market Funds (MMF) sector (currently included within monetary financial institutions) as part of the annual update for 2018.

8 . Reconciling historical data sources for the households and non-profit institutions serving households (NPISH) sectors

As part of the work within the enhanced financial accounts initiative, work has been undertaken to reconcile historical data sources for the households (HH) and non-profit institutions serving households (NPISH) sectors. This is a continuation of the work started in 2016 . The article produced in September 2017 described progress on initial steps to reconstruct historical time series using the sources identified in the 2016 article. This covers historical data that goes further back than these published whom-to-whom matrices. As this only covers two sectors of the economy there are currently no plans to integrate this into the matrices but the work forms an integral part of our work to ensure that our time series data covers all periods possible.

9 . Changes to defined contribution pension fund estimates

As part of the improvements made for Blue Book 2017, there have been changes to the estimates for defined contribution pension schemes, which have improved the estimates of the insurance, pensions and standardised guarantee schemes transactions (AF.6). As described in an article published in January, these changes note a big step forward in this area. Further improvements will be incorporated into the tables at the earliest opportunity.

10 . Further work

As part of the enhanced financial accounts initiative, we will continue to improve these from-whom-to-whom Experimental Statistics. In particular, we will aim to reduce the size of the unknown sector as a counterpart. Additionally, these matrices will continue to be updated with new data as they become available including commercial data mentioned in section 6 and further publications of the UK Economic Accounts (UKEA) consistent with the National Accounts Blue Book. Any queries regarding this work or any comments should be sent to the flowoffundsdevelopment@ons.gov.uk inbox.

11 . Acknowledgements

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12 . Relevant links

Flow of Funds archived background information

Explanatory notes: to be published shortly

Institutional sectors and financial instruments

AF.2 Currency and deposits

AF.3 Debt securities

AF.4 Loans

AF.5 Equity and investment fund shares or units

AF.6 Pension, insurance and standardised guarantee schemes

AF.71 Financial derivatives

23 October 2017 Article – Economic Statistics Transformation Programme: enhanced financial accounts (UK flow of funds) – progress on commercial data use

25 September 2017 Article – Economic Statistics Transformation Programme: enhanced financial accounts (UK flow of funds) reconciling sources of historic data for households and the non-profit institutions serving households (NPISH) sectors

12 September 2017 Article – Economic Statistics Transformation Programme: Enhanced financial accounts (UK flow of funds) – A flow of funds approach to understanding financial crises

31 August 2017 Article – Economic Statistics Transformation Programme: enhanced financial accounts (UK flow of funds) estimating the value of other accounts receivable or payable in the UK economy

21 July 2017 Article – Economic Statistics Transformation Programme: enhanced financial accounts (UK flow of funds) improving the measurement of company quarterly profits

3 July 2017 Article - Economic Statistics Transformation Programme: Enhanced financial accounts (UK flow of funds) progress on financial derivatives data

5 June 2017 Article – [National Accounts articles: The UK Enhanced Financial Accounts; the introduction of the new securities dealers survey data and expansion of financial sub-sector detail](#)

31 May 2017 Article – [Economic Statistics Transformation Programme: Enhanced financial accounts (UK flow of funds) commercial data use](#)

31 May 2017 Article – [Economic Statistics Transformation Programme: Enhanced financial accounts (UK flow of funds) improving the economic sector breakdown](#)

27 April 2017 Article – [Economic Statistics Transformation Programme: Enhanced financial accounts (UK flow of funds) employee stock options](#)

24 April 2017 Article – [Financial intermediation services indirectly measured (FISIM) in the UK revisited](#)

29 March 2017 Article – [Economic Statistics Transformation Programme: Enhanced financial accounts (UK flow of funds) Government tables for the special data dissemination standards plus (SDDS plus)](#)

30 January 2017 Article – [The UK Enhanced Financial Accounts: changes to defined contribution pension fund estimates in the national accounts; part 2 – the data](#)

16 January 2017 Article – [The UK Enhanced Financial Accounts: changes to defined contribution pension fund estimates in the national accounts; part 1 – the methodology](#)

8 August 2016 Article – [Economic Statistics Transformation Programme: UK flow of funds experimental balance sheet statistics, 1997 to 2015](#)

14 July 2016 Article – [Economic Statistics Transformation Programme: Flow of funds - the international context](#)

14 July 2016 Article – [Economic Statistics Transformation Programme: Developing the enhanced financial accounts (UK Flow of Funds)](#)

10 March 2016 Article – [Identifying Sectoral Interconnectedness in the UK Economy](#)

24 February 2016 Article – [Improvements to the Sector and Financial Accounts](#)

12 January 2016 Article – [Historical Estimates of Financial Accounts and Balance Sheets](#)

6 November 2015 Article – [Comprehensive Review of the UK Financial Accounts](#) including explanatory notes for each financial instrument covered in the article

13 July 2015 Article – [Introduction Progress and Future Work](#)