Office for National Statistics

Article

UK financial accounts experimental statistics flow of funds matrices: 2020

The latest experimental UK whom-to-whom matrices, covering annual data for 2016, 2017 and 2018. This includes progress to improve quality, coverage, granularity and counterparty information.

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Release date:
7 December 2020

Next release:
To be announced

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1 . Main points

- For the first time this article presents experimental flow of funds whom-to-whom matrices estimates for 2018 , along with highlights of improvements to the previously published 2016 and 2017 experimental statistics.

- The key 2016 to 2018 experimental whom-to-whom statistics are presented via Sankey diagrams in addition to the whom-to-whom matrices tables.

- The data presented in this article are experimental statistics, which means that they are "under active development" and so are not directly comparable with the Office for National Statistic's National Accounts statistics, such as the Blue Book.

- For the first time, results from the recent UK pension surveys: redevelopment 2019 have been incorporated into this release and this has resulted in improvements to the experimental statistics for the pensions funds sector.

- Improvements have been made in this release to the method used for allocating financial balances relating to the pension fund management business of insurance companies.

- The 2018 listed shares (AF.511) experimental statistics presented in this article have been constructed by the Office for National Statistics (ONS) using data from the London Stock Exchange (LSE) in conjunction with commercially sourced data.

- Deposit Taking Corporations' (banks and building societies), in 2018, were the largest UK-based asset holder with total financial assets of £11.5 trillion, of which £5.3 trillion is held as overseas assets.

- Total loan liabilities increased from £8.4 trillion in 2016 to £9.3 trillion by 2018. Of this £0.9 trillion increase in loans liabilities, £0.4 trillion were short-term loans issued by UK Deposit Taking Corporations (banks and building societies).

- There was notable growth in the value of long-term debt transactions (AF.32) between 2016 and 2018. The largest growth of liabilities was observed by Captive Financial Institutions and Money Lenders (S.127) which was 38%. Private Non-Financial Corporations long-term debt liabilities also grew by 9.8%.

- In 2018, private non-financial corporations (PNFCs), which includes sectors such as retailers, manufacturers and service providers had the largest negative subsector net financial asset holding of -£3.5 trillion.

- The main Derivatives counterparties in 2018 were Deposit Taking Corporations (£2.3 trillion), Rest of the World (£2.2 trillion) and Other Financial Intermediaries (£1.2 trillion). Together these accounted for more than 87 per cent of the total Derivatives assets and liabilities in 2018.

- The Pension Fund sector's main investments, in 2018, were in Non-Money Market Funds (£0.8 trillion), Long-term Debt Securities (£0.7 trillion) including £0.4 trillion of UK Government Gilts, and Derivatives (£0.3 trillion).

2 . Overview

The development of experimental statistics for financial balance sheets and transactions is essential for identifying risks in the financial sector and in understanding financial connections between the institutional sectors and sub-sectors of the economy, see (Barker 2014).

Since December 2014, the Office for National Statistics (ONS) and the Bank of England (BoE) have been working in partnership to improve the flow of funds statistics for the UK. We set out in our initial flow of funds article why improving the UK financial accounts is so important and our plans and ambitions to improve the quality, coverage and granularity of UK Financial Accounts including better whom-to-whom statistics.

In the context of the joint ONS and BoE UK Flow of Funds Project (FoF), the term flow of funds is used to refer to the development of whom-to-whom statistics, with this article presenting balance sheet levels. The need for improvement of the UK financial accounts was first recognised in the National Statistics Quality Review: National Accounts and Balance of Payments (2014).

These improvements were also a core theme in the Independent Review of UK Economic Statistics (2016) (PDF, 5MB), also known as the Bean Review. The FoF initiative builds upon the existing National Accounts statistics that ONS publishes in the UK Economic Accounts (UKEA), UK National Accounts (Blue Book) and the UK Balance of Payments (Pink Book).

The development of whom-to-whom data for financial transactions and balance sheets has gained increasing international interest. The European System of Accounts manual (ESA 2010) and the United Nations (UN) System of National Accounts (SNA 2008) both recommend the implementation of Flow of Funds matrices into the National Accounts. The development of these data are further encouraged in a number of global data initiatives, including the International Monetary Fund's (IMF) Special Data Dissemination Standard Plus (SDDS+) and the G20 Data Gaps Initiative (DGI).

Flow of funds data provide policymakers and regulators with information required to assess counterparty risks in the economy. Assessment of events leading to the 2007 to 2009 economic downturn drew attention to an urgent need to improve the quality, coverage and detail of financial statistics, to better support financial stability and prudential analysis. Counterparty information (whom-to-whom statistics) on balances and transactions in the financial accounts (the flow of funds) was identified as a particular need.

As an economy with a large and international financial sector, this is of particular importance for the UK. Good quality, detailed financial statistics are necessary to drive the robust analyses required by policymakers, economists and market analysts, see A flow of funds approach to understanding financial crises. There are also broader benefits from the collection of these data in better understanding sectoral balance sheets and the flow and distribution of credit within the economy, which in turn are useful for the analysis of consumption and investment trends.

For any given financial instrument, flow of funds measures financial flows across sectors of the UK economy and the rest of the world, tracking funds as they move from one sector to another. In addition, flow of funds is based upon the principle that the movement of all funds must be accounted for. A consequence of this approach is that for any given economy, total sources of funds must equal total uses of funds, and financial asset transactions must equal transactions in liabilities. Flow of funds therefore presents information on financial debtor and creditor relationships and captures the changes in financial assets and liabilities in the economy.

An important step for the delivery of the flow of funds initiative was to develop whom-to-whom matrices, presenting Experimental Statistics for financial balance levels. Although sectoral data for the UK, that is, who holds what financial instrument (for example debt securities, loans and shares) by institutional sector, are already published in the UK National Accounts, the whom-to-whom matrix approach provides a separate matrix for each financial instrument, with the matrix having the same sectors on the assets axis as the liabilities axis.

This matrix representation makes it easier for users to visualise the financial counterparty relationships, that is, assets and liabilities, between the different sectors of UK economy and the Rest of the World. So, for example, the whom-to-whom matrices show which sectors have advanced loans to the household sector, such as banks, non-bank lenders and the Rest of the World.

This is an improvement on the traditional balance sheet approach that simply shows the household sector's total loans owed (that is, liabilities) and the total loans made (assets) by banks and building societies, non-bank lenders and the Rest of the World.

In November 2019, the ONS published its first experimental whom-to-whom matrices that provided experimental balance sheet statistics for 2016 and 2017. This represented an improvement in granularity in terms of both additional sectors covered and the financial instrument detail level. Those matrices used more than 10 new data sources to provide the extra granularity, with seven extra sectors and a more detailed breakdown of financial instruments.

This is the second Enhanced financial accounts article that we have published, providing whom-to-whom financial counterparty Experimental Statistics. It improves upon the original 2016 and 2017 whom-to-whom matrices published in the first article in late 2019 by updating them to reflect improvements in methods and input data, where available.

For the first time this article also provides whom-to-whom matrices for 2018. The term Experimental Statistics means that the data and other contributing sources are "under active development" and so are not directly comparable with National Accounts statistics such as the data published in the ONS publications UK Economic Accounts (UKEA), UK National Accounts (Blue Book) and the UK Balance of Payments (Pink Book). These Experimental Statistics have been produced outside current National Accounts processes and so may be further improved prior to inclusion in official statistics.

Looking ahead, it is intended to gradually improve the National Accounts, Blue Book, whom-to-whom statistics and financial sector balance sheets via a phased implementation of the Experimental Statistics improvements obtained from the joint ONS and BoE UK Flow of Funds Project. The final path of experimental whom-to-whom inclusion in the National Accounts will depend on the pace of improvements made in Experimental Statistics in combination with other priorities, some of the anticipated improvements include:

- pensions balance sheet data improvements from an enhanced Financial Survey of Pension Schemes (FSPS)
- Insurance Corporations and Pension Funds improvements using Solvency II (SII) data
- listed shares equity data improvements, resulting from commercial data use
- Rest of the World Deposit Taking Corporation improvements, using enhanced Bank for International Settlements data
- inclusion of improved data for the Private Non-Financial Corporations resulting from enhancements to the ONS FALS survey
- introduction of separate financial sub-sectors' statistics for Other Financial Intermediaries (S.125), Financial Auxiliaries (S.126) and holding companies using data from improved ONS Financial Services Surveys, in combination with other sources, such as commercial data
- further improvements to Insurance data resulting from ONS survey changes
- introduction of Money Market Funds (S.123) as a separate financial sub-sector from Deposit Taking Corporations (S.121 to S.122)

3 . Improving the whom-to-whom statistics

This section describes some of the improvements in the whom-to-whom experimental statistics that have been made since the 2019 experimental flow of funds publication. This 2020 experimental publication presents sectorised total asset holdings for 2018, see Table 1.

Table 1: 2018 total assets by sector

Sector	Assets £ trillion
1 Rest of the World	£12.0
2 Deposit taking corporations	£11.5
3 Households	£6.3
4 Other financial intermediaries	£3.4
5 Captive financial institutions and money lenders	£3.1
6 Pension funds	£2.9
7 Private non-financial orporations	£2.4
8 Insurance corporations	£1.5

Of the total assets of £52.8 trillion presented in the 2018 whom-to-whom matrices, the largest eight sectors each have assets in excess of £1.5 trillion and together account for more than 80% of total assets.

Throughout this article, the Rest of the World asset and liability values are only representative of direct transactions between overseas sectors and UK sectors. Other overseas transactions where no UK sector is a counterparty are excluded from this publication, for purposes of interest.

For clarity, Rest of the World asset holdings relate to Rest of the World holdings of only UK assets, whereas all other headings reference UK sectors and their holdings of both UK and Rest of the World assets.

The Rest of World and Deposit Taking Corporations sectors are by far the largest counterparties in the 2018 whom-to-whom matrices. In terms of net assets, the Household sector dominates with net financial assets of £4.4 trillion.

In terms of improved sector granularity, the presentation of separate Experimental Statistics for the Insurance Corporations and Pensions Funds sectors in the whom-to-whom Experimental Statistics provides a significant improvement in granularity relative to the current National Accounts. The division of these two sectors combined 2018 financial assets of £4.4 trillion, and their respective counterparties by financial instrument, are presented in the whom-to-whom matrices.

Similarly in the case of the Other Financial Institutions sectors (all financial sectors except banking, investment funds, insurance and pension funds) the whom-to-whom matrices provide significantly more granularity, particularly for Other Financial Intermediaries (dominated by security dealers and non-bank lending) and holding companies (which dominate Captive Financial Institutions and Money Lenders). The Other Financial Intermediaries and Captive Financial Institutions and Money Lenders sectors each had financial assets in 2018 in excess of £3 trillion, making them each larger than the Pension Funds and Insurance Corporations sectors.

In our previous 2019 experimental flow of funds publication we presented an overview of the improved sources of data, financial instruments, sector coverage and granularity. We also provided improved counterparty detail for the whom-to-whom matrices and estimates. Building upon the improvements detailed in the previous article, in this section we describe the further improvements that have been introduced since the 2019 publication.

In addition to the new 2018 data matrices in this publication, there have been revisions to the data for 2016 and 2017 since the previous publication, which can largely be attributed to underlying data differences. These include the reduction of double counting observed in Insurance sector data, as well as data revisions in-line with the UK National Accounts (Blue Book) 2020.

The net effect of all revisions since 2019 publication are relatively small, as the estimated total flows across all transactions and sectors has decreased by £131.3 billion (0.2%) in 2016 and decreased by £97.3 billion (0.2%) in 2017. Other improvements and enhancements to the underlying data by sector are discussed in the remainder of this section.

Pensions Funds S.129

During 2019, we replaced the MQ5 Pension Funds Survey (PFS) with the Financial Survey of Pension Schemes (FSPS). The FSPS is a quarterly survey that collects data on the income, expenditure, transactions, assets and liabilities of UK funded occupational pension schemes. The general objectives of the redevelopment were:

- to move the survey from a paper-based survey to online collection
- to bring the survey into line with the latest requirements and definitions of the UK National Accounts and recent changes in the pensions industry and policy environment; see UK pension surveys redevelopments and 2019 results for further details
- to improve the quality and granularity of the results

The Office for National Statistics (ONS) June 2020 publication UK pension surveys: redevelopment and 2019 results describes the replacement of the MQ5 Pension Funds Survey (PFS) with the Financial Survey of Pension Schemes (FSPS) and the 2019 results. In addition to the 2019 results, revised estimates were produced for the balance sheet series going back to 1997 and these will be included in the UK National Accounts in Blue Book 2021.

The improvements in the collection of the pension sector's data have been incorporated in the Experimental Statistics presented in this article, and so have improved the financial assets and liabilities of the pension funds sector.

As with the previous 2019 experimental flow of funds publication, the Experimental Statistics presented in the whom-to-whom matrices in this article are presented separately for Pension Funds (S.129) and Insurance Corporations (S.128). By contrast, the National Accounts present the total financial assets and liabilities for the Insurance Corporations and Pension Funds sectors. The separation of these two sectors enables visibility of the financial interactions between them and improves granularity of counterparty information available with the other sectors.

In terms of the wider use of the new Financial Survey of Pension Schemes, the results of the new survey including pension contributions and benefit payments, have already started to feed into the National Accounts and economic statistics including gross domestic product (GDP) and the household saving ratio. They will soon be incorporated into the National Accounts supplementary table on pensions, which brings together information on UK pension schemes' liabilities, along with the enhanced financial accounts (flow of funds) work described in this article to improve the coverage, quality and granularity of UK financial statistics.

The FSPS results also form part of ONS submissions to international organisations such as the European statistics agency (Eurostat), the Organisation for Economic Co-operation and Development (OECD), and the International Monetary Fund (IMF). They are used by the government and international bodies to inform decision-making and by the pensions industry and pensions researchers.

To give an example of the potential policy use of the FSPS, as it is designed to be able to monitor changes in pension schemes' financial flows and balances, if the 2020 economic downturn produced by the coronavirus (COVID-19) pandemic were to have an impact on pension contributions or entitlements, the survey will capture this. The ONS will be monitoring any such changes and keeping a close watch on any consequences that they may have for important economic indicators.

Insurance Corporations S.128

During 2016, Solvency II (SII) replaced its predecessor, Solvency I (SI) as the Europe-wide insurance regulatory framework. An important element of the Flow of Funds Project (FoF) has been the use of quarterly SII data to improve the quality of economic statistics for the UK Insurance Corporations sector. SII provides detailed quarterly information on assets by type, for example, debt securities, shares, other equities and investments funds. The main benefit of this is an improved picture of the insurance sector exposure, namely:

- holdings of different classes of investment instruments
- exposure to other UK economic sectors and the rest of the world

In SII, insurers provide details of all their asset holdings by currency, classified according to the Complementary Identification Code (CIC) (PDF, 272KB). For each security holding, counterparty information is provided including the issuer's country and industrial allocation. The Office for National Statistics (ONS) has developed a mapping between CIC and the European System of Accounts (ESA 2010 (PDF, 6.4MB)) financial instrument codes, as well as a mapping of the issuers' industrial classification to the ESA 2010 institutional sectors.

These SII-mapped data were used for the first time in 2019, as described in Experimental financial statistics for insurance using Solvency II regulatory data – enhanced financial accounts (UK flow of funds). This work has continued during 2020, with a particular focus on reconciling SII data with the new Financial Survey of Pension Schemes (FSPS) as described above.

For this publication, improvements were made to the method for excluding the pension fund assets of insurance companies that act as pension fund managers. While data from insurers that act solely as pension fund managers were already excluded, this year the pension fund management business of "partial fund managers[1] " has also been removed from insurance corporations and reallocated to pension funds. This fund management business (reported by both full and partial fund managers) is now recorded as assets and liabilities of pension funds and therefore excluded from insurance corporations.

A further improvement, compared with the previous experimental statistical release of November 2019, has been to the counterparty relationships for the investment funds shares or units held by insurance corporations. This was achieved by analysing the residency of the ultimate issuers of the investment funds shares or units and has resulted in a reallocation from the "unknown" sector to the Non-Money Market Fund (S.124) and Rest of the World (S.2) sectors.

Commercial Data

An important improvement made in the quality of balance sheet Experimental Statistics presented in the previous experimental whom-to-whom matrices (November 2019) release was the greater use of commercial data. Despite many of the benefits provided, the greater use of commercial data has provided some unique challenges, which continue to require further development and quality assurance. The main challenge relating to the use of commercial data comes from the difficulties aligning the definitions underpinning some of the commercial metadata to the National Accounts framework that uses the European System of Accounts 2010 (ESA 2010 (PDF, 6.4MB)) classification.

In this release we have not revised the Listed Share (AF.511) estimates for 2016 and 2017 that were published in November 2019 using commercial data, where issuance data were based on UK domiciled companies listing on worldwide stock exchanges. However, for 2018 the issuance data were unavailable to the Flow of Funds Project, and so internally available London Stock Exchange (LSE) data have been used along with an experimental estimate for the value of UK domiciled companies listing on overseas exchanges.

Work on using commercial data continues as part of the Flow of Funds Project objective of improving the UK financial accounts and implementation of quality enhancements to listed share data is at the forefront of our uses.

Investment and Other Financial Institutions (IOFI)

An important milestone in the improvement of the UK financial accounts was the provision and publication of granular level data for our financial UK sectors and sub-sectors in the November 2019 article. In our previously published experimental whom-to-whom matrices, we presented for the first time disaggregated experimental estimates for each of the UK investment and other financial institutions (IOFIs) sub-sectors (S.123 to S.127):

S.123 – Money Market Funds
S.124 – Non-Money Market Investment Funds
S.125 – Other Financial Intermediaries
S.126 – Financial Auxiliaries
S.127 – Captive Financial Institutions and Money Lenders

The Experimental Statistics for these newly disaggregated financial sub-sectors were compiled using a variety of data sources. More information about these data sources and their use in producing experimental statistics can be found in the article Investment and other financial institutions.

In this article, we are continuing to present the experimental balance sheet statistics for the five IOFIs sub-sectors. For the first time we are presenting Experimental Statistics for 2018, along with improvements for 2016 and 2017, such as the enhanced investment funds counterparty information for the insurance and pension fund sectors. This article also makes use of the Experimental Statistics provided by the Financial Services Survey (FSS 266): Return of Assets and Liabilities (IOFIs).

Deposit Taking Corporations

In our previous November 2019 release of the experimental whom-to-whom matrices, a collaborative effort was needed to produce the UK banking sector's (S.12C) financial account statistics on a whom-to-whom basis. The Deposit Taking Corporations (DTCs) sector comprise the Central Bank (S.121) and Other Deposit Taking Corporations (S.122), more commonly known as banks and building societies. In both the current National Accounts and our Experimental Statistics, the Bank of England (BoE) provides data to the Office for National Statistics (ONS) that directly involves the banking sector (S.12C).

The Bank of England collects a broad range of data on the positions of DTCs with other parts of the financial sector. In this release, the data from the Bank of England have been combined with a range of other sources such as the ONS Financial Services Survey (FSS), Prudential Regulatory Authority Solvency II regulatory reporting and the ONS Financial Services Pensions Survey (FSPS) to improve the full S.123 to S.129 sector breakdown for the complete list of financial instruments. More information on this can be found in the banking sector update article.

In this release, a similar collaborative approach was used to compile the newly published 2018 Experimental Statistics and to incorporate revisions to the 2016 and 2017 experimental whom-to-whom matrices for this sector.

Notes for: Improving the whom-to-whom statistics

1. Those insurance firms that do a mixture of pension fund management and other business

4 . The latest whom-to-whom experimental statistics

In this release, we are presenting the latest experimental whom-to-whom matrices.

Interpreting the experimental whom-to-whom matrices

All financial instruments presented in these tables have an economic owner (the sectors that are considered to hold the asset) and, with the exception of Monetary Gold, they all have counterparty relationships (the sector or sectors that are considered to be responsible for the liability). In these matrices, the sectors holding the assets are presented on the vertical axis and those holding the liabilities are presented on the horizontal axis.

For example, when a private individual deposits cash in a bank account, the National Accounts balance sheets record several things simultaneously:

- 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 individual counterparties' transactions separately, the whom-to-whom accounts link the asset and liability holders, showing the relationship between the counterparties.

Visualising the experimental whom-to-whom matrices

To visualise the counterparty relationships between institutional sectors within these matrices, Sankey diagrams are used, see an innovative way to present whom-to-whom statistics, for further details. This Sankey diagram has been updated to include the improved Experimental Statistics for 2016 and 2017, and for the first time Experimental Statistics for 2018. See Figure 1.

Figure 1: UK experimental flow of funds whom to whom Sankey diagram

Sector-to-sector interactions for financial balance sheets by financial instruments

Download the data

.xlsx

Please note: the data used for the Sankey diagram differ slightly from that data in the experimental whom-to-whom matrices. This is because the Sankey diagram cannot display negative values, so the data have been adjusted accordingly. The overall impact on the diagram is minimal.

There are also bar charts, known as tooltips, embedded within the interactive Sankey diagram. These show the underlying timeseries data of each thread covering the three-year time span.

The Sankey diagram includes a filter, enabling the selection of a specific financial instrument to view. For example, by filtering "transferable deposits and other deposits" one can see that most of the deposits made to the Deposit Taking Corporations sector are made by sectors outside of the UK.

5 . Counterparty insights

The experimental whom-to-whom statistics presented in this article provide the UK's financial counterparty relationships for the years 2016 to 2018 inclusive. The term Experimental Statistics means that they are "under active development" and so are not directly comparable with the National Accounts, such as the Blue Book. Some caution is therefore required in the interpretation of these experimental estimates. The Experimental Statistics presented in this article encompass 15 sub-sectors and 22 financial instruments, such as bank deposits, bonds, equities and derivatives.

Please see Annex A and Annex B for sub-sectors and financial instruments code, alongside European Systems of Accounts 2010 (ESA 2010 (PDF, 6.4MB)).

Some of the main benefits of the development of these Experimental Statistics are that they provide:

- quality improvements to the estimates
- enhanced counterparty information
- greater financial instrument granularity
- more granular sub-sector detail than is currently available in the National Accounts

The sub-sectors that have benefited the most from improved granularity are the Other Financial Institutions (S.125 to S.127), Insurance Corporations (S.128), Pensions Funds (S.129) and Non-Money Market Investment Funds (S.124). Additionally, improvements following the splitting of Money Market Funds (S.123) from Deposit Taking Corporations (S.12C) instead of inclusion within the Monetary Financial Institutions sector (S.121 to S.123).

Table 2 provides the available financial sub-sector breakdowns prior to the Flow of Funds project (FoF), compared to the current time. ESA 2010 divides financial corporations (S.12) into nine financial sub-sectors (S.121-S.129). Prior to the Flow of Funds Project, the National Accounts Blue Book provided three high-level financial aggregations. The experimental whom-to-whom matrices presented in this article provide information on seven individual financial sub-sectors and one aggregation, see improving the economic sector breakdown for further details.

Table 2: Financial sub-sector mapping

Pre-flow of funds project sub-sectors	ESA 2010 financial sub-sectors	Post-flow of funds project sub-sectors
Monetary financial institutions	S.121 Central Bank	Deposit taking corporations (S.121 + S.122)
	S.122 Deposit taking corporations except the Central Bank	
	S.123 Money market funds	S.123 Money market funds
Other financial institutions and investment funds	S.124 Non-money market funds	S.124 Non-money market funds
	S.125 Other financial intermediaries	S.125 Other financial intermediaries
	S.126 Financial auxiliaries	S.126 Financial auxiliaries
	S.127 Captive financial institutions and money lenders (mostly holding companies)	S.127 Captive financial institutions and money lenders (mostly holding companies)
Insurance corporations and pensions funds	S.128 Insurance corporations	S.128 Insurance corporations
	S.129 Pension funds	S.129 Pension funds

Source: Office for National Statistics

This section highlights some of the main counterparty insights that the latest experimental data provide to users. For details on the other sub-sectors not discussed in this section please see the experimental whom-to-whom matrices that accompany this article.

Total Financial Assets and Liabilities

In 2018, Deposit Taking Corporations (Central bank, banks and building societies) were the largest UK sector holder of financial assets, with financial asset holdings of £11.5 trillion, followed by UK households with £6.3 trillion. Excluding the Rest of the World, Deposit Taking Corporations also held the highest level of total liabilities, with liabilities of £11.2 trillion.

Of the 15 subsectors presented in 2018, UK households had the largest net financial asset position of £4.4 trillion, see the experimental whom-to-whom matrices. Our previous analysis showed that the households' portfolio is diverse and predominantly low risk.

Private Non-Financial Corporations (S.1100P)

Private Non-Financial Corporations (PNFC), which includes sectors such as retailers, manufacturers and service providers had the largest negative subsector net financial asset holding of negative £3.5 trillion. The total liabilities of the PNFCs are held predominantly by the Rest of the World at £2.4 trillion and their parent UK holding companies within Captive Financial Institutions and Money Lenders, at £1.2 trillion. PNFC's liabilities to the Rest of the World are mostly held in three financial instruments, Unlisted shares (£0.9 trillion), Listed Shares (0.8 trillion) and Long-Term Loans (£0.5 trillion). These large foreign asset holdings in the UK's PNFCs reflect its open nature and the significant overseas investment in the UK economy, see the experimental whom-to-whom matrices.

Rest of the World (S.2)

The Rest of the World’s UK financial balance sheet counterparty relationships (assets and liabilities) are dominated by Deposit Taking Corporations, £4.7 and £5.3 trillion respectively. This means that the UK’s Deposit Taking Corporations have a positive net financial asset balance with the Rest of the World of around £0.6 trillion.

The Bank of England in 2018 highlighted that foreign investors have a strong appetite for leveraged loan markets and commercial real estate, see Financial Stability Report 2018.

The Rest of the World’s UK financial instrument asset holdings in 2018 were held in a wide variety of financial instruments including Derivatives (£2.2 trillion), Other Deposits (£2 trillion), Long-Term Debt Securities (£1.8 trillion), Unlisted shares (£1.4 trillion), Listed shares (£1.2 trillion), Transferable Deposits (£1.1 trillion), Long-Term Loans (£0.9 trillion) and Short-Term Loans (£0.8 trillion). This wide range of Rest of the World’s UK financial assets holdings demonstrates the importance of overseas investors to the UK economy. A similar picture of Rest of the World UK financial instrument holdings existed in 2016 and 2017.

Table 3: Rest of the World Assets and liabilities by financial instruments, 2018

£ Billions	**Rest of World**		
Financial instruments	**Assets**	**Liabilities**	**Net Financial Asset**
Monetary gold and special drawing rights (AF.1)	11	10	1
Currency (notes and coins) (AF.21)	2	2	1
Transferable deposits (AF.22)	1,089	1,740	-651
Other deposits (AF.29)	2,015	977	1,038
Short-term debt securities (AF.31)	257	121	136
Long-term debt securities (AF.32)	1,800	1,172	628
Short-term loans (AF.41)	819	1,513	-694
Long-term loans (AF.42)	911	744	168
Listed shares (AF.511)	1,222	829	393
Unlisted shares (AF.512)	1,443	1,647	-204
Other equity (AF.519)	16	170	-155
MMF shares or units (AF.521)	0	291	-291
Non-MMF investment fund shares or units (AF.522)	53	486	-433
Non-life insurance technical reserves (AF.61)	60	39	21
Life insurance and annuity entitlements (AF.62)	26	35	-9
Pension entitlements (AF.63)	29	0	29
Financial derivatives (AF.71)	2,183	2,186	-3
Other accounts receivable and payable (AF.8)	17	16	2
TOTAL	11,955	11,978	-23

Source: Office for National Statistics

Notes

1. See Annexes A and B for financial instruments and sub/sectors codes
2. z not applicable (no value possible for this relationship)

The Rest of the World’s total UK financial assets and liabilities in 2018 were broadly similar at around £12.0 trillion. However, it should be noted that the Rest of the World’s UK liabilities exceeded its UK assets in Transferable Deposits (negative £0.7 trillion) and Short-Term Loans (negative £0.7 trillion). Although the Rest of the World’s 2018 total UK financial assets and liabilities levels were broadly similar at £12 trillion, the mix of financial instruments between financial assets and liabilities was somewhat different, resulting in variations in net financial assets, by instrument.

Deposit Taking Corporations (S.12C)

With total assets of £11.5 trillion and total liabilities of £11.2 trillion, the Deposit Taking Corporations subsector is the largest UK based counterparty. In 2018 Deposit Taking Corporations held around 18% of both their assets and liabilities within their own domestic sector. This reflects intra-group and intra-Deposit Taking Corporation funds moving through the banking system, see the experimental whom-to-whom matrices.

As previously referenced, Deposit Taking Corporations largest counterparty in 2018 was the Rest of the World, holding financial assets in the Rest of the World of £5.3 trillion and liabilities to the Rest of the World of £4.7 trillion. Deposit Taking Corporations liabilities with the Rest of the World were mostly in the form of Transferable Deposits (£1.1 trillion), Other Deposits (£2 trillion) and Derivatives (£1.3 trillion).

Table 4: Deposit Taking Corporations with Rest of the World by financial instruments, 2018.

£ billions	**Counterparty relationship with rest of world**	
Financial instruments	**DTC Assets**	**DTC liabilities**
Currency (notes and coins) (AF.21)	0	2
Transferable deposits (AF.22)	1,485	1,089
Other deposits (AF.29)	434	2,013
Short-term debt securities (AF.31)	36	183
Long-term debt securities (AF.32)	483	
Short-term loans (AF.41)	1,070	z
Long-term loans (AF.42)	328	z
Listed shares (AF.511)	37	0
Unlisted shares (AF.512)	44	83
Non-MMF investment fund shares or units (AF.522)	1	z
Financial derivatives (AF.71)	1,382	1,340
TOTAL	5,300	4,710

Source: Office for National Statistics

Notes

1. See Annexes A and B for financial instruments and sub/sectors codes.
2. z not applicable (no value possible for this relationship).,Empty cells represent unknown values.

The financial assets of Deposit Taking Corporations with the Rest of the World in 2018 were held in a different mix to liabilities, which were mostly compromised of Transferable Deposits (£1.5 trillion), Derivatives (£1.4 trillion), Long-Term Loans (£0.3 trillion), Short-Term Loans (£1.1 trillion) and Long-Term debt securities (£0.5 trillion).

Other Financial Intermediaries (S.125)

With financial assets and liabilites of £3.4 trillion and £3.3 trillion respectively, Other Financial Intermediaries is the largest UK financial sub-sector after Deposit Taking Corporations, with Derivative asset and liabilities of £1.2 trillion, see the experimental whom-to-whom matrices. The two largest counterparties are Rest of the World (£0.7 trillion) and Deposit Taking Corporations (£0.4 trillion).

Derivatives are an important financial instrument for the UK economy that can be used for risk management and hedging purposes. In 2018 the UK held £6.4 trillion of Derivatives assets and liabilities, equivalent to more than 10% of the total financial assets and liabilities presented in the whom-to-whom matrices of £52.8 trillion. The main Derivatives counterparties in 2018 were Deposit Taking Corporations (£2.3 trillion) Rest of the World (£2.2 trillion) and Other Financial Intermediaries (£1.2 trillion). Together these three counterparties accounted for more than 87 per cent of the total Derivatives assets and liabilites in 2018.

Captive Financial Institutions and Money Lenders (S.127)

This sub-sector is overwhelmingly compromised of holding companies, with total financial assets of £3.1 trillion. The development of Experimental Statistics has enabled the Office for National Statistics (ONS) to provide significantly improved information on the financial instrument holdings of holding companies than was previously available. Most assets in this sector compromise Unlisted Shares holdings (£2.1 trillion) and short and long terms loans (over £0.6 trillion), see the experimental whom-to-whom matrices. Such loans will generally be to holding companies' subsidiary companies both in the UK and abroad.

Pension Funds (S.129)

In 2018 Pension Funds had total liabilities of £2.9 trillion, mostly in the form of pension entitlements of the household sector and pensioners living abroad (£2.6 trillion). Pension Fund financial assets were estimated at £2.9 trillion, of which £2.3 trillion were real financial assets and £0.6 trillion was notional assets in the form of "claims on employers" to cover pension deficits. The Pension Fund sector's main investments were in Non-Money Market Funds (£0.8 trillion), Long-term Debt Securities (£0.7 trillion) including £0.4 trillion of UK Government Gilts, and Derivatives (£0.3 trillion). Of the £0.6 trillion notional assets of Pension Funds, the largest part related to claims on sponsoring employers in the Private Non-Financial Corporations sector, see the experimental whom-to-whom matrices.

Non-Money Market Investment Funds (S.124)

Non-Money Market Investment Funds provide an important mechanism for chanelling funds into investments both in the UK and abroad. In 2018 this sector held total assets of £1.3 trillion and the largest sector investor was Pension Funds with holdings of UK Non-Money Market Investment Fund Shares or Units of £0.5 trillion. The Insurance Corporations sector was also a large investor in UK investment funds with assets of more than £0.3 trillion. Taken together the Insurance and Pension sectors accounted for 63.6 percent of the liablities of the Non-Money Market Investment Funds sector, see the experimental whom-to-whom matrices.

51.1 percent of the assets held by UK Non-Money Market Investment Funds (£0.7 trillion) were invested outside of the UK in the Rest of the World. The sector is however also a large investor in the UK's Private Non-Financial Corporations sub-sector with assets holdings in excess of £0.2 trillion.

Non-Money Market Investment Funds provide an important non-bank source of funding for UK businesses, and this is replicated at the Global level with non-equity investment funds being the largest single contributor to the international Financial Stability Board's estimates, see Global Monitoring Report on Non-Bank Financial Intermediation 2019.

Households (S.14)

In 2018 Households held £6.3 trillion in financial assets and £1.9 trillion in financial liabilities. These exclude non-financial assets such as property. Most financial assets were held in Pension Funds (£2.4 trillion), Deposit Taking Corporations (£1.4 trillion) and Insurance Corporations (£1.1 trillion).

The Household's counterparty liabilities are mostly loans, primarily with Deposit Taking Corporations (£1.4 trillion) and Other Financial Intermediaries (£0.3 trillion). £1.8 trillion of loans to households were long-term, with a further £0.1 trillion being short-term. The situation for Household liabilities by financial instrument and counterparties in 2016 and 2017 were very similar to that seen in 2018.

Time Series Analysis 2016 to 2018

Although experimental whom-to-whom statistics analysis typically concentrates on the changes in counterparty relationships, it is equally important to examine the trends in individual financial instrument assets and liabilities. In terms of counterparty risk, two of the most important financial instruments are loans (F.4) and debt instruments (F.3). In this section we briefly present the main trends in loans and debt using the Experimental Statistics for 2016 to 2018.

The total value of loan liabilities increased consistently between 2016 and 2018 for all counterparty sectors, with particularly fast growth in loan liabilities being observed in the Rest of the World, Household, PNFCs and Other Financial Intermediaries sectors. These trends reflect the fact that total loan liabilities increased from £8.4 trillion in 2016 to £9.3 trillion by 2018.

Most of the increase in loans observed between 2016 and 2018 appears to have been issued by Deposit Taking Corporations (DTCs) and the Rest of the World. DTCs short-term loan assets (loan maturity of less than a year) increased from £1.5 trillion in 2016 to £1.9 trillion in 2018 and DTCs long-term loan assets increased (loan maturity of more than one year) from £2.1 trillion in 2016 to £2.2 trillion. The Rest of the World short-term loan assets increased from £0.7 trillion to £0.8 trillion and long-term loan assets also increased by £0.1 trillion to £0.9 trillion between 2016 and 2018.

Debt movements are important to monitor as evidence suggests that entities are shifting away from traditional bank-based lending and towards market-based finance, such as debt instruments. Between 2016 and 2018 there were some notable increases in the stock of long-term debt instruments, that is, debt liabilities, including Captive Financial Institutions and Money Lenders of £86.4 billion (38.1%), Private Non-Financial Corporations of £32.7 billion (9.8% growth from 2016), Other Financial Intermediaries £36.5 billion (11.2% growth) and Deposit Taking Corporations £35.0 billion (5.2% growth from 2016).

On the asset holdings side of long-term debt instruments, the largest increase between 2016 and 2018 was the Rest of the World, which increased by £110.5 billion (6.5%). Other large increase in long-term holdings included Pension Funds £72.4 billion (11.9%), Non-Money Market Funds £34.2 billion (13.8%) and Captive Financial Institutions and Money Lenders £30.7 billion (66.9%).

6 . Conclusion

The experimental whom-to-whom statistics presented in this article assist with the identification of the build-up of risks in the financial sector and understanding financial connections amongst the institutional sectors and sub-sectors within the economy. In this respect, the experimental whom-to-whom statistics presented in this article improve upon the counterparty information available in the National Accounts, Blue Book, both in terms of sector granularity and financial instrument granularity. As an economy with a large financial sector, this additional granularity and counterparty information is of particular importance for the UK, so that policymakers, economists and market analysts have the detailed financial information they require to make informed decisions.

One notable improvement in the quality of financial information available to policy makers described in this article is the introduction of the new Financial Survey of Pension Schemes (FSPS). Since the FSPS is designed to be able to monitor changes in pension schemes' financial flows and balances, if the 2020 economic downturn produced by the coronavirus (COVID-19) pandemic were to have an impact on pension contributions, the survey should pick this up.

Similarly, in 2020, as part of our pandemic impact analysis, the improved granularity provided by the development of experimental whom-to-whom statistics, particularly from the ongoing development of the Financial Service Survey, identified that the other financial institutions' derivatives assets and liabilities had increased by approximately 50% during Quarter 1 (Jan to Mar) 2020 and that security dealers were responsible for most of this increase.

The same Financial Service Survey in conjunction with a recently developed commercial data source also provided experimental statistics on non-bank lending to assist policymakers with their 2020 analysis.

These examples, in conjunction with the wider improvements in data and data sources introduced since our first November 2019 experimental whom-to-whom matrices article, will provide policymakers with the enhanced financial information that they require once these improvements have been integrated into the National Accounts via future Blue Books. In the meantime, the publication of Experimental Statistics articles, such as this article, provide readers with an opportunity to have sight of these still under-development Experimental Statistics, and as such they cannot be not directly compared with existing National Accounts statistics.

The enhancement of the financial accounts to include whom-to-whom data and an improved sector and instrument breakdown will also have wider-reaching benefits for the UK National Accounts.

The provision of more granular level financial account data is likely to have applications beyond the financial accounts. For example, increased granularity for the sectoral stocks of, and transactions in, debt securities have the potential to provide enhanced estimates of property income. This work could lead to future improvements in not only financial account statistics but throughout the sequence of accounts. It is also believed that improving the quality and granularity of financial account statistics would help to meet increased data demands from both policymakers and researchers to cope with the financial uncertainties more generally.

Through collaboration with the Bank of England, the Flow of Funds Project has made considerable progress in attempting to achieve this aim. Our previous experimental whom-to-whom statistics, for the years 2016 and 2017, provided our first granular experimental information for the UK financial accounts, incorporating over 10 new data sources. This has provided greater insight into the sector and instrument relationships within the whom-to-whom matrices.

In this release, for the first time we have published experimental whom-to-whom matrices for the year 2018. We have also incorporated improvements in the underlying data sources to the 2016 and 2017 matrices previously published.

While significant progress has been made in the development of whom-to-whom matrices, we will continue to enhance them via the use of improved counterparty information and new data sources. Looking to the future, we are aiming regularly to update our experimental whom-to-whom matrices with enhanced data to increase the granularity and to improve the quality and coverage of counterparty relationships. The objective is to integrate the improvements made to the quality of balance sheets data and counterparty information into the core accounts, mostly notably into the Blue Book and Pink Book from 2021 onwards.

7 . Acknowledgements

Special thanks to Adrian Chesson (ONS), Abbe Williams (ONS), Tomos Davies (ONS), Jason Murphy (ONS), Sarah Levy (ONS), Oliver Ramsey (ONS), Lewis Forder (ONS), Pete Lee (ONS), Sarah Adams (ONS), Hazel, Clarke (ONS) and other Financial Sector Accounts and International Development colleagues.

Also, special thanks to colleagues at the Bank of England for their continued support and collaboration.

8 . Annex A – Sector names and codes

Sector Name	Sector Code
Public Non-Financial Corporations	S11001
Private Non-Financial Corporations	S1100P
Deposit Taking Corporations	S12C
Money Market Funds	S123
Non-Money Market Investment Funds	S124
Other Financial Intermediaries, except insurance corporations and pension funds	S125
Financial Auxiliaries	S126
Captive Financial Institutions and Money Lenders	S127
Insurance Corporations	S128
Pension Funds	S129
Central Government	S1311
Local Government	S1313
Households	S14
Non-Profit Institutions Serving Households	S15
Rest of the World	S2
Not sectorised (unknown)	SN
Unknown – Financial sector	SN.S12
Unknown – UK sector	SN.S1
Unknown – Any sector	SN.UNK

9 . Annex B – Financial Instruments

Instrument	Code
Monetary Gold and Special Drawing Rights	AF.1
Currency (notes and coins)	AF.21
Transferable Deposits	AF.22
Other Deposits	AF.29
Short-term Debt Securities	AF.31
Long-term Debt Securities	AF.32
Short-term Loans	AF.41
Long-term Loans	AF.42
Listed Shares	AF.511
Unlisted Shares	AF.512
Other Equity	AF.519
Money Market Fund Shares or Units	AF.521
Non-Money Market Investment Fund Shares or Units	AF.522
Non-life Insurance Technical Reserves	AF.61
Life Insurance and Annuity Entitlements	AF.62
Pension Entitlements	AF.63
Claims of Pension Funds on Pension Managers	AF.64
Entitlements to Non-Pension Benefits	AF.65
Provisions for Calls under Standardised Guarantees	AF.66
Financial Derivatives	AF.71
Employee Stock Options	AF.72
Other Accounts Receivable and Payable	AF.8

10 . Related links

Flow of funds previous publications
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