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Modelling metadata in central banks

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David Bholat **Modelling metadata in
central banks**

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Abstract

This article discusses a small scale pilot to harmonise three Bank of England statistical and regulatory data forms. The primary purpose of the pilot was to assess opportunities for improved operational efficiency in regulatory reporting. The broader purpose was to demonstrate how common data standards can be created from heterogeneous data sets. In the course of discussing the pilot, the article explains the history of how data has been collected at the Bank of England; how that process is changing in light of the Bank's Strategic Plan; and why a common data standard is a critical financial market infrastructure fundamental to the success of global regulatory reform.

Keywords: data standards, regulatory reporting, Bank of England, central banks, metadata.

JEL Codes: E58, C81, G18

1 Introduction

One of the iconic books in Western European political theory is *Leviathan* (Hobbes 2008). In it Thomas Hobbes depicts an anarchic world he calls the ‘state of nature’ in which life is ‘nasty, brutish and short’ because we have no means of protecting ourselves from the predations of our fellow man. As a remedy he recommends we trade some of the unfettered freedom we might enjoy in the state of nature for the security we may obtain from submitting to sovereign rule.¹

Although the main line of Hobbes’ argument is well-known, one surprising feature of the book is its peculiar organisation. Rather than start his treatise with a summary of the central political argument, Hobbes begins the book with a lengthy inquiry into the nature of language. He motivates this unexpected digression on the grounds that, before individuals can establish a commonwealth, they must first agree upon a common meaning for words. If so, Hobbes surely would despair of the current state of semantics in our financial system. Here unambiguous meaning is elusive, and drawing even the most basic distinctions is difficult. In some cases the same word refers to different concepts.² Thus ‘shares’ on the stock market mean publicly traded securities that confer on their owners rights to a variable dividend, while ‘shares’ in a credit union context signify non-tradable claims for a nominally fixed principal, akin to a bank deposit. In other instances, different words are used to refer to the same financial concept.³ For example, what are called gilts in the United Kingdom may be called government bonds elsewhere (Bholat 2013).

These ambiguities may foster financial instability. For Hobbes, political stability is enhanced by the settlement of metapolitics—the domain and definition of the key terms used by people in political debate. According to Hobbes, conflict ensues when people disagree about the relative priority of terms: for instance, whether maximising ‘individual autonomy’ or ‘income equality’ is more important, or when there is ambiguity regarding the definition of such terms—when one party conceives of ‘individual autonomy’ as meaning doing whatever one pleases, while another party conceives of it as acting virtuously, for example. Similarly, financial stability is enhanced by the settlement of metadata. If there is disagreement about the meaning of key terms in financial transactions then conflicts ensue. One recent example is the controversy about whether the restructuring of Greece’s sovereign debt obligations constituted a “credit event.”⁴

However, forging a common language either in politics or in finance is not an easy task. Unlike Hobbes in his thought experiment, real world financial professionals are not afforded the luxury of starting fresh from first principles. Instead they must start by confronting sunk costs in the form of legacy IT systems and operational

¹ Writing in the sixteenth century, Hobbes could be read as an apologist for then-prevailing absolutist monarchies. But insofar as Hobbes roots sovereignty in popular consent, as opposed to divine right or natural law, he may be equally interpreted as a proto-democratic philosopher.

² Technically speaking, this problem is known as polysemy.

³ This problem is known as synonymy in the jargon.

⁴ <http://www.reuters.com/article/2012/03/09/us-greece-cds-isda-trigger-idUSBRE82817B20120309>

processes, and scepticism from some staff about implementing transformative change to the existing data infrastructure. As a consequence, efforts to create a common financial language in the real world must take these rigidities as given. This means making the case for common data standards through pilots that improve on and build from data infrastructures already in place.

In this paper I describe one small-scale pilot recently undertaken at the Bank of England. This exploratory exercise attempted to harmonise three forms with inconsistent language used by the Statistics and Regulatory Data Division (SRDD) to collect financial data from firms: Form ER (Effective Interest Rates on Sterling Business By Sector), Form BE (Additional Balance Sheet Sectoral Detail) and FSA054 (Currency analysis). The narrow objective of this pilot was to assess opportunities for improved operational efficiency, namely to investigate if data currently collected by three different forms and their associated work processes could be done once, with potential long-term savings for both the Bank of England and its reporters.⁵ The broader motivation was to take first steps toward creating a common language for regulatory reporting and central bank statistics.

The article is organised as follows. The first section explains the purpose of this pilot and situates it within a broader narrative of how primary data has been collected historically by the Bank of England.⁶ Although much is written about the Bank's policy decisions and forecasts, less is known about the data that underpin these, particularly how that data is gathered. So one of the objectives of this article is to contribute to the literature on how central banks operate, in the tradition of Hennessy's (1992) study of internal operations at the Bank of England in the period between 1930 and 1960. This section also explains how the traditional approach to data is changing, as announced in the Bank's recently released Strategic Plan.

The second section of the article then details the specific steps taken to demonstrate that the Bank could regenerate aggregate figures currently collected using forms ER, BE and FSA054 from raw instrument-by-instrument data. The motivation for proving this concept was to provide assurance to senior leaders that the transition from the current data collection method to a new approach could occur without diminishing the Bank's ability to generate existing aggregate figures, and with the added benefit that switching to a single granular collection would make the metadata more standard.⁷ Thus this article accords with a number of recent papers published by staff at various central banks that claim benefits accrue to central banks from using micro-data to compile aggregate statistics and conduct macro-analysis (centralbanking.com 2014; Matos 2013; Gaytán 2013; Hille 2013; Menezes and D'Aguilar 2013). It also chimes with a growing chorus of central banks calling for a common financial language, and some recent initiatives like Project ACTUS, the AnaCredit project,⁸ the European Central Bank's data dictionary and SDMX

⁵ The principal reporters are UK banks, building societies, credit unions and insurers.

⁶ The Bank uses a range of secondary data sources collected by commercial vendors and other public agencies. The Bank also collects primary data through a number of surveys and interviews not discussed here.

⁷ Balanced against these benefits are potential financial costs to central banks incurred from putting place systems to aggregate granular data and to reconcile with reported data.

⁸ For more information see <https://www.ecb.europa.eu/stats/money/aggregates/anacredit/html/index.en.html>.

metadata work at the Bank of England and in other countries that have made practical contributions in this regard.⁹

Of course, granular data can be collected without standards, just as standards can be established for aggregate data. However, as this paper explains, and other scholars have noted, there is an elective affinity between the pursuit of data standards, on the one hand, and granular data, on the other (Ali 2014; Bennett 2013; Bholat 2013; Kohn 2011; Jones et al. 2000). Indeed the link between data granularity and standardisation was the subject of a major international conference co-sponsored by the Bank of England, European Central Bank and Office of Financial Research last year (Haldane et al. 2015).¹⁰ However, in general, the existing scholarly literature does not shed light on the mechanics of transition. In other words, the existing literature does not describe how to persuade senior leaders that change is required. And while information integration is a much discussed topic in computer science (Brank 2005; Wache 2001) there is little written about it in the finance and central banking literatures. This article aims to fill that lacuna by discussing the detailed steps required to rationalise multiple financial data collections having inconsistent metadata into a single, standard, conceptually integrated metadata model.

The final section concludes the article by reflecting on larger issues raised by the pilot. A key part of the international package of regulatory reforms has been enhancing the breadth, depth, quality and timeliness of data disclosed by financial firms to central banks and supervisory authorities.¹¹ During the financial crisis, many financial firms were not equipped with the infrastructure to quickly aggregate their data across legal entities and counterparties. This impaired central banks' and supervisory authorities' ability to identify the appropriate recovery and resolution mechanism for firms (Basel Committee on Banking Supervision 2013). However, effective risk aggregation and reporting by financial firms to central banks and supervisory authorities, and the latter's ability to aggregate data on individual firms to gain perspective on the financial system as a whole, is possible only when common standards exist for granular data; if the underlying definitions of instruments vary, they are not additive (Office of Financial Research 2013). So coming to terms on standard metadata is critical for making workable enhanced risk reporting, identification and monitoring, and, by extension, the credibility of the international regulatory commitment that no financial firms will be too large or complex to fail in the future (Cunliffe 2014; Financial Stability Board 2011). This article makes a small contribution to thinking how central banks can practically fulfil that commitment with the right infrastructure.

⁹ For more information see <http://www.bankofengland.co.uk/research/Documents/conferences/Breymann.pdf>.

¹⁰ Please see <http://www.bankofengland.co.uk/research/Pages/conferences/0115.aspx> for more information.

¹¹ For example, in accordance with the global regulatory reform agenda set at the Pittsburgh Group of Twenty (G20) meeting in 2009, the European Market Infrastructure Regulation (EMIR) now mandates financial firms report transaction level derivatives data to trade repositories. However, as a recent report from the Financial Stability Board (FSB) makes clear, there remain challenges in aggregating this data, in part because of an absence of common data standards (Financial Stability Board 2014).

2 A brief history of statistics and regulatory data at the Bank of England

Like other central banks, the Bank of England's traditional data infrastructure reflects past technological constraints that may no longer be binding. Although the first dedicated data collection function at the Bank dates back to the late 1920s, two important events during the 1960s and 1970s established the Bank's data collection systems in their current configuration.¹² The first important event was the publication of a report by the Radcliffe Commission in 1960 recommending that the Bank collect more data and publish more statistics. As a result of the Radcliffe report, the appropriately named forms A and B were introduced to gather aggregate balance sheet items from commercial banks having reserve accounts with the Bank of England. A second important event then occurred in the early 1970s. With the onset of the 'secondary' or 'fringe' banking crisis in 1973, a new set of prudential returns were introduced by the Bank in September 1974 to more closely monitor commercial banks (Capie 2012, p. 611-616). These prudential returns are the direct antecedents of the suite of statistical forms still used by the Bank today. [Figure 1](#) compares the historic form BS to the current Form BT.

¹² For an in-depth historical overview of statistical production at the Bank see (Heath 1988).

Figure 1
Form BS (1975) compared to Form BT (present)

The figure displays two forms side-by-side for comparison. The left form is 'FORM BS' (1975) and the right form is 'FORM BT' (present). Both forms are divided into 'Assets' and 'Liabilities' sections. The 'Assets' section of Form BS includes items like 'Cash', 'Bank of England notes and UK coin', 'Other notes and coin', 'Balances with Bank of England', 'Debit items in course of collection on', 'UK offices of the reporting institution', 'Other banks in the UK', 'Balances and banking offices overseas', 'Market loans', 'Secured money with money market dealing counterparties of the Bank of England', 'Unsecured money with money market dealing counterparties of the Bank of England', 'Secured money in call with Bank of England money market', and 'Balances with and advances to other UK banks'. The 'Liabilities' section of Form BS includes 'Notes in circulation', 'Deposit and other liabilities', 'Sight deposits', 'UK banks', 'UK public sector', 'Other UK residents', 'Overseas offices of the reporting institution', 'Other overseas residents', 'Time deposits', 'UK banks', 'UK public sector', 'Deposits with original maturity of 2 years or less', 'Other deposits', 'Other UK residents', and 'Deposits with original maturity of 2 years or less'. The 'FORM BT' form has a similar structure but with more detailed sub-items and a different layout. Arrows indicate the mapping between the two forms.

Since the mid-1970s, the Bank of England's statistics division has continued to collect data through forms structured like standard financial statements.¹³ This multiple forms-based method for collecting data made sense in the 1970s when data was delivered by post or in person, and data had to be physically stored in file cabinets. But the forms-based method for collecting data has become increasingly unwieldy and anachronistic in light of technological advances such as high speed internet and petabyte drives that mean traditional technological restrictions on data transmission and storage have been relaxed in the 'big data' era.¹⁴

Specifically the forms-based method for collecting data has three key analytical limitations. The first analytical limitation relates to the timeliness of data. Most of these forms are filed quarterly, semi-annually and annually, meaning that there are lags between when data is published and the latest financial facts.

The second analytical limitation pertains to coherence and compatibility.¹⁵ On their own terms, statistical and regulatory data forms can have coherence and

¹³ That is, like balance sheet and income statements, and variations thereof.

¹⁴ My claim here should not be construed as meaning all restrictions have been overcome. Technology is no panacea. The collection of ever more granular data raises legal, ethical and data quality issues I have discussed in greater depth elsewhere (Bholat 2015).

¹⁵ To avoid misunderstanding, the issue is not the existence of different bases, methods and conventions as such. For example, it is completely legitimate to want marketable securities reported at historic cost and 'fair' (current saleable) value. Rather, the issue is efficiency; ensuring that data is reported in a way that differing requirements can be covered by the fewest datasets.

compatibility. For example, Bank of England statistical forms are based on the internationally agreed System of National Accounts. The forms revolve around a comprehensive balance sheet (Form BT) and then expand out to other forms providing more granularity on different aspects of the balance sheet. Consistency and coherency is ensured by using common definitions and extensive cross-form checks. Similarly, many of the new regulatory forms are interrelated as they are aligned with different aspects of Capital Requirements Directive (CRD) IV reporting requirements. However, while statistical and regulatory data may have their own consistent internal logics, they may not be easy to integrate because statistical and regulatory forms often specify different consolidation bases, valuation methods, accounting conventions and definitions, and are reported at different frequencies due to different analytical purposes.¹⁶ This imposes a third analytical limitation—the relevance of the data in meeting end users’ needs. Since the forms are designed at their origin to answer particular analytical or policy questions, the data captured does not easily lend itself to other uses or secondary analysis. This is largely because the forms tend to collect only aggregate figures. As a result, it becomes difficult, if not impossible, to subsequently drill down into the underlying instrument data constituting the aggregate to ask and answer new questions. This also makes it difficult to blend data sets together to gain the kind of comprehensive view on the financial system as a whole required to properly conduct macro-prudential policy.

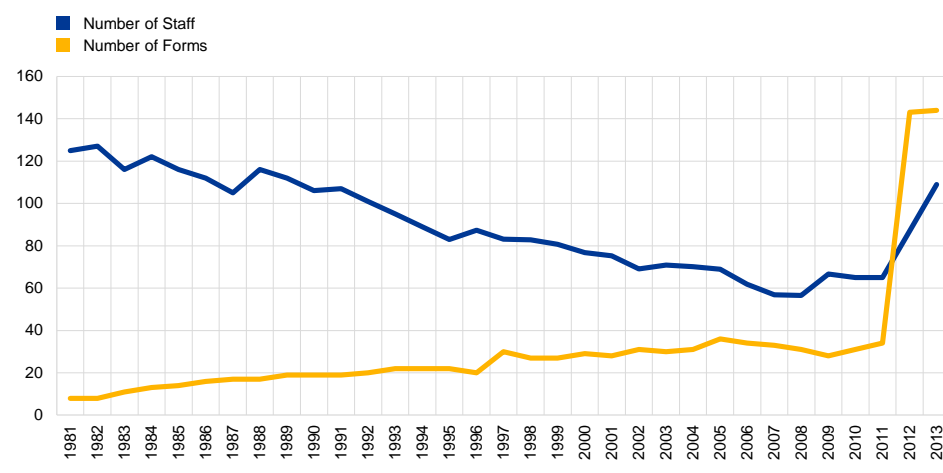
These analytical limitations with the forms-based approach to data collection are compounded by operational inefficiencies. Each new form imposes marginal costs on the central bank. The introduction of a new form may require: the hiring of additional staff or the re-training of existing staff; the creation and modification of associated guidance notes and explanatory materials related to the form; the reengineering of IT systems and business workflows to perform new quality checks on the data; and consultation and periodic reviews of the new form with reporters. The magnitude of these costs is increasingly prohibitive. As [Figure 2](#) shows, for the first time in the Statistics Division’s history, the number of forms exceeds the number of staff, in spite of an increase in employee headcount in recent years.¹⁷

¹⁶ Also, statutory definitions are sometimes not harmonised. For example, in the European Union (EU), at least two definitions of small and medium-sized enterprises (SMEs) exist, leading to potential confusion about what should be reported when EU wide regulators ask for data on lending to SMEs. I thank an anonymous reviewer for this observation.

¹⁷ The graph probably underestimates the extent of the gap because it does not include ad-hoc data collections currently done by the division.

Figure 2

Bank of England forms-to-staff comparison, 1981-2013



Although this rapid growth in the number of forms largely reflects the one-off establishment of the Prudential Regulation Authority (PRA) and the on-boarding of its legacy Financial Services Authority (FSA) forms, increasing data demands from the Financial Stability Board (FSB), European authorities like the European Banking Authority (EBA) and the European Occupational and Pension Authority (EIOPA), and the Financial Policy Committee (FPC), among other Bank of England data users, means that the form-to-staff gap is likely to grow and persist for the foreseeable future.

The proliferation of forms also incurs marginal time and resource costs for reporters to the extent that statistical and regulatory data requirements differ from other financial disclosures made to market participants. Even the simplest regulatory request may set in train a complex set of operational tasks for reporters in order to fulfil it. Suppose a central bank introduces a new regulatory form. In order to populate this form, the reporter may need to hire additional staff; develop IT solutions for aggregating financial agreements stored in a myriad of departmental, subsidiary and branch databases; initiate data quality processes to calculate and validate the required regulatory aggregates; and, in some instances, pay auditors to certify the results.

If budget constraints and scarcity in staff were not issues, the costs imposed on central banks and reporting institutions might be justified if there was no overlap between each new form. However, as further detailed below, there are overlaps. For example, **Figure 3** shows that Form BE, FSA047 (Daily Flows) and Form AD (Analysis of Deposits) each contain sections that collect data on deposits.

Figure 3

Three forms collecting data on a single instrument class (deposits) with a box showing how they could be integrated in theory in a granular data infrastructure.

Part 7 - Other liability cash flows FSA047

52	Non-financial large enterprises - Type B	
53	SME deposits	
54	Retail deposits - Type A	
55	Retail deposits - Type B	
56	Client / brokerage fee cash	

FORM BE LIABILITIES

Items: Sterling

Sight Deposits

2H	Other UK residents (BT item 2H)	
2H1	Financial corporations (including unlimited liability partnerships) other than monetary financial institutions	
2H2	All non-financial corporations other than public corporations (including unlimited liability partnerships)	
2H3A	Individuals and individual trusts	
2H3B	Unincorporated businesses other than unlimited liability partnerships	
2H4	Non-profit institutions serving households	

Of which interest bearing sight deposits

2HA	Other UK residents	
2HA1	Financial corporations (including unlimited liability partnerships) other than monetary financial institutions	
2HA2	All non-financial corporations other than public corporations (including unlimited liability partnerships)	
2HA3A	Individuals and individual trusts	
2HA3B	Unincorporated businesses other than unlimited liability partnerships	
2HA4	Non-profit institutions serving households	

Time Deposits

3H	Other UK residents (BT item 3H)	
3H1	Financial corporations (incl. unlimited liability partnerships) other than banks, building societies and money market funds	
3H2	All non-financial corporations other than public corporations (incl. unlimited liability partnerships)	
3H3A	Individuals and individual trusts	
3H3B	Unincorporated businesses other than unlimited liability partnerships	
3H4	Non-profit institutions serving households	

FORM AD: ANALYSIS OF DEPOSITS (£000s)

Items in brackets correspond to SIC 2007 classification codes

Deposit liabilities (including under repos) Sterling

1	Agriculture, hunting and forestry (1, 2)	
---	--	--

Balance	Currency	Financial Instrument	Financial Position	Industry	Sector
100	£	Deposit	Liability	Agriculture, hunting and forestry	Non-Financial

Source: Bank of England

The recording of the same instrument (deposits) on different forms generates inconsistencies. For example, retail deposits are defined in the guidance notes of Form BE as deposits arising from customers' acceptance of an advertised rate (including nil) for a particular product. But the definition of a retail deposit for liquidity forms like FSA047 differs materially, as these forms classify deposits as retail or not, depending on the nature of the counterparty; that is, whether it is a claim held by natural or legal persons (Financial Services Authority 2009). As a result of these definitional differences, data on the residual maturity of retail deposits cannot be easily compared with data on their sector composition. These incompatibilities and redundancies reflect the fact that forms are designed to meet specific end-user requirements. However, since end-users often formulate their data requirements in isolation from one another, overlaps and gaps crop up.¹⁸

Recognising the challenges posed by organisational segmentation and data fragmentation, the Statistics and Regulatory Data Division established a Vision Team

¹⁸ Roughly the same challenges often occur in private financial institutions. There, it is common for different departments to use customised IT infrastructures, developed by different vendors, to interface with various data sources, to ultimately perform only slight variations of the same calculation. Private financial institutions have tried to overcome data silos by building enterprise data warehouses. But as Willi Brammertz and his co-authors argue, these data warehouses physically integrate different sources of data but do not conceptually unify them. For example, a single concept like notional value still might be captured by multiple fields such as 'nominal value,' 'current principal,' 'par value' and 'balance' (Brammertz et al. 2009, p. 10-14).

cum Projects and Development Group (PDG) in 2011 to formulate an enterprise-wide data management vision to tackle these issues.¹⁹ That vision conceived of a single Bank-wide data infrastructure for collecting and warehousing standardised, granular - that is, instrument-by-instrument - data in a common metadata language jointly developed with reporters.²⁰ Key features of that vision are evident in the Bank's recently released Strategic Plan. In particular the Bank's strategic initiative 8 titled "One Bank data architecture" announced the organisation's intention to build an "integrated, but distributed, data architecture and governance, ensure data acquisition and integration are as efficient as possible and allow Bank-wide information-sharing with effective data management" (Bank of England 2014).

One approach to designing a conceptually integrated, but physically distributed, data infrastructure is to consolidate and reduce the number of forms submitted by reporting firms. The next section describes the steps by which this can be done, by reference to the experience of integrating Forms BE, ER and FSA054. The aim of the pilot was to decompose these three forms into their granular dimensions and show they could be regenerated on the basis of more elementary and standard categories. The working group responsible for the pilot felt this was important in order to minimise concerns about the mechanics of transitioning to a new method for collecting data.²¹ In brief, we wanted to demonstrate that a common metadata model existed as an implicit, but unrealised, possibility within our current data collection, rather than having the metadata model perceived as an exogenously imposed alternative to the existing forms.

¹⁹ The Projects and Development Group no longer exists. However, part of PDG formed the original core for the recently established Advanced Analytics Division.

²⁰ Elements of this granular financial data vision have been put into practice in Europe through initiatives such as Securities Holdings Statistics, Money Market Statistical Reporting and the forthcoming Central Credit Register. I thank an anonymous reviewer for this observation.

²¹ Related to managing internal stakeholders, the working group kept track of ambiguities and inconsistencies in the existing forms and guidance notes and fed this information back to our colleagues so they could take steps to correct them. This by-product was important to show we were delivering immediate value as much as contributing to the future.

3 Process and Findings

3.1 Selection and analysis of forms for pilot

In order to understand the extent of overlap between existing forms and, by extension, the possibility of unifying them, a small pilot was undertaken, focused on three forms managed by the three business-as-usual (BAU) teams within the Statistics and Regulatory Data Division (SRDD): Form BE (overseen by the Money and Credit Group); Form ER (overseen by the Financial Statistics Group); and FSA054 (overseen by the Regulatory Data Group). These forms can be found in the appendix. Significantly, these forms were not cherry picked for the pilot. Rather they were selected indirectly and blindly. The senior managers of each of the respective BAU teams were asked which of their analysts could spare time to feed their expertise into this exercise, and the forms those analysts oversee were consequently integrated into the exercise. So the forms sampled in this pilot were selected using a blend of random and convenience sampling strategies.

At first glance these sampled forms have nothing in common because they serve very different end-analytical purposes. Form ER is used by the Bank of England to assess the timing and effect of changes in the Bank rate on market rates. Form BE is used to segment reporters' balance sheet by sector, as that term is defined by the European System of National and Regional Accounts (ESA95).²² FSA054 is a micro-prudential liquidity return used to monitor currency mismatch between reporters' uses and sources of funds.

In sum there are a total of 690 boxes across forms BE, ER and FSA054. Each of these boxes represents an aggregate data item reported by firms. For instance box C6H4 on Form BE represents reporters' euro-denominated liabilities under sales and repurchase agreements with counterparties classified by ESA95 as the "non-profit institutions serving households" sector.²³ In trying to spot commonalities across these three forms, all 690 boxes were expressed as a string of code recorded in Excel. As the pilot team analysed each box on the forms, we asked ourselves:

- What data dimensions, that is, the attributes of the instruments underlying the aggregate figure, are captured by this box?
- Which possible values can those data dimensions assume?
- What are the data dimensions and the values that distinguish this box from the other 689 boxes and could be used to identify relevant data to populate the box if the code was used to retrieve data from a database containing all of the exposures of a firm?

²² ESA95 now has been superseded by ESA10. ESA10 was implemented only in September 2014, after completion of this small-scale pilot. Therefore the remainder of the text makes reference to the predecessor accounting framework (Eurostat 2013).

²³ However these euro liabilities are reported on Form BE in sterling terms.

In order to answer these questions, recourse was made to both the forms and their guidance notes.²⁴ In some cases the string of code was straightforward to write. For instance box C6H4 on Form BE was described by six data dimensions with the following values:

- Balance = Balance value
- Financial Position = Liability
- Currency = Euro
- Financial Instrument = Sales and Repurchase Agreement
- Residency of Counterparty = UK
- ESA 95 Sector = Non-profit institutions serving households

In other cases the resulting query string was more elaborate, usually when the guidance notes specified exclusions. For instance, form ER contains a section entitled "Memorandum items: Non-interest bearing loans/preferential loans."²⁵ The purpose of this section is to capture "non-interest bearing loans, including non-performing loans, loans traded at discount and preferential loans but excluding intra-group loans" if "these loans represent 5% or more of outstanding balances" in any of the boxes on form ER in the section "Outstanding £Loans and Advances", i.e., items 40 to 69.¹⁸ The reason for excluding such loans from the main sector analysis and recording them in the margin is that their inclusion is purported to distort assessment of changes in Bank rate on market rates.²⁶ An additional nuance is that preferential loans to reporters' staff secured on dwelling are excluded from the memorandum as they are covered separately by boxes in the main sector analysis section.

Therefore each box in the form ER section "Outstanding £ Loans and Advances" required both a positive description and a description of exclusions conditional on a threshold being reached. For instance, the column B box for data item (row) 48 quantifies the accrued interest flow over a month of a reporter's pound sterling loans to UK resident financial corporations (excluding banks and building societies), excluding the sum of non-interest bearing loans, non-performing loans, loans traded at discount and preferential loans when these loans exceed 5% of the overall balance for this item. This box was positively described with four data dimensions, having the following exclusions:²⁷

²⁴ In some instances this also required reference to other guidance notes, especially the General Notes and Definitions, the Classification of Accounts guide and the Prudential Sourcebook for Banks, Building Societies and Investment Firms (BIPRU Handbook).

²⁵ Effective Interest Rates (Form ER) guidance notes. The wording in the guidance notes has changed since the pilot was conducted:
http://www.bankofengland.co.uk/statistics/Documents/reporters/defs/def_er2014.pdf

²⁶ This may not be a reasonable assumption under all conditions. For instance, a rise in the Bank Rate may result in a material rise in arrears among borrowers with rates linked to it. In this case the performance, or non-performance, of loans may reflect the change in Bank rate.

²⁷ All the variables in bold fonts (e.g., Financial Position, Residency, Loan Status etc.) are data dimensions/columns in our table of a hypothetical granular database. Italic fonts (e.g., Asset, UK, Non Performing etc.) are possible values of those fields. INTEREST_FLOW, ERB74 and ERB48 are the values we have calculated using the pseudo code.

INTEREST_FLOW = 0 #Initialize to 0

For each entry in database {

IF (Financial Position == Asset

AND Currency == £

AND Residency == UK

AND Sector == Private

AND Subsector == Financial Corporations other than Banks and Building Societies

)

THEN

INTEREST_FLOW = INTEREST_FLOW + Accrued Interest

}

ERB74 = 0 #Initialize to 0

For each entry in database {

IF (Financial Position == Asset

AND Currency == £

AND Residency == UK

AND Sector == Private

AND Subsector == Financial Corporations other than Banks and Building Societies)

AND (

Interest Rate == 0

OR Loan Status == Non Performing

OR (Originating Lender != Reporting Institution AND Purchase Price != Book Value)

OR Preferential Term == YES)


```

)
THEN
    ERB74 = ERB74 + Accrued Interest
}
IF (ERB74/INTEREST_FLOW) >= 0.05
THEN
    ERB48 = INTEREST_FLOW - ERB74
ELSE
    ERB74 is empty
    ERB48 = INTEREST_FLOW

```

3.2 General findings and first draft

In our first draft of the code we tried to maintain fidelity with terms currently used in the forms and guidance notes. For instance, the counterparty sector was recorded according to the ESA95 classification scheme used on Form BE:

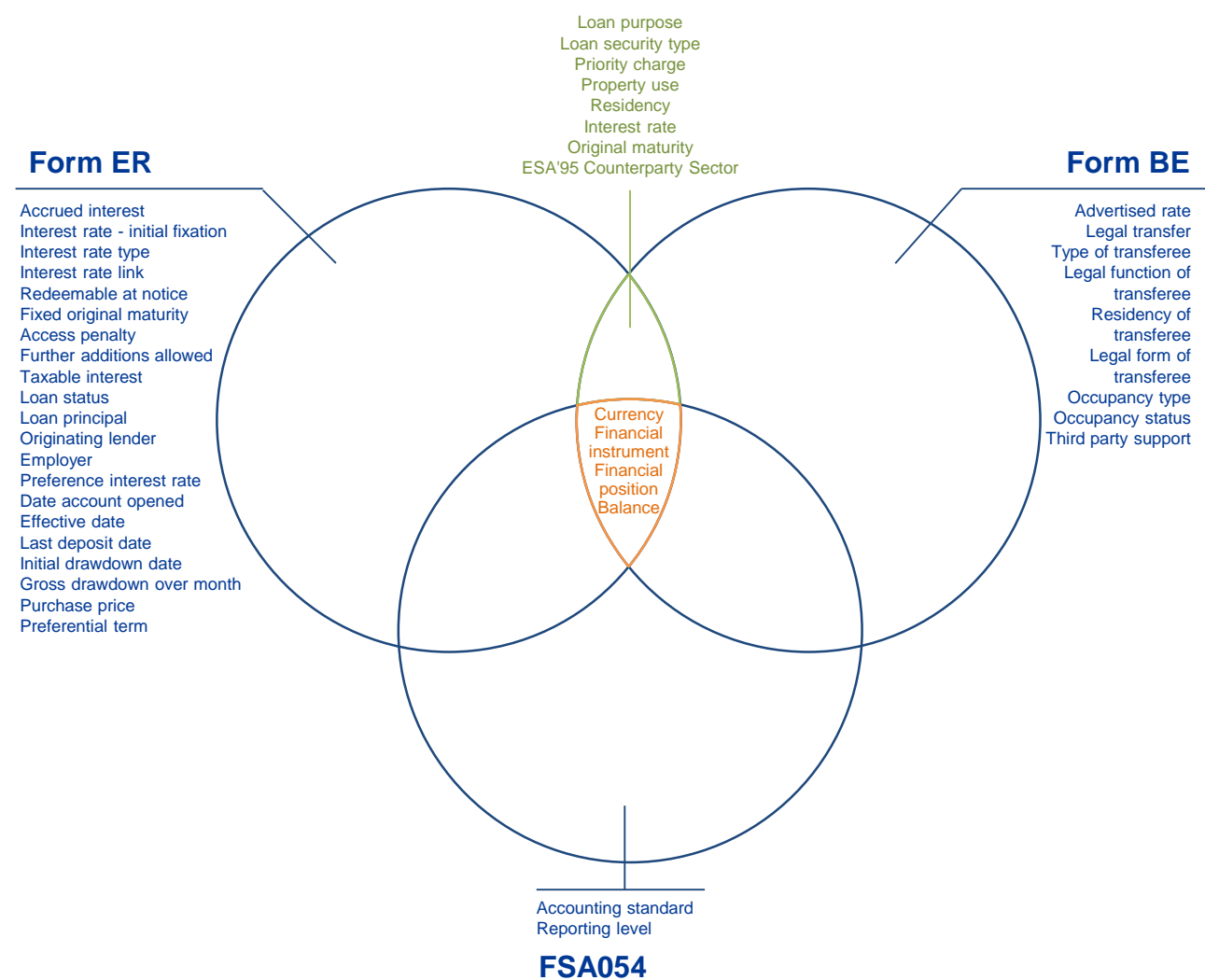
- Financial corporations (including unlimited liability partnerships) other than monetary financial institutions;
- All non-financial corporations other than public corporations (including unlimited liability partnerships);
- Individuals and individual trusts;
- Unincorporated businesses other than unlimited liability partnerships;
- Non-profit institutions serving households.

The first draft of the code identified 44 data dimensions with 105 values across the forms and guidance notes. **Figure 4** is a Venn diagram depicting the qualitative overlap of data dimensions between forms. Four data dimensions occurred across all three forms: Balance, Currency, Financial Instrument and Financial Position. A further eight data dimensions appeared in more than one form. **Figure 5** quantifies this overlap. Of the cumulative 5,312 data dimensions identified across the 690 boxes, four data dimensions recurred across all three forms, or 41.8 per cent of the total. Overall, twelve data dimensions appearing in more than one form accounted for 78.1 per cent of all the data dimensions. If this pilot is any indication, while defining the initial data dimensions is resource intensive up front, the effort required

to translate aggregate boxes into granular dimensions diminishes over time because certain core dimensions continually recur (**Figure 6**).

Figure 4

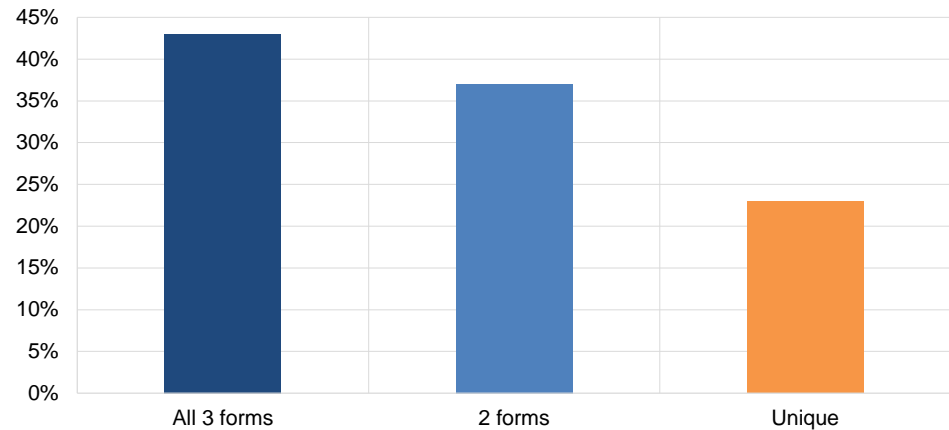
Venn diagram of overlap between forms



Source: Bank of England

Figure 5

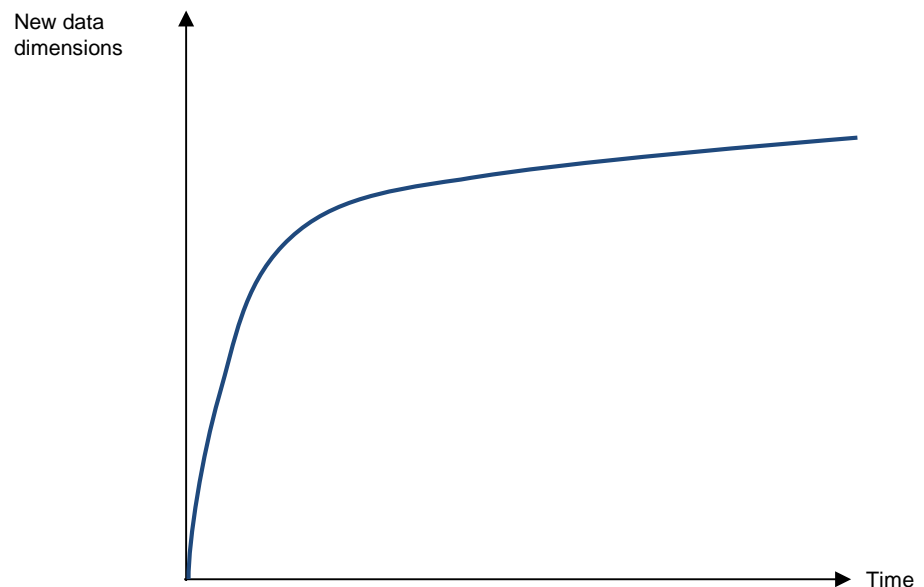
Percentage of overlap between forms BE, ER and FSA054



Source: Bank of England

Figure 6

Diminishing Marginal Data Dimensions



Source: Bank of England

Indeed these figures probably underestimate the full extent of data overlap between forms for two reasons. First data dimensions were recorded only if they were referenced in the relevant forms and guidance notes. However, certain data dimensions apply to all forms but may be referenced only by one. For instance, only FSA054 explicitly records accounting convention (such as International Financial Reporting Standards) and the unit level of reporting (consolidated, solo basis and so forth). But these data are tacit dimensions of other forms as well. The second reason the count probably underestimates the true extent of data overlap between forms is that it does not account for similarity between different data

dimensions. For instance, residency is recorded twice; once in relation to the residency of direct counterparties and again with respect to the residency of transferees to whom loans have been sold (indirect counterparties).

3.3 Refinement and restatement

A second draft of the code was then written to make it more conceptually precise. At this stage the working group applied two key principles characteristic of any robust data standard. The first principle is that the terms used for data dimensions, and their allowable values, should be mutually exclusive and disjoint. In practice this meant we had to parse terms in the original code. For instance, the term ‘Financial corporations’ conflates the legal form and economic function of counterparties. So the code for ‘Financial corporations’ was re-written as the union of two dimensions: ‘Legal Form = Corporation’ and ‘Economic Function = Financial.’ When drawing these fine-grained distinctions, logical gaps in the forms became apparent. For instance, while the ESA 95 sector scheme accounts for entities taking the legal forms of a publicly limited corporation, trust and unlimited liability partnership, it does not tease out mutual organisations and limited liability partnerships as distinct forms of legal organisation.

The second best practice principle applied at this stage was that the dimensions and values used in a data standard need to be cast in an analytically more abstract form than the terms ordinarily used by financial market participants. For example, it is common in derivative markets to distinguish between so-called ‘European’ and ‘American’ options. European options are options that can be exercised only on the option’s maturity date, while American options allow the holder to exercise the option any time between the purchase of the option and maturity date. So one way regulators could collect data on derivatives markets is using a data dimension ‘type of option’ with permissible values ‘American’ and ‘European,’ among others. This, for instance, is how options are classified within the International Organization for Standardization (ISO) Classification of Financial Instruments (CFI) standard.²⁸ However, an alternative way to collect the data would be to use a data dimension termed ‘exercise date’ with permissible values being either a particular date (thus identifiable as European options) or a range of dates (thus identifiable as American options). The benefit of this approach is that the data dimension ‘exercise date’ is applicable to a much wider variety of financial instruments besides options; for example, the call (early withdrawal) option on certain fixed term bank deposits. This example is indicative of how existing standards for granular financial data can provide food for thought for regulators as they develop their own, and also how these existing standards and standard setting bodies can be enriched from dialogue with policymakers.

Figure 7 illustrates the benefits of this more abstract approach.

²⁸ See https://www.iso20022.org/standardsrepository/public/wqt/Description/mx/dico/codesets/_aQR7BNp-Ed-ak6NoX_4Aeg_195526371

Figure 7
Credit Risk Mitigation Techniques



Source: Bank of England

This specific figure unfolded during discussion of Form BE data item 29DB3A2 "Loans and advances (including amounts receivable under finance leases) other than overdrafts to Individual and individual trusts secured on dwellings (excluding bridging loans)" and BE data item 29D2A "Loans and advances (including overdrafts) to housing associations secured on residential property."²⁹ These data

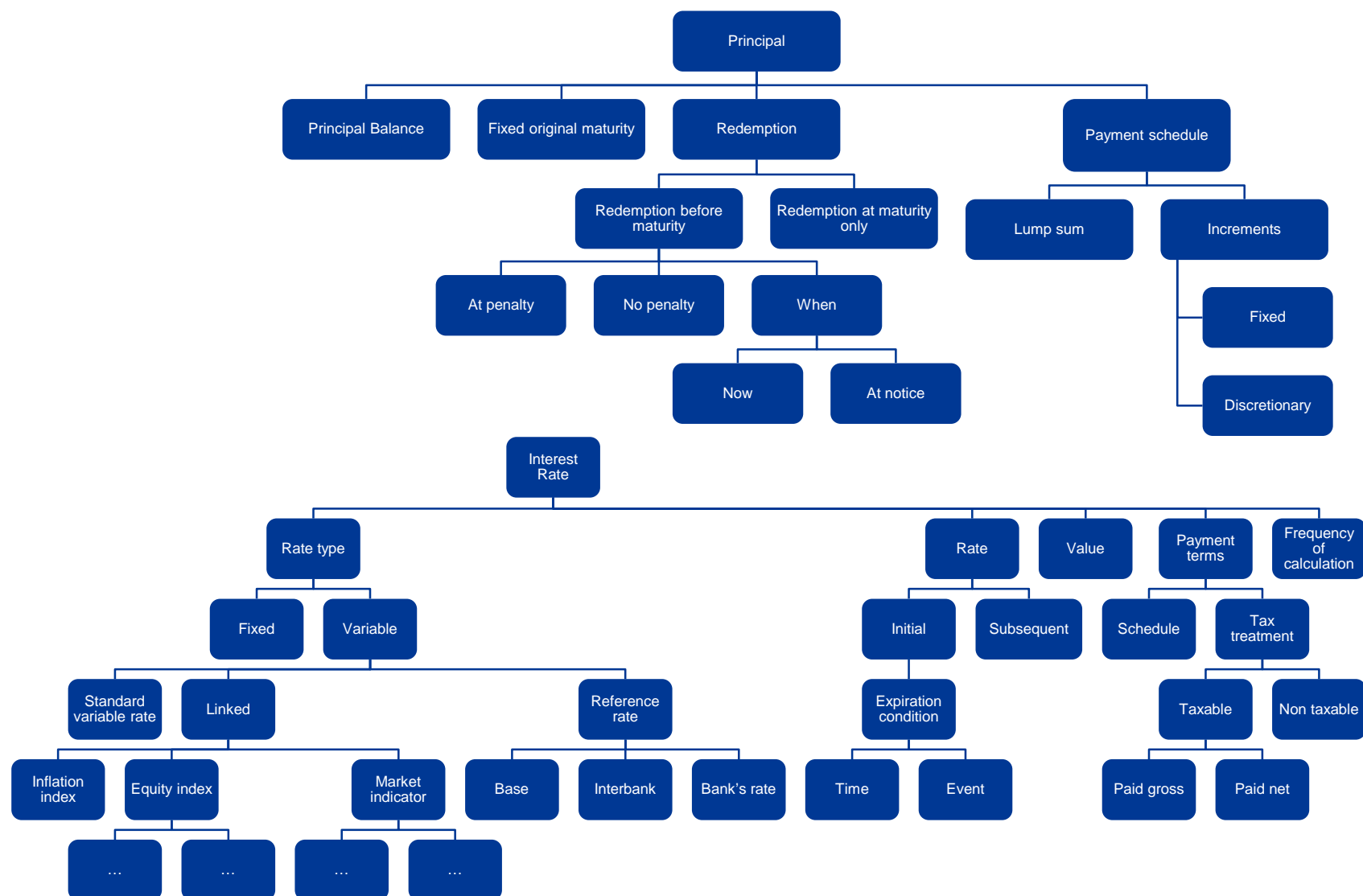
²⁹ In the guidance notes, item 29DB3A2 comprises mortgage loans to individuals and individual trusts secured by a first charge over properties (both freehold and leasehold) that are or will be occupied by the borrower, or that are rented out, and mortgage sub-participations fully and specifically secured against residential mortgage loans, as well as such loans that are fully secured on land. 29D2A is a record of mortgage loans to housing associations registered with the Homes & Communities Agency (HCA), the Greater London authority (GLA), the Scottish Government, the Welsh Government and the Northern Ireland Housing Executive that are fully secured by a first priority charge on housing association residential property that is rented out. It also includes loans that meet all of the following conditions: (a) the development attracts a social housing grant; (b) the loans are fully secured by a first priority charge on the development property; and (c) the loans are fully secured by a charge (but not necessarily a first priority charge) on a housing association's residential property that is rented out.

items sparked more general reflection in the group about the credit risk mitigation techniques available to reporters, of which security in the form of a first charge over real property is but one type. For instance, second charge mortgages are not differentiated from other forms of unsecured personal lending on Form BE. Although these mortgages probably represent at most an estimated 3 per cent of new mortgage lending in the UK in recent quarters, they are often used to borrow down payments for first charge mortgages and could be captured for micro-prudential purposes as a separate item indicating loosening lending standards.

Figure 8, 9, 10 and 11 group these concepts into taxonomies. The four conceptual taxonomies pertain to: original terms and conditions; metadata on the reporting unit and contract; entity characteristics; and subsequent events. Note that these taxonomies are illustrative and incomplete. They have been generated on the basis of the sampled forms and do not cover the full range of financial instruments and entities.³⁰ The taxonomies also remain preliminary. For example, another draft of the code could further unpick the conventional names given to financial instruments into distinct data dimensions, describing their terms and conditions, and their contracted and realised cash flow.

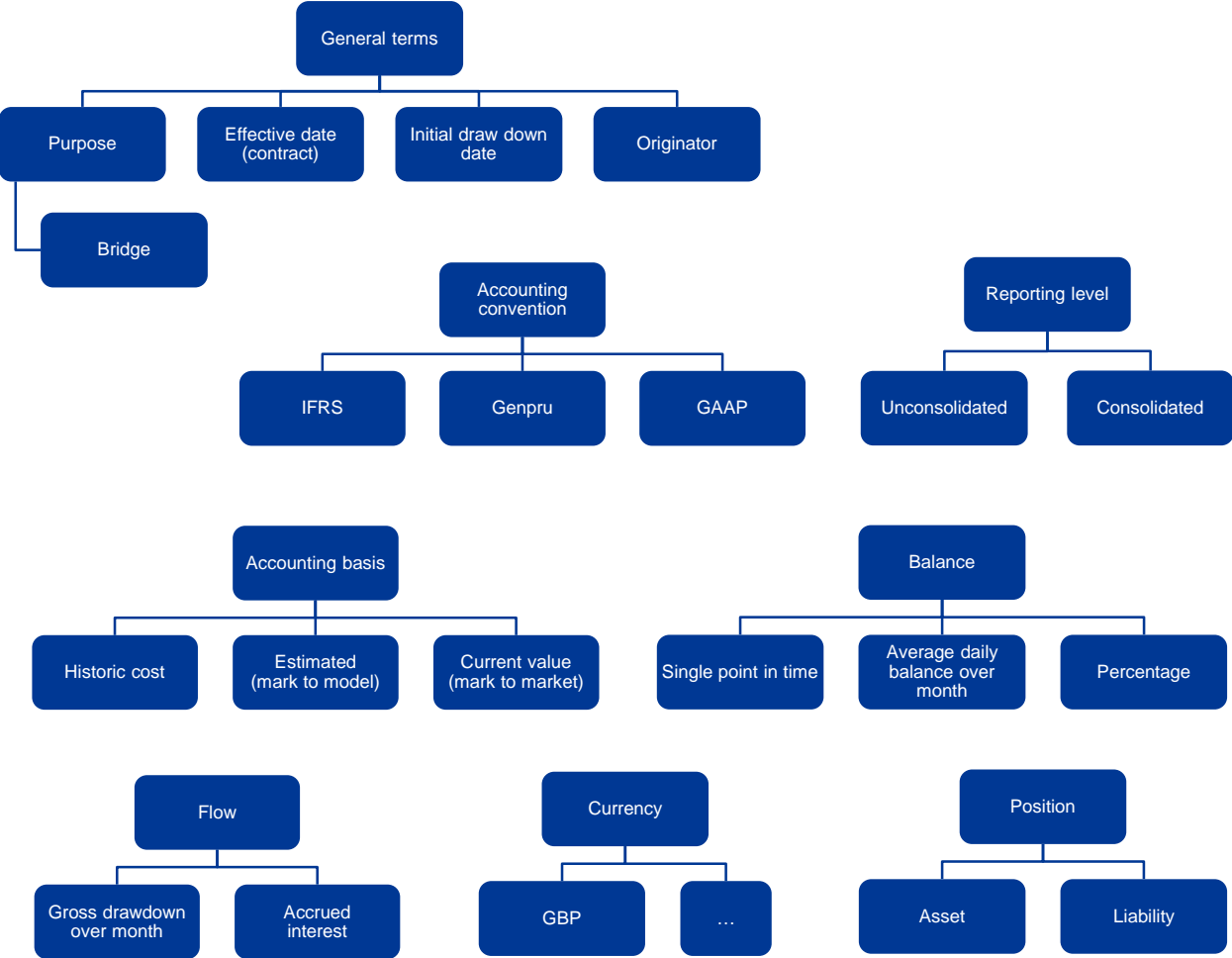
³⁰ For example, the taxonomies do not cover derivatives in detail or their standard dimensions such as reference asset, delivery method, strike price, and exercise dates.

Figure 8
Original Terms & Conditions



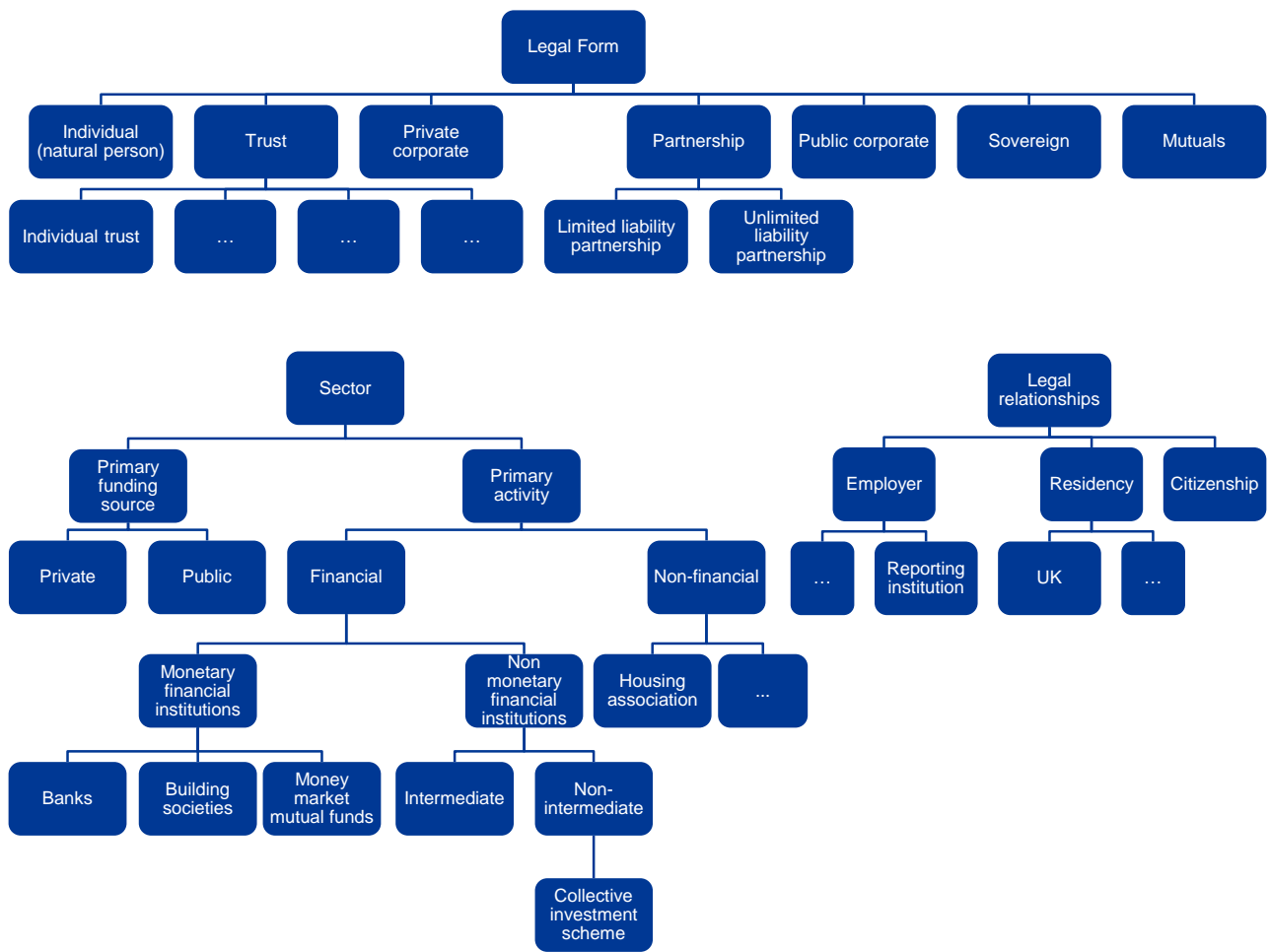
Source: Bank of England

Figure 9
 Metadata on the reporting unit and contract



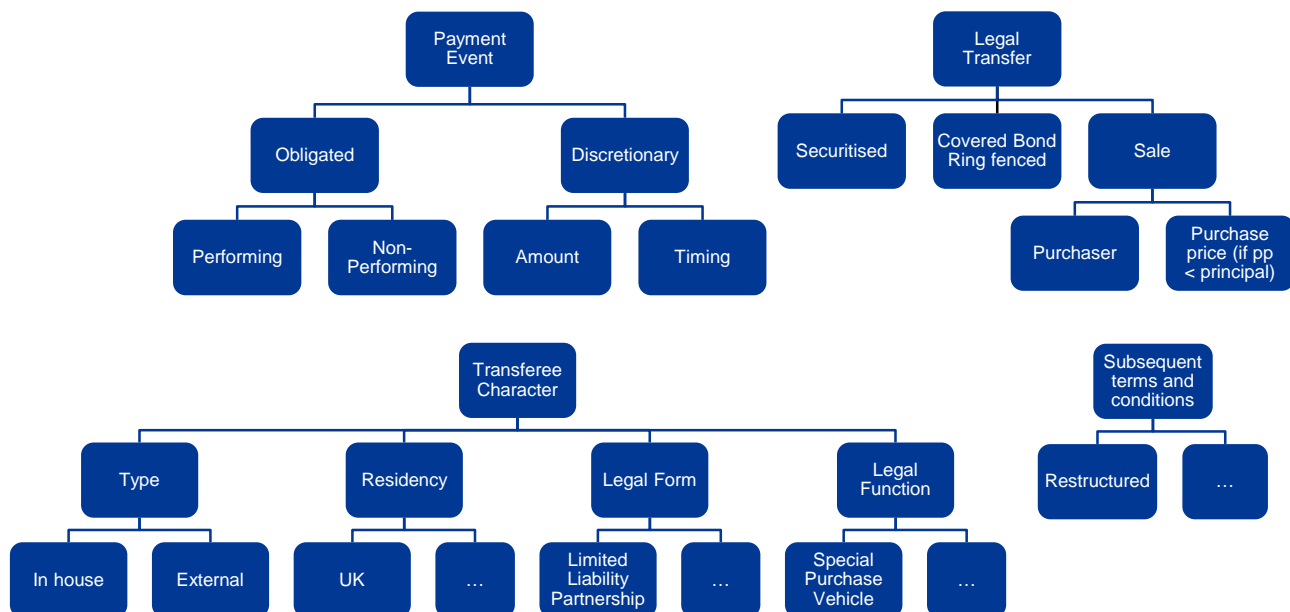
Source: Bank of England

Figure 10
Entity Characteristics



Source: Bank of England

Figure 11
Subsequent events



Source: Bank of England

During the pilot some progress in this direction was made. For example in the current draft code the category 'fixed rate bonds' is described as

- Financial Instrument = Time Deposit
- Interest Rate Type = Fixed
- Access Penalty = Yes
- Fixed Maturity = (Not Null)
- Further Additions Allowed = No.

There are two reasons why it is preferable to record financial instruments using their data dimensions rather than by their conventional name.³¹ The first reason is that the same conventional name is often ascribed to different products and instruments. For example, a 'fixed rate bond' could refer to either a type of term deposit or an issued debt security, depending on financial market context. And even when the context is known, there may be ambiguity in the definition of products and instruments. For example, fixed rate bonds are defined in the form ER guidance notes as follows: "These products usually have a specified interest rate and maturity date. Customers may either lose interest by accessing their money before the maturity date or may

³¹ However, a delicate balance needs to be struck between abstraction and precision. For instance, from a purely legal and contracted cash flow perspective, deposits are just loans in reverse (loans made from households to banks). But the regulatory permissions of deposit takers and credit granting institutions are different so it is necessary to find a means for distinguishing between deposits and loans.

not be able to access the money at all. Often further additions to the bond are not allowed after the initial deposit is made."³²

The definition of fixed rate bonds in probabilistic, rather than deterministic, terms makes this data open to varying interpretations by different reporters. This introduces sources of reporting error.

However, it is unlikely that deterministic definitions of products and financial instruments can be achieved because of on-going financial innovation.³³ Nor would laying down such definitions necessarily be desirable. The 'correct' definition of instruments depends on analytical purpose. For example, it may make sense ordinarily to classify Cash Individual Savings Accounts (ISAs) as time deposits, as form ER does. But during a liquidity crisis it may be more relevant to classify any accounts that allow immediate access to principal without penalty as sight deposits. So instead of trying to rigidly define a complex concept such as 'non-performing loans', for example, the basic unit days can be used to record how much time has passed since the last payment of principal or interest. Central banks would then have the flexibility to specify different thresholds for classifying loans as non-performing depending on end-analytical purpose and economic context.

The second reason to favour capturing financial products and instruments by data dimensions is that conventional names tend to vary geographically. For instance, 'sight deposit' is a term particular to UK banking. By contrast, these accounts are referred to as 'demand deposits' in the United States. So central bank data collections cast in local terms are at odds with the reality that the business of their largest reporters is global, and that finance itself is a universal activity.

This last observation raises a more general issue. Some conceive of central bank reporting burden in quantitative terms, as a function of the volume of data reported to the authorities, whether measured in bytes or the number of boxes on forms. But another way to conceive of central bank reporting burden is in qualitative terms; in other words, whether the data requested by central banks reflects the way reporters and source systems record their business for their own purposes. The closer these types of data are aligned, the cheaper reporting costs become. Judged by these standards there is scope to improve central bank operations and reduce reporter burden. For example, the column on form BE labelled 'Other currencies' is a reporting artifice at odds with the reality that each position recorded by firms in their source systems is denominated in a particular currency. So a more streamlined, granular approach to collecting data might reduce reporters' burden by minimising the number of forms and guidance notes reporters need to be familiar with, and pro-actively pre-empt ad-hoc requests by central banks to fill in data gaps in their data collections.

³² Effective Interest Rates (Form ER) guidance notes. Italics added to emphasise conditionality. See http://www.bankofengland.co.uk/statistics/Documents/reporters/defs/def_er2014.pdf

³³ For example, reporters may invent fixed rate bonds that allow additions on top of the initial deposit.

4 Conclusion

Financial regulation in the last thirty years at an international and, especially, European level, has become more integrated. From the first Basel Accord and subsequent efforts to standardise the meaning of regulatory capital, regulatory harmonisation has spurred on initiatives aiming to harmonise data. In recent years, regulatory standards for classifying data have become increasingly granular. For example, the Markets in Financial Instruments Directive (MiFID) requires firms to classify each of their clients as retail or professional clients, or eligible clients, as those terms are defined in the directive. In parallel, these regulatory initiatives have been complemented by the emergence of market standards, for example, the development by the International Standards and Derivatives Association (ISDA) of a Master Agreement to standardise terms for derivatives transactions (Andenas and Chiu 2014).

While all these initiatives are admirable, they are piecemeal in the sense that they pertain to particular financial subsectors and products. What remains undone is the development and effective implementation of a data standard to comprehensively cover all financial activities. There are now some efforts in this vein underway such as the Financial Industry Business Ontology (FIBO).³⁴ However, their use by financial firms and regulators remains limited.

The creation and adoption of a common financial language (Ali et al. 2012) is critical to the success of post-crisis financial regulation. Common data standards facilitate comparability, enabling central bankers and regulators to compare the performance of a particular reporter against peers (micro-prudential analysis) and to build up an accurate aggregate picture of all reporters (macro-prudential and macro-economic analysis).

The prospect of arriving at and implementing common data standards in finance might sound as fanciful as Hobbes' thought experiment discussed at the start of the article. However, there are real, historical precedents when standardisation has been achieved (see also Milne 2013). The European System of Accounts and the United Nations Systems of National Accounts are two examples. Another is the *Système International d'Unités* (SI). The SI was a remarkable achievement. Until its establishment in 1960, there was no consistent standard of measurement across Continental Europe. For instance, instead of a single, general category to measure length, there existed a plurality of units whose usage depended on context and the particular object measured. The fathom was used to record the depths of the sea, the pace used to describe distances travelled, and the foot used to measure out potato patches. As Felix Martin (2013) notes, "This was the lamentable state of affairs which the General Conference on Weights and Measures had been established to remedy, and the creation of the SI was the culmination of nearly a century's worth of international efforts to simplify and standardise the world's weights and measures." It introduced a set of seven basic units for measuring the physical

³⁴ For more information on FIBO, see <http://www.edmouncil.org/financialbusiness>.

world: the metre for length; the kilogram for mass; the second for time; the degree Kelvin for temperature; the candela for luminosity; the ampere for electric current; and the mole for substance.

Similarly a common data standard also may be possible in finance. As this article has suggested, even the most complex financial aggregates might be described using combinations of simple data elements, analogous to the way the whole English language is composed from a finite set of letters (Schwerdt and von Wendland 2010). The trick is to see commonality underlying superficial difference. For example, a deposit is basically a loan just the other way. Given the choice between collecting aggregate figures or granular data, central banks may want to follow best practice in science (Occam's razor) and choose the data infrastructure employing the simplest, most standard elements.³⁵

³⁵ One of the advantages of collecting data by dimensions is that central bank data systems could then flexibly adapt to expansions of the regulatory reporting perimeter. For example, although certain 'shadow banks' do not currently fall with the Bank's regulatory remit, they could be easily brought within reporting scope if a granular metadata model existed, since the dimensions of the instruments held by these entities do not materially differ from the dimensions of the instruments held by other already regulated lenders. This would save the Bank costs of developing bespoke forms for 'shadow banks' (Bholat 2013).

Version: 1
 Date: 07 October 2009
 Based on: [Handbook Legal Instrument 2009/56 \(October 2009\)](#)

Reference	Label	XML Name	Data Type	Validation	Error code	Additional Information
FSA054	Currency analysis	FSA054-CurrencyAnalysis				
		@reportingBasis	RepBas			An attribute of the data item element, indicating the reporting basis, eg "unconsolidated"
		GroupInfo				This element does not appear on the handbook layout, but has been added to the XML of this and other data items to capture information when the data item is being submitted for a defined liquidity group. If the data item is not being completed on such a group basis, then this element should be omitted.
		OtherGroupFirms				
		FirmReferenceNumber	FRN	Conditional: If the reporting basis is "unconsolidated" then this element must not be completed.	ERR0050	This element is repeated as many times as there are other firms in the group.
1	GBP	GBP				
1A	Assets (%)	PercentageOfAssets	Pct2	1A >= 0.00 1A <= 100.00	ERR0040 ERR0040	
1B	Liabilities (%)	PercentageOfLiabilities	Pct2	1B >= 0.00 1B <= 100.00	ERR0040 ERR0040	
2	USD	USD				
2A to 2B						Repeat definitions of 1A and 1B including equivalent validation
3	EUR	EUR				
3A to 3B						Repeat definitions of 1A and 1B including equivalent validation
4	JPY	JPY				
4A to 4B						Repeat definitions of 1A and 1B including equivalent validation
5	CHF	CHF				
5A to 5B						Repeat definitions of 1A and 1B including equivalent validation
6	CAD	CAD				
6A to 6B						Repeat definitions of 1A and 1B including equivalent validation
7	SEK	SEK				
7A to 7B						Repeat definitions of 1A and 1B including equivalent validation
8	NOK	NOK				
8A to 8B						Repeat definitions of 1A and 1B including equivalent validation
9	DKK	DKK				
9A to 9B						Repeat definitions of 1A and 1B including equivalent validation
10	AUD	AUD				
10A to 10B						Repeat definitions of 1A and 1B including equivalent validation
11	HKD	HKD				
11A to 11B						Repeat definitions of 1A and 1B including equivalent validation
12	ZAR	ZAR				
12A to 12B						Repeat definitions of 1A and 1B including equivalent validation
13	Other	Other				
13A	Assets (%)	PercentageOfAssets	Pct2	13A >= 0.00 13A <= 100.00 Sum(1A to 13A) = 100.00	ERR0040 ERR0040 ERR0010	
13B	Liabilities (%)	PercentageOfLiabilities	Pct2	13B >= 0.00 13B <= 100.00 Sum(1B to 13B) = 100.00	ERR0040 ERR0040 ERR0010	

Private and confidential

Additional Sectoral Detail

as at.....

dd / mm / yyyy
eg (31 / 12 / 2012 etc)

Reporting institution _____

Name (block letters please) and signature of authorised official of reporting institution

In the event of a query, the Bank of England may contact (block letters please)

Name _____

E-mail _____ Tel No _____

Notes on completion

If you have any technical difficulties in completing this form please telephone the Statistics and Regulatory Data Division on 020 7601 5360. If you have any difficulties in transmitting the form or any subsequent amendments to the figures please contact Data Reception on 020 7601 5360.

- 1 Complete the form as at the end-calendar months as requested by the Bank of England.
- 2 For definition of items, refer to the Statistics area of the Bank of England website
- 3 Enter amounts to the nearest thousand, omitting £000s.
- 4 Return the form within **ELEVEN WORKING DAYS** of reporting date, clearly addressed to:

**Statistics and Regulatory Data Division
Business and Communications Group (HO-5)
Bank of England
Threadneedle Street
London EC2R 8AH**

- 5 Forms may also be delivered to the Works Gate at the Lothbury entrance of the Bank of England between 9.00am and 5.00pm, Monday to Friday. Envelopes should be clearly addressed as above.

Bank of England use only

Received	Processed	Amendment received	Amendment processed

Effective from January 2014

FORM BE: ADDITIONAL SECTORAL DETAIL

LIABILITIES

Item no

Sight Deposits

2H	Other UK residents (BT item 2H).....	
2H1	Financial corporations (including unlimited liability partnerships) other than monetary financial institutions.....	
2H2	All non-financial corporations other than public corporations (including unlimited liability partnerships).....	
2H3A	Individuals..... and..... individual	
2H3B	trusts..... Unincorporated	
2H4	businesses other than unlimited liability partnerships..... Non-profit	
	institutions serving households.....	

£000s			
Sterling	Euro	Other currencies	
BE£2H	BEE2H	BEC2H	2H
BE£2H1	BEE2H1	BEC2H1	2H1
BE£2H2	BEE2H2	BEC2H2	2H2
BE£2H3A	BEE2H3A	BEC2H3A	2H3A
BE£2H3B	BEE2H3B	BEC2H3B	2H3B
BE£2H4	BEE2H4	BEC2H4	2H4

Of which: interest bearing sight deposits

2HA	Other UK residents.....	
2HA1	Financial corporations (including unlimited liability partnerships) other than monetary financial institutions.....	
2HA2	All non-financial corporations other than public corporations (including unlimited liability partnerships).....	
2HA3A	Individuals..... and..... individual	
2HA3B	trusts..... Unincorporated	
2HA4	businesses other than unlimited liability partnerships..... Non-profit	
	institutions serving households.....	

BE£2HA	BEE2HA		2HA
BE£2HA1	BEE2HA1		2HA1
BE£2HA2	BEE2HA2		2HA2
BE£2HA3A	BEE2HA3A		2HA3A
BE£2HA3B	BEE2HA3B		2HA3B
BE£2HA4	BEE2HA4		2HA4

Time Deposits

3H	Other UK residents (BT item 3H).....	
3H1	Financial corporations (incl. unlimited liability partnerships) other than banks, building societies and money market funds.....	
3H2	All non-financial corporations other than public corporations (incl. unlimited liability partnerships).....	
3H3A	Individuals..... and..... individual	
3H3B	trusts..... Unincorporated	
3H4	businesses other than unlimited liability partnerships..... Non-profit	
	institutions serving households.....	

BE£3H	BEE3H	BEC3H	3H
BE£3H1	BEE3H1	BEC3H1	3H1
BE£3H2	BEE3H2	BEC3H2	3H2
BE£3H3A	BEE3H3A	BEC3H3A	3H3A
BE£3H3B	BEE3H3B	BEC3H3B	3H3B
BE£3H4	BEE3H4	BEC3H4	3H4

Retail Deposits (part of 2H and 3H)

47A	Other UK residents' interest bearing retail deposits.....	
47B	Non-financial corporations other than public corporations (incl. unlimited liability partnerships).....	
47C	Households.....	

BE£47A	BEE47A		47A
BE£47B	BEE47B		47B
BE£47C	BEE47C		47C

Liabilities under sale and repurchase agreements

6H	Other UK residents (BT item 6H).....	
6H1	Financial corporations (including unlimited liability partnerships) other than monetary financial institutions.....	
6H2	All non-financial corporations other than public corporations (including unlimited liability partnerships).....	
6H3	Individuals, individual trusts and unincorporated businesses other than unlimited liability partnerships.....	
6H4	Non-profit institutions serving households.....	

BE£6H	BEE6H	BEC6H	6H
BE£6H1	BEE6H1	BEC6H1	6H1
BE£6H2	BEE6H2	BEC6H2	6H2
BE£6H3	BEE6H3	BEC6H3	6H3
BE£6H4	BEE6H4	BEC6H4	6H4

FORM BE: ADDITIONAL SECTORAL DETAIL

ASSETS

26EC	Other UK residents (BT item 26EC).....	
26EC1	Financial corporations (including unlimited liability partnerships) other than monetary financial institutions.....	
26EC2	All non-financial corporations other than public corporations (including unlimited liability partnerships).....	
26EC3	Individuals, individual trusts and unincorporated businesses other than unlimited liability partnerships.....	
26EC4	Non-profit institutions.....	serving households.....

BEF26EC	BEE26EC	BEC26EC	26EC
BEF26EC1	BEE26EC1	BEC26EC1	26EC1
BEF26EC2	BEE26EC2	BEC26EC2	26EC2
BEF26EC3	BEE26EC3	BEC26EC3	26EC3
BEF26EC4	BEE26EC4	BEC26EC4	26EC4

Commercial paper issued by:

26F	Other UK residents (BT item 26F)	
26F1	Financial corporations (including unlimited liability partnerships) other than monetary financial institutions.....	
26F2	All non-financial corporations other than public corporations (including unlimited liability partnerships).....	

BEF26F	BEE26F	BEC26F	26F
BEF26F1	BEE26F1	BEC26F1	26F1
BEF26F2	BEE26F2	BEC26F2	26F2

Other loans, advances, and amounts receivable under finance leases

29D	Other UK residents (BT item 29D).....	
Overdrafts		
29DA1	Financial corporations (including unlimited liability partnerships) other than monetary financial institutions.....	
29DA2	All non-financial corporations other than public corporations (including unlimited liability partnerships).....	
29DA3A	Individuals and individual trusts.....	
29DA3B	Unincorporated businesses other than unlimited liability partnerships.....	
29DA4	Non-profit institutions serving households.....	
Loans and advances (incl. amounts receivable under finance leases) other than overdrafts		
29DB1	Financial corporations (including unlimited liability partnerships) other than monetary financial institutions.....	
29DB1U	Up to and including twelve months' original maturity.....	
29DB1V	Over twelve months' original maturity.....	
29DB2	All non-financial corporations other than public corporations (including unlimited liability partnerships).....	
29DB2U	Up to and including twelve months' original maturity.....	
29DB2V	Over twelve months' original maturity.....	
29DB2W	of which: loans transferred / securitised to own UK resident securitisation special purpose vehicles (SPVs).....	
29DB2X	loans transferred / securitised to own non-resident securitisation special purpose vehicles (SPVs).....	
29DB2Y	loans ring-fenced as part of a covered bond programme with UK resident LLP.....	
29DB2Z	loans ring-fenced as part of a covered bond programme with non-resident LLP.....	
29DB3A1	Individuals and individual trusts bridging finance (secured and unsecured).....	Individuals and individual trusts secured on dwellings (excluding bridging loans).....
29DB3A2	of which: loans transferred / securitised to own UK resident securitisation special purpose vehicles (SPVs).....	
29DB3A2X	loans transferred / securitised to own non-resident securitisation special purpose vehicles (SPVs).....	
29DB3A2Y	loans ring-fenced as part of a covered bond programme with UK resident LLP.....	
29DB3A2Z	loans ring-fenced as part of a covered bond programme with non-resident LLP.....	
29DB3A3	Individuals and individual trusts credit card credit.....	
29DB3A3W	of which: loans transferred / securitised to own UK resident securitisation special purpose vehicles (SPVs).....	
29DB3A3X	loans transferred / securitised to own non-resident securitisation special purpose vehicles (SPVs).....	
29DB3A3Y	loans ring-fenced as part of a covered bond programme with UK resident LLP.....	
29DB3A3Z	loans ring-fenced as part of a covered bond programme with non-resident LLP.....	
29DB3A4	Up to and including twelve months' original maturity.....	
29DB3A4V	Over twelve months' original maturity.....	
29DB3A4W	of which: loans transferred / securitised to own UK resident securitisation special purpose vehicles (SPVs).....	
29DB3A4X	loans transferred / securitised to own non-resident securitisation special purpose vehicles (SPVs).....	
29DB3B	Unincorporated businesses other than unlimited liability partnerships.....	
29DB3BU	Up to and including twelve months' original maturity.....	
29DB3BV	Over twelve months' original maturity.....	
29DB4	Non-profit institutions serving households.....	
29DB4U	Up to and including twelve months' original maturity.....	
29DB4V	Over twelve months' original maturity.....	
29D2A	Addendum: Loans and advances (incl. overdrafts) to housing associations secured on residential property (part of 29DA2 and 29DB2)	
29D2AW	of which: loans transferred / securitised to own UK resident securitisation special purpose vehicles (SPVs).....	
29D2AX	loans transferred / securitised to own non-resident securitisation special purpose vehicles (SPVs).....	
29D2AY	loans ring-fenced as part of a covered bond programme with UK resident LLP.....	
29D2AZ	loans ring-fenced as part of a covered bond programme with non-resident LLP.....	

BEF29D	BEE29D	BEC29D	29D
BEF29DA1	BEE29DA1	BEC29DA1	29DA1
BEF29DA2	BEE29DA2	BEC29DA2	29DA2
BEF29DA3A	BEE29DA3A	BEC29DA3A	29DA3A
BEF29DA3B	BEE29DA3B	BEC29DA3B	29DA3B
BEF29DA4	BEE29DA4	BEC29DA4	29DA4
BEF29DB1	BEE29DB1	BEC29DB1	29DB1
BEF29DB1U	BEE29DB1U	BEC29DB1U	29DB1U
BEF29DB1V	BEE29DB1V	BEC29DB1V	29DB1V
BEF29DB2	BEE29DB2	BEC29DB2	29DB2
BEF29DB2U	BEE29DB2U	BEC29DB2U	29DB2U
BEF29DB2V	BEE29DB2V	BEC29DB2V	29DB2V
BEF29DB2W	BEE29DB2W	BEC29DB2W	29DB2W
BEF29DB2X	BEE29DB2X	BEC29DB2X	29DB2X
BEF29DB2Y	BEE29DB2Y	BEC29DB2Y	29DB2Y
BEF29DB2Z	BEE29DB2Z	BEC29DB2Z	29DB2Z
BEF29DB3A1	BEE29DB3A1	BEC29DB3A1	29DB3A1
BEF29DB3A2	BEE29DB3A2	BEC29DB3A2	29DB3A2
BEF29DB3A2W	BEE29DB3A2W	BEC29DB3A2W	29DB3A2W
BEF29DB3A2X	BEE29DB3A2X	BEC29DB3A2X	29DB3A2X
BEF29DB3A2Y	BEE29DB3A2Y	BEC29DB3A2Y	29DB3A2Y
BEF29DB3A2Z	BEE29DB3A2Z	BEC29DB3A2Z	29DB3A2Z
BEF29DB3A3	BEE29DB3A3	BEC29DB3A3	29DB3A3
BEF29DB3A3W	BEE29DB3A3W	BEC29DB3A3W	29DB3A3W
BEF29DB3A3X	BEE29DB3A3X	BEC29DB3A3X	29DB3A3X
BEF29DB3A4	BEE29DB3A4	BEC29DB3A4	29DB3A4
BEF29DB3A4U	BEE29DB3A4U	BEC29DB3A4U	29DB3A4U
BEF29DB3A4V	BEE29DB3A4V	BEC29DB3A4V	29DB3A4V
BEF29DB3A4W	BEE29DB3A4W	BEC29DB3A4W	29DB3A4W
BEF29DB3A4X	BEE29DB3A4X	BEC29DB3A4X	29DB3A4X
BEF29DB3B	BEE29DB3B	BEC29DB3B	29DB3B
BEF29DB3BU	BEE29DB3BU	BEC29DB3BU	29DB3BU
BEF29DB3BV	BEE29DB3BV	BEC29DB3BV	29DB3BV
BEF29DB4	BEE29DB4	BEC29DB4	29DB4
BEF29DB4U	BEE29DB4U	BEC29DB4U	29DB4U
BEF29DB4V	BEE29DB4V	BEC29DB4V	29DB4V
BEF29D2A	BEE29D2A	BEC29D2A	29D2A
BEF29D2AW	BEE29D2AW	BEC29D2AW	29D2AW
BEF29D2AX	BEE29D2AX	BEC29D2AX	29D2AX
BEF29D2AY	BEE29D2AY	BEC29D2AY	29D2AY
BEF29D2AZ	BEE29D2AZ	BEC29D2AZ	29D2AZ

FORM BE: ADDITIONAL SECTORAL DETAIL

ASSETS (continued)

Claims under sale and repurchase agreements

30H	Other UK residents (BT item 30H).....	
30H1	Financial corporations (including unlimited liability partnerships) other than monetary financial institutions.....	
30H2	All non-financial corporations other than public corporations (including unlimited liability partnerships).....	
30H3	Individuals, individual trusts and unincorporated businesses other than unlimited liability partnerships.....	
30H4	Non-profit institutions serving households.....	

BEE30H	BEE30H	BEC30H	30H
BEE30H1	BEE30H1	BEC30H1	30H1
BEE30H2	BEE30H2	BEC30H2	30H2
BEE30H3	BEE30H3	BEC30H3	30H3
BEE30H4	BEE30H4	BEC30H4	30H4

Securities (including shares and other equities) issued by:

32H	Other UK residents (BT item 32H).....	
32H1	Financial corporations (including unlimited liability partnerships) other than monetary financial institutions.....	
32H1A	Intermediate other financial corporations.....	
32H1AA	Quoted shares.....	
32H1AB	Unquoted shares.....	
32H1AC	of which: historic cost.....	
32H1AD	Bonds and other debt securities.....	
32H1B	All other securities.....	
	Non-intermediate other financial corporations.....	
32H1BF	of which: collective investment schemes.....	
32H1BFM	of which: money market funds (where identifiable).....	
32H1BFN	of which: non-MMF collective investment schemes (where identifiable).....	
32H1BA	Quoted shares.....	
32H1BB	Unquoted shares.....	
32H1BBA	of which: historic cost.....	
32H1BC	Bonds and other debt securities.....	
32H1BD	All other securities.....	
32H2	All non-financial corporations other than public corporations (incl. unlimited liability partnerships).....	
32H2A	Quoted shares.....	
32H2B	Unquoted shares.....	
32H2C	Bonds and other debt securities.....	
32H2D	All other securities.....	
32H4	Non-profit institutions serving households.....	

BEE32H	BEE32H	BEC32H	32H
BEE32H1	BEE32H1	BEC32H1	32H1
BEE32H1A	BEE32H1A	BEC32H1A	32H1A
BEE32H1AA	BEE32H1AA	BEC32H1AA	32H1AA
BEE32H1AB	BEE32H1AB	BEC32H1AB	32H1AB
BEE32H1ABA	BEE32H1ABA	BEC32H1ABA	32H1ABA
BEE32H1AC	BEE32H1AC	BEC32H1AC	32H1AC
BEE32H1AD	BEE32H1AD	BEC32H1AD	32H1AD
BEE32H1B	BEE32H1B	BEC32H1B	32H1B
BEE32H1BF	BEE32H1BF	BEC32H1BF	
BEE32H1BFM	BEE32H1BFM	BEC32H1BFM	
BEE32H1BFN	BEE32H1BFN	BEC32H1BFN	32H1BF
BEE32H1BA	BEE32H1BA	BEC32H1BA	32H1BFM
BEE32H1BB	BEE32H1BB	BEC32H1BB	32H1BFN
BEE32H1BBA	BEE32H1BBA	BEC32H1BBA	32H1BA
BEE32H1BC	BEE32H1BC	BEC32H1BC	32H1BB
BEE32H1BD	BEE32H1BD	BEC32H1BD	32H1BBA
BEE32H2	BEE32H2	BEC32H2	32H1BC
BEE32H2A	BEE32H2A	BEC32H2A	32H1BD
BEE32H2B	BEE32H2B	BEC32H2B	32H2
BEE32H2C	BEE32H2C	BEC32H2C	32H2A
BEE32H2D	BEE32H2D	BEC32H2D	32H2B
BEE32H4	BEE32H4	BEC32H4	32H2C
			32H2D
			32H4

OTHER ASSETS

Acceptances

41F	Other UK residents (BT item 41F).....	
41F1	Financial corporations (including unlimited liability partnerships) other than monetary financial institutions.....	
41F2	All non-financial corporations other than public corporations (including unlimited liability partnerships).....	
41F3	Individuals, individual trusts and unincorporated businesses other than unlimited liability partnerships.....	
41F4	Non-profit institutions serving households.....	

BEE41F	BEE41F	BEC41F	41F
BEE41F1	BEE41F1	BEC41F1	41F1
BEE41F2	BEE41F2	BEC41F2	41F2
BEE41F3	BEE41F3	BEC41F3	41F3
BEE41F4	BEE41F4	BEC41F4	41F4

Form ER

Private and confidential

Effective Interest Rates On Sterling Business By Sector

as at..... eg (

dd
19

 /

mm
09

 /

yyyy
2012 etc)

Reporting institution _____

Name (block letters please) and signature of authorised official of reporting institution

In the event of a query, the Bank of England may contact (block letters please)

Name _____

Email _____ Tel No _____

Notes on completion

If you have any technical difficulties in completing this form please telephone the Statistics and Regulatory Data Division on 020 7601 5360. If you have any difficulties in transmitting the form or any subsequent amendments to the figures please contact Data Reception on 020 7601 5360.

- 1 All reporting banks in the ER panel should complete the form as at the last day of the calendar month.
- 2 For definition of sectors, please refer to the Classification of Accounts guide in the 'yellow' Banking Statistics Folder.
- 3 Enter amounts to the nearest thousand, omitting £000s. Enter percentage interest rates to two decimal places, **eg 7% - 7.00**
- 4 Return the form within **13 WORKING DAYS** of the reporting date clearly addressed to:

**Statistics and Regulatory Data Division
Business and Communications Group (HO-5)
Bank of England
Threadneedle Street
London EC2R 8AH**

- 5 Forms may also be delivered to the Works gate at the Lothbury entrance of the Bank of England between 9.00am and 5.00 pm, Monday to Friday. Envelopes should be clearly addressed as above.

Bank of England use only

Received	Processed	Amendment received	Amendment processed

Effective January 2011

OUTSTANDING £ DEPOSITS

Average daily balance over month (£000s)	Interest flow (£000's)	Annualised interest rate % to 2 d.p. eg 7% = 7.00
--	---------------------------	---

A

B

C

Central & Local Government

- 1 Non-interest bearing sight
- 2 Interest bearing sight
- 3 Time

ERA1		
ERA2	ERB2	ERC2
ERA3	ERB3	ERC3

Public Corporations

- 4 Non-interest bearing sight
- 5 Interest bearing sight
- 6A Time

ERA4		
ERA5	ERB5	ERC5
ERA6A	ERB6A	ERC6A

Banks (including Central Bank)

- 10 Non-interest bearing sight
- 11 Interest bearing sight
- 12 Time

ERA10		
ERA11	ERB11	ERC11
ERA12	ERB12	ERC12

Building Societies

- 13 Non-interest bearing sight
- 14 Interest bearing sight
- 15 Time

ERA13		
ERA14	ERB14	ERC14
ERA15	ERB15	ERC15

Financial Corporations (excluding Banks and Building Societies)

- 16 Non-interest bearing sight
- 17 Interest bearing sight
- 18 Time

ERA16		
ERA17	ERB17	ERC17
ERA18	ERB18	ERC18

Private Non-financial Corporations

- 19 Non-interest bearing sight
- 20 Interest bearing sight
- 21 Time - fixed original maturity: <= 1yr
- 22 > 1yr <= 2yrs
- 23 > 2yrs
- 24 Time - redeemable at notice

ERA19		
ERA20	ERB20	ERC20
ERA21	ERB21	ERC21
ERA22	ERB22	ERC22
ERA23	ERB23	ERC23
ERA24	ERB24	ERC24

Households & Individual Trusts

- 25 Non-interest bearing sight
- 26 Interest bearing sight
- 27 Time - fixed original maturity: <= 1yr
- 28 > 1yr <= 2yrs
- 29 > 2yrs
- 30 Time - redeemable at notice: <= 3mths
- 31 > 3mths
- 31A Time - of which Fixed Rate Bonds
- 31B Time - of which Guaranteed Equity Bonds
- 31C Time - of which ISAs

ERA25		
ERA26	ERB26	ERC26
ERA27	ERB27	ERC27
ERA28	ERB28	ERC28
ERA29	ERB29	ERC29
ERA30	ERB30	ERC30
ERA31	ERB31	ERC31
ERA31A	ERB31A	ERC31A
ERA31B	ERB31B	ERC31B
ERA31C	ERB31C	ERC31C

Non-profit Institutions Serving Households

- 32 Non-interest bearing sight
- 33 Interest bearing sight
- 34A Time

ERA32		
ERA33	ERB33	ERC33
ERA34A	ERB34A	ERC34A

39 Total

ERA39	ERB39	ERC39
-------	-------	-------

OUTSTANDING £ LOANS & ADVANCES

Average daily balance over month (£000s)	Interest flow £000's	Annualised interest rate % to 2 d.p. eg 7% = 7.00
--	-------------------------	--

		A	B	C
40 Central & Local Government		ERA40	ERB40	ERC40
Public Corporations				
41 Overdrafts		ERA41	ERB41	ERC41
42A Other loans & advances		ERA42A	ERB42A	ERC42A
46 Banks (including Central Bank)		ERA46	ERB46	ERC46
47 Building Societies		ERA47	ERB47	ERC47
48 Financial Corporations (excl Banks/BSocs)		ERA48	ERB48	ERC48
Private Non-financial Corporations				
49 Overdrafts		ERA49	ERB49	ERC49
50 Other loans & advances - floating rate		ERA50	ERB50	ERC50
51 Other loans & advances - initial fixation: <= 1yr		ERA51	ERB51	ERC51
52 > 1yr <= 5yrs		ERA52	ERB52	ERC52
53 > 5yrs		ERA53	ERB53	ERC53
Households & Individual Trusts				
54 Bridging finance		ERA54	ERB54	ERC54
55 Other secured on dwellings - floating rate		ERA55	ERB55	ERC55
55A of which SVR		ERA55A	ERB55A	ERC55A
55B of which Bank Rate Tracker		ERA55B	ERB55B	ERC55B
56 Other secured on dwellings - initial fixation: <= 1yr		ERA56	ERB56	ERC56
57 > 1yr <= 5yrs		ERA57	ERB57	ERC57
57A of which - initial fixation 2 years		ERA57A	ERB57A	ERC57A
57B of which - initial fixation 3 years		ERA57B	ERB57B	ERC57B
57C of which - initial fixation 5 years		ERA57C	ERB57C	ERC57C
58 > 5yrs <= 10yrs		ERA58	ERB58	ERC58
59 > 10yrs		ERA59	ERB59	ERC59
60 Other secured on dwellings - of which staff loans		ERA60	ERB60	ERC60
61 Credit card - interest chargeable		ERA61	ERB61	ERC61
62 - no interest charged		ERA62		
63 Overdrafts		ERA63	ERB63	ERC63
64 Unsecured personal loans - floating rate		ERA64	ERB64	ERC64
65 Unsecured personal loans - initial fixation: <= 1yr		ERA65	ERB65	ERC65
66 > 1yr <= 5yrs		ERA66	ERB66	ERC66
67 > 5yrs		ERA67	ERB67	ERC67
Non-profit Institutions Serving Households				
68 Overdrafts		ERA68	ERB68	ERC68
69 Other loans and advances		ERA69	ERB69	ERC69
Memorandum items: Non-interest-bearing loans / preferential loans				
70 Central & Local Government		ERA70	ERB70	ERC70
71 Public Corporations		ERA71	ERB71	ERC71
72 Banks (including Central Bank)		ERA72	ERB72	ERC72
73 Building Societies		ERA73	ERB73	ERC73
74 Financial Corporations(excluding Banks/Building Societies)		ERA74	ERB74	ERC74
75 Private Non-financial Corporations		ERA75	ERB75	ERC75
76 Households & Individual Trusts		ERA76	ERB76	ERC76
77 Non-profit Institutions Serving Households		ERA77	ERB77	ERC77
78 Total		ERA78	ERB78	ERC78

NEW BUSINESS RATES

NEW £ DEPOSITS

Public Corporations

79A Time - fixed original maturity

Private Non-financial Corporations

82 Time - fixed original maturity: <= 1yr
83 > 1yr <= 2yrs
84 > 2yrs

Households & Individual Trusts

85 Time - fixed original maturity: <= 1yr
86 > 1yr <= 2yrs
87 > 2yrs
87A Time - of which Fixed Rate Bonds
87B Time - of which Guaranteed Equity Bonds

Non-profit Institutions Serving Households

88 Time - fixed original maturity

NEW £ LOANS & ADVANCES (EXCLUDING OVERDRAFTS)

Public Corporations

89A Loans

Private Non-financial Corporations

101 Loans <=£1m: Floating rate
102 Initial fixation: <= 1yr
103 > 1yr <= 5yrs
104 > 5yrs
105 Loans > £1m Floating rate
106 <= £20m: Initial fixation: <= 1yr
107 > 1yr <= 5yrs
108 > 5yrs
109 Loans > £20m: Floating rate
110 Initial fixation: <= 1yr
111 > 1yr <= 5yrs
112 > 5yrs
112A Gross fees on new PNFC lending

Households & Individual Trusts

113 Bridging finance
114 Other house purchase - floating rate
115 Other house purchase - initial fixation: <= 1yr
116 > 1yr <= 5yrs
117 > 5yrs <= 10yrs
118 > 10yrs
118A Gross fees on new mortgage lending
119 Other house purchase - of which staff loans
120 Unsecured personal loans - floating rate
121 Unsecured personal loans - initial fixation: <= 1yr
122 > 1yr <= 5yrs
123 > 5yrs

Non-profit Institutions Serving Households

124A Loans

Average daily balance over month (£000s)	Interest flow (£000's)	Annualised interest rate % to 2 d.p. eg 7% = 7.00	Gross new deposits over month (£000s)
--	---------------------------	---	---

A

B

C

D

ERA79A	ERB79A	ERC79A	ERD79A
--------	--------	--------	--------

ERA82	ERB82	ERC82	ERD82
ERA83	ERB83	ERC83	ERD83
ERA84	ERB84	ERC84	ERD84

ERA85	ERB85	ERC85	ERD85
ERA86	ERB86	ERC86	ERD86
ERA87	ERB87	ERC87	ERD87
ERA87A	ERB87A	ERC87A	ERD87A
			ERD87B

ERA88	ERB88	ERC88	ERD88
-------	-------	-------	-------

Average daily balance over month (£000s)	Interest flow (£000's)	Annualised interest rate % to 2 d.p. eg 7% = 7.00	Gross new lending over month (£000s)
--	---------------------------	---	--

A

B

C

D

ERA89A	ERB89A	ERC89A	ERD89A
--------	--------	--------	--------

ERA101	ERB101	ERC101	ERD101
ERA102	ERB102	ERC102	ERD102
ERA103	ERB103	ERC103	ERD103
ERA104	ERB104	ERC104	ERD104
ERA105	ERB105	ERC105	ERD105
ERA106	ERB106	ERC106	ERD106
ERA107	ERB107	ERC107	ERD107
ERA108	ERB108	ERC108	ERD108
ERA109	ERB109	ERC109	ERD109
ERA110	ERB110	ERC110	ERD110
ERA111	ERB111	ERC111	ERD111
ERA112	ERB112	ERC112	ERD112
			ERD112A

ERA113	ERB113	ERC113	ERD113
ERA114	ERB114	ERC114	ERD114
ERA115	ERB115	ERC115	ERD115
ERA116	ERB116	ERC116	ERD116
ERA117	ERB117	ERC117	ERD117
ERA118	ERB118	ERC118	ERD118
			ERD118A
ERA119	ERB119	ERC119	ERD119
ERA120	ERB120	ERC120	ERD120
ERA121	ERB121	ERC121	ERD121
ERA122	ERB122	ERC122	ERD122
ERA123	ERB123	ERC123	ERD123

ERA124A	ERB124A	ERC124A	ERD124A
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References

- Ali, R. (2014). Legal entity identifiers: The beginning of a new platform in financial data. *Journal of Securities Operations & Custody*, 6(4): 295-299.
- Ali, R., Haldane, A., and Nahai-Williamson, P. (2012). [Towards a common financial language](#). Speech, Bank of England.
- Andenas, M. and Chiu, I. (2014). *The Foundations and Future of Financial Regulation: Governance for Responsibility*. Routledge.
- Bank of England (2014). [Strategic Plan: Background Information](#).
- Basel Committee on Banking Supervision (2013). [Principles for effective data aggregation and risk reporting](#).
- Bennett, M. (2013). The financial industry business ontology: Best practice for big data. *Journal of Banking Regulation*, 14: 255-268.
- Bholat, D. (2013). The future of central bank data. *Journal of Banking Regulation*, 14: 185-194.
- Bholat, D. (2015). [Big data and central banks](#). Bank of England- Quarterly Bulletin Q1.
- Brammertz, W., Akkizidis, I., Breymann, W., Ention, R., , and Rustmann, M. (2009). *Unified Financial Analysis: The Missing Links of Finance*. John Wiley & Sons.
- Brank, J., Grobelnik, M., and Mladenić, D. (2005). [A Survey of Ontology Evaluation Techniques](#).
- Capie, F. (2012). *The Bank of England: 1950s to 1979*. Cambridge University Press.
- centralbanking.com (2014). [ECB conference tackles 'reconciliation' of statistics as central bank's powers expand](#).
- Cunliffe, J. (2014). [Ending too big to fail - progress to date and remaining issues](#). Speech, Bank of England.
- Eurostat (2013). [European system of national and regional accounts\(ESA95\)](#).
- Financial Services Authority (2009). [Strengthening liquidity standards - Policy Statement 09/16](#).
- Financial Stability Board (2011). [Key Attributes of Effective Resolution Regimes for Financial Institutions](#).
- Financial Stability Board (2014). [Feasibility study on approaches to aggregate OTC derivatives data](#).

Gaytán, A. (2013). [The use of micro-data in the financial system information model of Banco de México - Workshop on Integrated Management of Micro-Databases.](#)

Haldane, A., Schubert, A., and Berner, R. (2015). [Knowledge needed to prevent Lehman repeat.](#)

Heath, R. H. (1988). History of Statistical Work in the Bank. Bank of England Publications. Hennessy, E. (1992). A Domestic History of the Bank of England 1930-1960. Cambridge University Press.

Hille, E. (2013). Recent developments in restructuring the Austrian banking reporting system. Journal of Banking Regulation, 14(3-4): 269-284.

Hobbes, T. (2008). Leviathan. Oxford University Press.

Jones, S., Eber, J., and Seward, J. (2000). [Composing contracts: an adventure in financial engineering.](#)

Kohn, D. (2011). [Enhancing Financial Stability.](#) Speech, Bank of England.

Matos, J. C. (2013). [Integrated management of micro-databases - the Portuguese experience. Workshop on Integrated Management of Micro-Databases.](#)

Menezes, P. and D'Aguilar, L. (2013). [Integrating micro-databases for statistical purposes. Workshop on Integrated Management of Micro-Databases.](#)

Milne, A. (2013). The rise and success of the barcode: Some lessons for financial services. Journal of Banking Regulation, 14: 241-254.

Office of Financial Research (2013). [Annual Report.](#)

Schwerdt, W. and von Wendland, M. (2010). Pricing, Risk and Performance Management in Practice: The Building Block Approach to Modelling Instruments and Portfolios. Elsevier.

Wache, H., Vögele, T., Visser, U., Stuckenschmidt, H., Schuster, G., Neumann, H., and Hübner, S (2001). [Ontology-based Integration of Information - A Survey of Existing Approaches.](#)

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