BANK OF ENGLAND

Financial Stability Paper No. 31 – November 2014

Understanding the fair value of banks' loans

Samuel Knott, Peter Richardson, Katie Rismanchi and Kallol Sen

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Loans are typically the largest asset class on banks' balance sheets. So understanding the value of loans is vital to any assessment of the resilience of the banking system. This is not straightforward. The market value of loans is seldom observable. And the nature and diversity of banks' loans has changed markedly over time: the maturity of loans has increased, on average; banks' mortgage lending has ballooned; and banks use more hard information in their lending decisions. So it is unlikely that any one valuation technique will capture all relevant aspects of valuation across all types of loans. Recognising this, banks are required by accounting standards to disclose the fair value of their loans in the notes to their accounts. At the end of 2013, the fair value of the major UK banks' loans was £55 billion less than the amortised cost value.

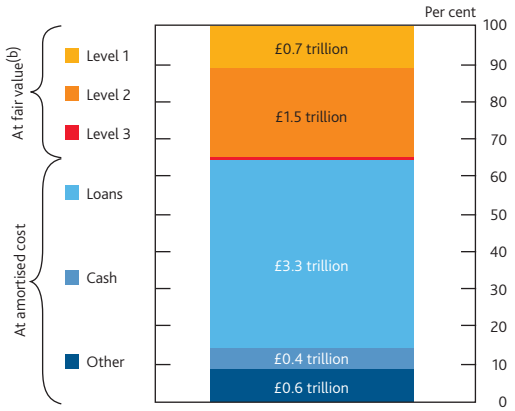
This paper explains loan fair value techniques and compares these to other valuation approaches. Fair value approaches include elements of valuation that are not captured by amortised cost approaches, such as lifetime expected credit losses and embedded interest rate gains and losses. As such, fair value disclosures might provide additional insight into the value of some assets, such as longer-term, fixed-rate loans, like mortgages. But loan fair values, like all loan valuation approaches, come with a number of health warnings. For example, they may capture factors that do not necessarily have a bearing on banks' resilience. As a result, a loan fair value number on its own is often insufficient, which suggests that there may be benefits to improved supplementary disclosures about the drivers of the fair value of banks' loans to complement balance sheet values.

1 Introduction

Loans are typically the largest asset class on banks' balance sheets. Major UK banks(1) held £3.8 trillion of loans at the end of 2013 — equal to 55% of their assets, nearly 10 times their equity, and 2.2 times UK GDP. As a result, loans are a key driver of banks' profits — since 2007, UK banks' net interest income has comprised around half of their total revenues. So understanding the value of loans is vital to any assessment of the resilience of the banking system.

Valuing loans would be easy in perfect markets.(2) In this case the value of a loan, like other financial assets, would equal the sum of expected discounted cash flows. But markets are not perfect, particularly for loans. As a result, there are a number of approaches to valuing loans — none of which is flawless. So while UK banks value most loans at amortised cost (**Chart 1**), broadly defined as historic cost less credit impairments, they are also required by accounting standards to disclose the fair value of their loans in the notes to their accounts.(3) The difference between these approaches can be significant: at the end of 2013, the fair value of the major UK banks' loans was £55 billion less than the amortised cost value (**Chart 2**).

Chart 1 The composition of major UK banks' assets by accounting classification at end-2013(a)

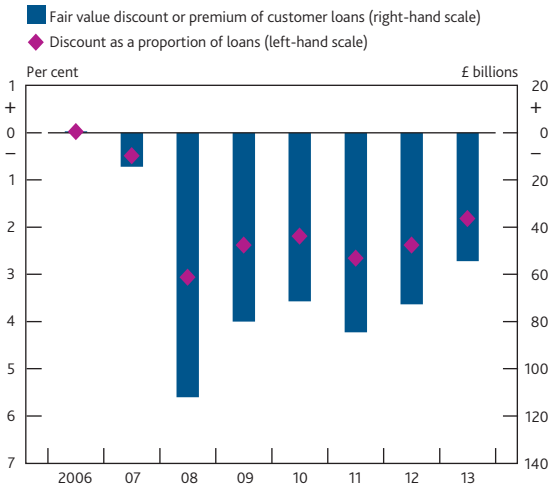


Sources: Bank of England, published accounts and Bank calculations.

(a) Excludes Virgin Money.
(b) Assets measured at fair value are categorised according to the inputs used in the valuation. Broadly speaking, Level 1 assets are valued using unadjusted quoted prices in active markets for identical financial instruments; Level 2 assets are valued using techniques based significantly on observable market data; and Level 3 assets are valued using techniques where at least one input that could have a significant effect on the instrument's value is not based on observable market data.

This paper explains loan fair value techniques and compares these with other valuation approaches. A key theme of the paper is that there is no universally suitable approach to valuing loans. Different approaches capture different aspects of loan value, such as credit losses and embedded interest rate gains and losses, and make different assumptions about the information available to value loans. Capturing these differences has become more important over time as the nature of banks' loans has shifted away from short-term

Chart 2 The reported fair value discount or premium of major UK banks' customer loans relative to the amortised cost value(a)



Sources: Bank of England, published accounts and Bank calculations.

(a) Excludes Virgin Money.

corporate loans and towards longer-term loans, particularly mortgages. And as banks have come to rely more on hard information when making lending decisions, as epitomised by credit scoring models. These developments have increased the heterogeneity of banks' loans and broadened the range of relevant valuation techniques. They also suggest that a pluralistic approach to disclosure, including high-quality supplementary disclosures about the drivers of the fair value of banks' loans, could complement balance sheet values. As such, this paper considers aspects of loan valuation that are relevant to fair value disclosures. It does not consider whether fair value is appropriate for accounting measurement or regulatory purposes.

The rest of the paper is organised as follows. Section 2 outlines the evolution of banks' loan portfolios, loan valuation and disclosure. Section 3 provides a framework for understanding the fair value of banks' loans. Section 4 compares fair value to other loan valuation approaches. Section 5 concludes.

(1) Unless otherwise noted, 'major UK banks' refers to: Banco Santander, Bank of Ireland, Barclays, Co-operative Bank, HSBC, Lloyds Banking Group, National Australia Bank, Nationwide, Royal Bank of Scotland and Virgin Money. Annual data used for National Australia Bank are for the period ending end-March, due to the bank's different reporting cycle.
(2) The following conditions are features of perfect capital markets: perfect competition; no taxes; no transaction costs; information is fully available to everybody at no cost; all financial assets are infinitely divisible; and individuals are rational expected utility maximisers.
(3) This paper focusses on loans, however the concepts can be applied to the 'loans and receivables' accounting category within IAS 39, which may also include unquoted bonds. This category comprises 'non-derivative financial assets with fixed or determinable payments that are not quoted in an active market' (IAS 39.9).

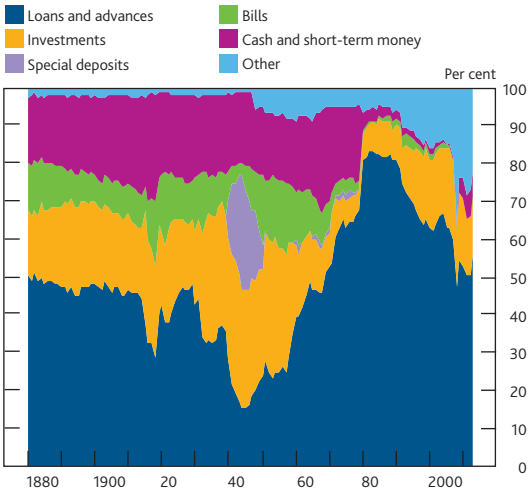
2 History of banks' loans, loan valuation and disclosure

Ahead of discussing loan valuation techniques in later sections, this section provides some historical context about the evolution of banks' loans, loan valuation and disclosure.

2.1 The evolution of banks' loans

Loans have always constituted a significant proportion of banks' assets (**Chart 3**). But the nature of banks' loans has changed markedly over time, in at least two ways that are relevant to loan valuation.

Chart 3 The composition of UK banking sector assets since 1880[(a)(b)(c)]



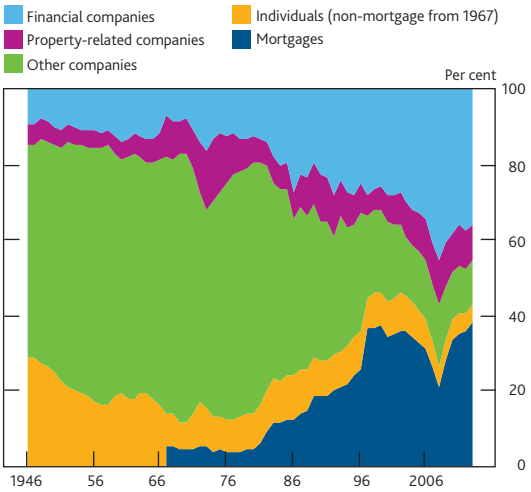
Sources: Banker's Almanac, published accounts, Sheppard (1971) and Bank calculations.

(a) Data up to 1966 cover UK banks' combined balance sheets, taken from Table (A)1.1 of Sheppard (1971). From 1967, the data are a sample of large banks in the United Kingdom. The sample includes: Bank of Scotland, Barclays, Lloyds, Midland, National Commercial Bank of Scotland, National Westminster and the Royal Bank of Scotland. From 1979 the sample is extended to include Abbey National (later Santander UK), Alliance and Leicester, Bradford and Bingley, Clydesdale bank, Halifax, Nationwide, Northern Rock (now Virgin Money) and the Trustee Savings Bank.
(b) Excludes acceptances and endorsements.
(c) Data have been compiled and categorised on a best-efforts basis. Data are not available for a small number of years for two banks. In these instances, missing data have been interpolated.

First, until the 1980s, short-term loans to non-financial businesses constituted the vast majority of UK banks' loans (**Chart 4**). Fewer than 10% of banks' loans to businesses between 1910 and 1914 had a contractual term greater than a year, compared with around half the stock of loans to businesses in 2013 (**Chart 5**). This largely reflected the purpose of the loans: nearly 80% of business loans were used for working capital or to support cash flows (Collins and Baker (2003)) and less than one sixth of loans financed long-term investments. A short contractual maturity enabled banks to reprice loans if interest rates changed, or if borrowers' credit quality deteriorated. This limited the extent to which the value of a loan could deviate from the amount owed (the balance sheet value at that time).

The second development is that banks' mortgage lending has ballooned over the past 30 years. Until the 1980s, mortgages

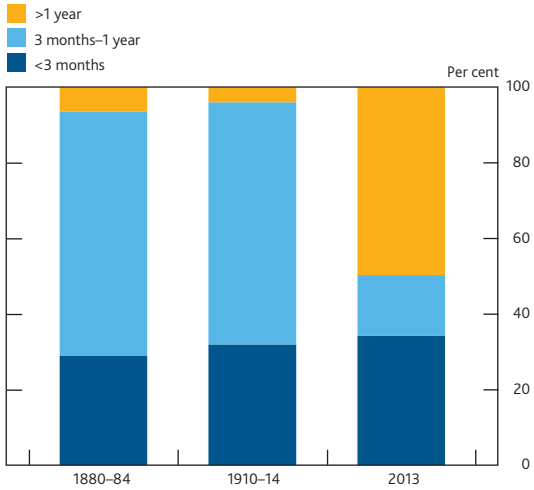
Chart 4 The composition of UK banks' loans[(a)(b)(c)]



Sources: Bank of England, Building Societies Association, Sheppard (1971) and Bank calculations.

(a) Data up to 1966 are taken from Table (A) 1.10 of Sheppard (1971) and include total advances of British Banking Association members. Mortgage lending is not identified separately from other lending to individuals during this period.
(b) Data between 1967 and 1986 are taken from past editions of the *Bank of England Quarterly Bulletin* and include advances to UK residents by banks in the United Kingdom. Loans to property-related companies includes loans to property and construction sectors.
(c) Data from 1987 include all UK monetary financial institutions' (MFIs) loans for all categories except mortgages. Banks' mortgage loans are estimated as UK MFIs' mortgage loans minus building societies' mortgage loans (from the Building Societies Association). Loans to property-related companies include loans to construction and real estate sectors.

Chart 5 The contractual maturity of UK banks' loans to businesses[(a)(b)]

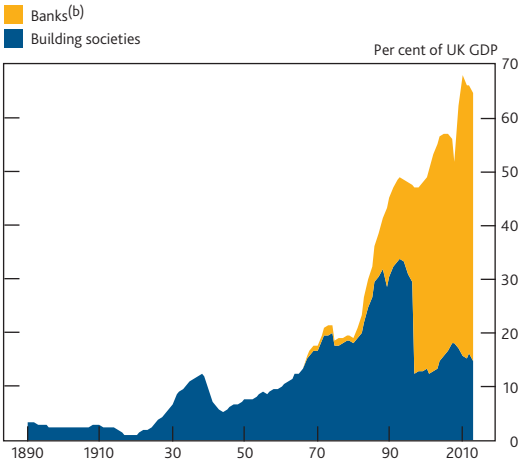


Sources: Bank of England, Collins and Baker (2003), published accounts and Bank calculations.

(a) Data for 1880–84 and 1910–14 are the contractual maturity of loans granted during these periods. These data are from Table 9.9 on page 195 of Collins and Baker (2003). By permission of Oxford University Press.
(b) Due to data availability, 2013 data are the residual contractual maturity for corporate and commercial loans held by HSBC and RBS only.

comprised less than 10% of banks' total loans (**Chart 4**), partly reflecting government credit controls. Building societies instead provided the vast majority of mortgages (**Chart 6**). Relaxation of government credit controls in the late 1970s and early 1980s, along with rising house prices and home ownership, triggered a sharp expansion in mortgage lending. Total UK mortgage lending has trebled as a share of UK GDP since 1980, to around 65% at the end of 2013. This trend is common across other advanced economies (Jordà, Schularick and Taylor (2014)). At the same time, banks' share of the

Chart 6 UK mortgage lending by banks and building societies relative to GDP[a]



Sources: Bank of England, Building Societies Association, Mitchell (1988), ONS, Sefton and Weale (1995), Sheppard (1971), Solomou and Weale (1991) and Bank calculations.

(a) Nominal GDP taken from Dimsdale, Hills and Thomas (2010).
(b) Data for banks' mortgage lending are as per footnotes (b) and (c) of **Chart 4**.

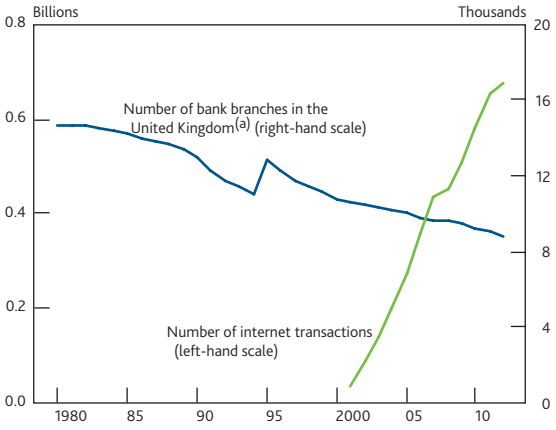
mortgage market has grown rapidly, partly due to building society demutualisation in the mid-1990s. Banks now provide nearly 80% of the stock of UK mortgages.

In the context of loan valuation, mortgage loans have at least two noteworthy features. First, mortgages are typically long-term assets, so their value can change materially as a result of movements in interest rates. Second, and as later sections discuss, information relevant to the valuation of mortgages tends to be more verifiable than for some other types of loans, which makes it easier for third parties to value mortgage loans.

2.2 Developments in banks' lending practices

There has also been a shift in the types of information used by banks to screen and monitor borrowers. Advances in information and communications technology over the past four decades or so have driven an information revolution (Mishkin and Strahan (1999)). As a result, banks now use more 'hard', rather than 'soft', information to make lending decisions, as embodied by credit scoring models — in some cases, lending decisions are now fully automated (Lacour-Little (2000)).(1) This has enabled banks to reduce the cost of processing loan applications by requiring less time from loan officers (Mester (1997)). And it is one reason why the distance between banks and borrowers has increased (Petersen and Rajan (2002), DeYoung *et al* (2011)). Greater use of hard information in banks' lending decisions is also consistent with a fall in the number of bank branches and an increase in impersonal bank transactions (**Chart 7**), and with the emergence of loan securitisation, peer-to-peer lending and internet-only banks. The implications of the increased use of hard information for loan valuation are explored in Section 4.3.

Chart 7 UK banks' interaction with customers



Sources: BBA Statistical Abstract and Bank calculations.

(a) The sample includes the UK branch networks of the five largest UK banks: Barclays, HSBC, Lloyds Banking Group, Royal Bank of Scotland and Santander UK. The jump in the line in 1995 is the result of Halifax joining the sample.

2.3 Developments in accounting standards for loans

Developments in accounting standards for loans have evolved alongside changes in the nature of banks' loans. Around a century ago, banks often reported the value of loans at historic cost — that is, simply the amount owed.

Banks were generally exempt from early accounting standards, due to concerns that disclosing losses could trigger bank runs (Billings and Capie (2009)). For example, the Companies Act 1948 allowed banks to transfer profits to undisclosed (or 'hidden') reserves to cover expected loan losses, though banks continued to report loan values at historic cost in their accounts (**Figure 1**). This lack of disclosure enabled bank management to build up large reserves to reduce the risk of reporting losses in future. For example, information revealed subsequently shows that Lloyds bank had hidden reserves of nearly £20 million in 1949 — two thirds of its published capital (Billings and Capie (2009)).

Support for banks' privilege of non-disclosure waned during the 1960s. The 1967 Companies Act gave the Board of Trade powers to withdraw the privilege (Leach and Stamp (1981)). The pressure this put on banks led them, in 1969, to adopt the 'Leach Lawson rules' — a set of voluntarily disclosure standards. This meant that, for the first time, loans on banks' balance sheets were shown net of provisions. But provisioning practices remained largely discretionary and banks were allowed to smooth their profits by averaging provision charges over a five-year period. In 1979, banks published the stock of provisions made for bad and doubtful debt for the first time. These were split between 'specific provisions' for expected losses and 'general provisions' for possible unexpected losses.

(1) 'Hard' information is based on objective criteria, such as financial ratios, and tends to be in the form of numbers rather than words. On the other hand, 'soft' information, such as the character of a borrower, is often difficult to quantify, verify and communicate, both within and outside of an organisation. See Petersen (2004) for more detail.

Figure 1 UK banks' loan provisioning and disclosures: a timeline

Date	Key event	Loans measured on balance sheet:	Provisions are:	Details
Pre-1948		Gross of provisions	Hidden and discretionary	Provisions for bad debts were hidden and loan values were reported at historic cost.
1948	Companies Act			Required companies to recognise bad or doubtful debts, but included a concession for banks to create 'hidden reserves'.
1962	Jenkins committee			Allowed banks' practice of hidden reserves to continue.
1969	Leach-Lawson rules	Net of provisions		Banks agreed voluntarily to report loan values net of provisions (though provisions could be smoothed over five years).
1979			Disclosed and discretionary	UK banks published their general and specific provisions for the first time.
From 1990	BBA SORPs			BBA Statements of Recommended Practice (SORPs) included guidance on the recognition of specific and general provisions.
2003	IAS 39			IASB's incurred loss approach — which is broadly consistent with the US approach — prohibited general provisions.
2005			Disclosed and more objective	IAS 39 became mandatory for EU listed companies.
2014	IFRS 9			IASB published final standards for an amended impairment model.

Note: The table is stylised.

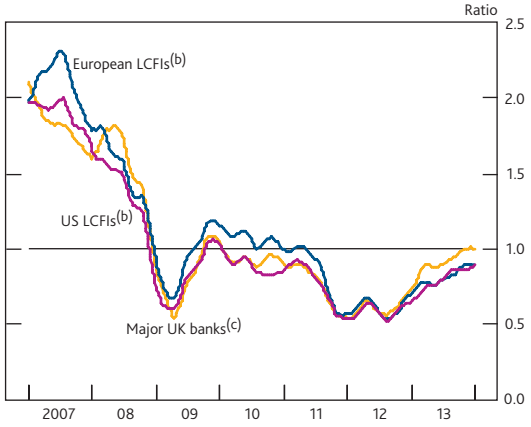
Sources: Bank of England, BBA, European Commission, IASB and Leach and Stamp (1981).

The subjective nature of general provisions — like hidden reserves before them — became a key source of debate during the 1990s and early 2000s, as the International Accounting Standards Committee (IASC) developed a standard for financial instruments (IAS 39). At that time, prominent accounting standard setters argued that banks had used general provisions to smooth their profits and that, to avoid this, provisions should be based on objective evidence of impairment. Other stakeholders, including many banking supervisors, wanted to retain a forward-looking approach to provisioning, with scope for judgement (Camfferman (2013)).

The debate concluded in favour of objectivity. In 2003, a revised version of IAS 39 made clear that provisions should be recognised only after a 'loss event' had occurred. This approach became known as 'incurred loss'. The standard stated that 'losses expected as a result of future events, no matter how likely, are not recognised.'(1) IAS 39 became mandatory for listed UK firms in 2005.

The incurred loss approach has recently been criticised for contributing to uncertainty about banks' solvency during the Global Financial Crisis. In hindsight, and even though IAS 39 permitted other types of loss event, the requirement for banks to observe an objective loss event often meant that provisions were only made once loans were in arrears. This arguably contributed, among other things, to the fall in banks' price to book values to below one in the early stages of the crisis, as equity investors priced in losses that banks were not yet able to reflect in their statutory accounts (**Chart 8**). Recently issued accounting standards require firms to recognise losses that are expected, rather than incurred, at the balance sheet date (these are described in more detail in Section 4).

Chart 8 Price to book ratios of major UK banks and LCFIs(a)



Sources: Thomson Reuters Datastream and Bank calculations.

(a) The chart plots the three-month rolling average of the ratios in each peer group, from the start of 2007 to the end of 2013.
(b) The large complex financial institutions (LCFIs) peer group comprises Bank of America Merrill Lynch, Citigroup, Goldman Sachs, JP Morgan and Morgan Stanley (US LCFIs); and BNP Paribas, Credit Suisse Group, Deutsche Bank, Société Générale and UBS (European LCFIs).
(c) Excludes Britannia, Co-operative Banking Group, Nationwide and Northern Rock (from end-2007).

2.4 The development of loan fair value disclosures

It has long been recognised that different assets might require different valuation approaches. For example, a form of fair value accounting emerged in the United States during the 19th century, as the rise of joint-stock companies increased the need for companies' accounts to more closely reflect owners' value in the company (Haldane (2010)). Fair value was initially restricted to marketable securities, though its application waxed and waned as regulators became concerned that it would create excess volatility in banks' capital.

(1) IAS 39 paragraph 59.

The concept of the fair value of loans, rather than securities, is relatively new. The Savings and Loan (S&L) crisis in the United States provided an impetus to measure the fair value of loans. The crisis resulted from S&L institutions paying variable interest rates on their deposits but charging fixed interest rates on their assets. As interest rates rose, S&L institutions' net operating income fell — by 1981, 85% were unprofitable (Barth (1991)). It has been argued that measuring loans at fair value would have highlighted the problems much earlier (US Treasury (1991), Michael (2004)).

The S&L crisis led to the issue of Statement of Financial Accounting Standards (SFASs) 107 and 133 in the 1990s, which required US banks to disclose the fair value of all financial instruments (derivatives, equity and debt) in the notes to their financial accounts. UK banks listed in the United States also provided these disclosures. The introduction of IFRS (and its equivalent UK standards FRS 25, 26 and 29) subsequently introduced fair value disclosure requirements for all financial instruments recognised at amortised cost within the UK accounting framework.(1)

Under the IFRS definition, fair value is the value that would be received if an asset is sold, or paid if a liability is transferred, between market participants in an orderly transaction (often known as 'exit price').(2) So it is a market-based measure and assumes a hypothetical sale of the asset. IFRS and US GAAP had originally defined fair value based on 'exchange', rather than 'exit', values. This led to diversity in practice, in particular for illiquid assets, where the price to acquire the asset (entry price) does not necessarily equal the price to sell it (exit price).(3)

2.5 Summary

The nature of banks' loans evolved during the twentieth century towards longer-term loans, particularly mortgages, and away from short-term corporate loans. Loan valuation standards and disclosure evolved too. For example, banks started to disclose the value of loans net of provisions. And, further down the line, provisioning requirements led to a relatively objective approach to loan valuation. This restricted banks' ability to adjust loan values for future credit losses and embedded interest rate losses. To provide additional information about these aspects of valuation, banks are required to present the fair value of loans in the notes to their accounts.

3 A framework for interpreting loan fair value disclosures

To help understand banks' disclosures about the fair value of their loans, this section sets out a theoretical basis for loan fair values.

3.1 The theory of loan fair values

The market value of loans is seldom observable. In this sense, loans are similar to assets of non-financial firms, such as property, plant and equipment, that affect the value of those firms but do not actively trade in secondary markets (Flannery, Kwan and Nimalendran (2004)). But a loan, like any other risky financial asset, is a future stream of uncertain cash flows. And the theory of pricing financial assets all stems from one simple concept: price equals expected discounted payoff (Cochrane (2001)). This concept can be applied to loans regardless of whether they are traded (**Equation 1**):

$$P_0 = \frac{CF_1}{1+r_1} + \frac{CF_2}{(1+r_2)^2} + \ldots + \frac{CF_n}{(1+r_n)^n} \quad (1)$$

Where

$$\frac{CF_t}{(1+r_t)^t} = \frac{Contractual\ payment_t + Prepayments_t - Shortfalls_t}{(1+Market\ intererest\ rate_t)^t}$$

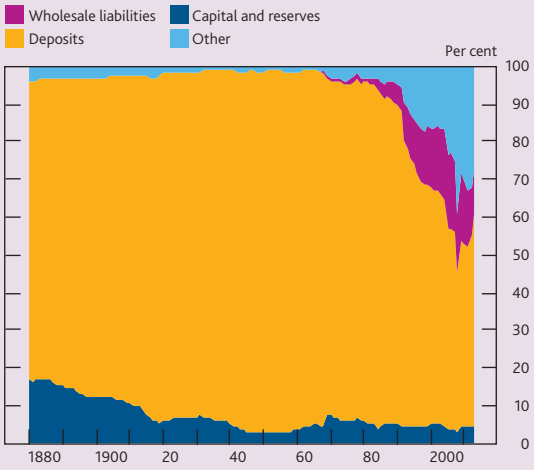
The cash flow in each period (CF_t) is the amount that a bank expects to receive from a loan. That can deviate from the contractual loan payment due to payment shortfalls or prepayments. The discount rate (r_t) is the return, net of credit and prepayment risk, required by the market on a loan with the same characteristics as the loan being valued. This includes compensation for the opportunity cost of making a loan, including the risk-free rate and illiquidity premia (see Section 3.2 below). The fair value of a loan equals the value P_0 in **Equation 1**. While there are equivalent methods to calculate loan fair values, we follow this approach for the remainder of the paper.(4) Assuming competitive pricing and no premium or discount, the fair value and historic cost value (ie the amount lent) will be equal when the loan is originated. The fair value of banks' liabilities can be calculated in a similar way but the interpretation of these values is not straightforward (Box 1).

(1) Accounting standards require loans to be recorded at fair value on the balance sheet if they are held for trading. Banks can also elect to measure loans at fair value on the balance sheet, assuming certain conditions are met.
(2) IFRS 13 paragraph 24; the definition under US GAAP is also based on the 'exit price' notion since the issue of SFAS 157 (now ASC 820) in 2006.
(3) IFRS and US GAAP provided guidance on the use of bid and ask prices, but stopped short of a universal definition of fair value based on either entry (purchase or replacement cost) or exit (sale) prices.
(4) In practice, loan fair values are often calculated by discounting contractual cash flows by the required interest rate (ie gross of compensation for credit losses).

Box 1
The fair value of banks' liabilities

This box discusses the relevance of the fair value of banks' liabilities. Banks are required to disclose the fair value of liabilities that are held at amortised cost. Accounting standards define the fair value of deposits available on demand as the amount repayable, so the disclosed fair value would be expected to equal the amortised cost value. Therefore, the discussion in this box is mainly about banks' wholesale liabilities, which have increased as a share of banks' funding during the past 30 years (**Chart A**).

Chart A The composition of UK banking sector liabilities since 1880[(a)]



Sources: Banker's Almanac, published accounts, Sheppard (1971) and Bank calculations.

(a) See footnotes to **Chart 3**.

During the recent crisis, the fair value of UK banks' liabilities fell to £52 billion less than their accounting value (**Chart B**). Fair value discounts on own debt can be realised as profit if the debt is redeemed for less than its face value. If a bank does not need to refinance redeemed debt, for example, because it was funded by reducing liquid assets or selling other assets, then these gains may be permanent. But banks may find it difficult to reduce liquid assets, or to sell assets without incurring extra losses, once their perceived creditworthiness has fallen. If, instead, a bank refinances the redeemed debt, then this will be at the market rate, which will be greater than the interest rate on the redeemed debt. In this case, higher future interest expenses will offset the initial gain. So the overall effect is one of timing; an immediate benefit in accounting profits is offset by higher future funding costs.

A fall in the fair value of a bank's liabilities increases the fair value of its equity. Even if the liabilities are not redeemed, a reduction in the fair value of a bank's liabilities driven by a reduction in its creditworthiness is equivalent to a transfer of value from debt to equity investors, reflecting the option value

Chart B The reported fair value discount or premium of major UK banks' liabilities relative to the amortised cost value[(a)]

Sources: Bank of England, published accounts and Bank calculations.

(a) Excludes Virgin Money.

of shareholders' limited liability (Jackson and Lodge (2000)). This measure of value may be useful for shareholders, but a more meaningful measure for other stakeholders, such as regulators, may be the difference between a bank's contractual obligations and the market value of its assets (US Treasury (1991)). On this basis, UK banks' net assets would have been around £345 billion, compared to their stated net assets of around £390 billion, at the end of 2013.

Mirroring this logic, the regulatory capital regime requires banks to remove from their capital unrealised gains and losses on debt resulting from changes in the bank's own credit risk. Removing gains avoids an increase in a bank's capital that would otherwise undermine the quality of capital and the protection it provides to depositors and creditors.

3.2 The link between loan fair values and banks' resilience

Major UK banks' disclosures show that the fair value of their loans was £55 billion less than the amortised cost value at the end of 2013 (**Chart 2**). But, in practice, there is no clear-cut mapping between the fair value of loans, as shown in supplementary disclosures, and banks' future profits and capital. We can see this by separating **Equation 1** into four drivers of loan fair values:

(a) **Expected credit losses**. Fair value discounts driven by increases in expected credit losses cannot usually be offset by charging higher loan rates. So banks will need to recognise the losses through provisions.

(b) **Market interest rates**. Fair value discounts driven by increases in expected market interest rates could signal lower future net interest income if banks' liabilities reprice more quickly than their loans (though banks can mitigate this risk through hedging).

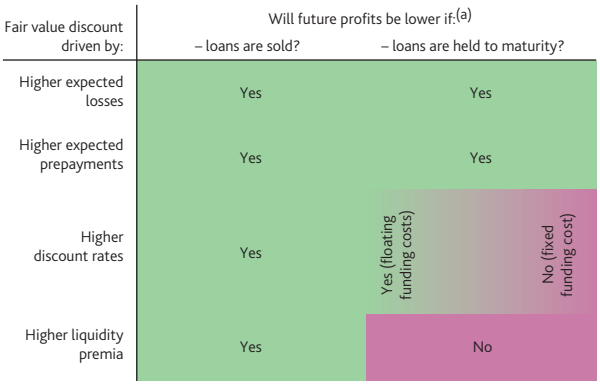
(c) **Prepayments**. Loan prepayments, in excess of those expected at origination, can deprive a bank of future profitable cash flows and lead to a fair value discount. This risk is greater if the loan rate is above market interest rates because borrowers have an incentive to repay the loan and obtain cheaper finance elsewhere. Prepayments on long-term, fixed-rate loans typically fall as interest rates rise. As a result, the sensitivity of loan values to interest rates can be asymmetric.

(d) **Illiquidity**. Fair value discounts due to liquidity premia will be realised only if a bank sells the loan. Forced sales are more likely where short-term debt can be withdrawn before assets mature (Diamond and Rajan (2011)).

3.3 Summary

In summary, a bank would expect to realise a fair value gain or loss if a loan was sold (**Figure 2**). But if banks hold loans to maturity, the implication of a fair value discount or premium on their resilience depends on banks' balance sheet structure and the driver of the discount or premium. So information about the drivers of valuation is necessary to assess what loan fair values could imply about banks' resilience. For example, asset (loan) price falls due to lower expected cash flows are less likely to be temporary than falls driven by discount rate changes, which tend to vary more over time (Campbell, Giglio and Polk (2012)). In the past two years, banks have provided a more granular breakdown and description of their fair value estimates and methodologies (**Table A**) but there is arguably scope to go further.

Figure 2 The link between loan fair value discounts and banks' profits



Source: Bank of England.

(a) Assuming all else is equal.

Table A Selected developments in banks' loan fair value disclosures(a)

	Barclays	HSBC	LBG	RBS
The fair value of loans measured at amortised cost included as a note to the accounts	✓ (1994)	✓ (2000)	✓ (2001)	✓ (1999)
Loan fair value estimates split by:				
Customer loan type	✓ (2007)	✓ (2013)		✓ (2013)
Geography		✓ (2007)		✓ (2013)
Performing and non-performing loans		✓ (2013)	✓ (2013)	✓ (2013)
Method of valuation (Level 1/2/3)	✓ (2013)	✓ (2013)	✓ (2013)	✓ (2013)

Sources: Published accounts and Bank calculations.

(a) Year in brackets indicates when the disclosure was first made in annual reports.

4 Comparing fair value with other selected loan valuation approaches

Having outlined the theory behind loan fair values and the link to banks' resilience, this section draws out some key similarities and differences between fair value and other selected loan valuation approaches.

4.1 Differences in the measurement of cash flows

Under the current incurred loss approach, provisions for impaired cash flows are made once a loss event has occurred (**Table B**). So provisions reflect 'realised' losses only. The recently issued accounting standard that covers expected-loss provisioning (IFRS 9) is more forward looking. Under this standard, a provision is made for expected credit losses over the next year. And lifetime expected credit losses are recognised if the credit quality of a loan deteriorates significantly. Fair value approaches incorporate all future cash flows, and so reflect lifetime expected credit losses (and prepayments). So, in theory, the fair value of loans changes mainly due to unexpected events. And, unlike under amortised cost approaches, moderate changes in the value of

Table B Features of different loan valuation approaches

	Incurred loss (IAS 39)	Expected loss (IFRS 9)	Fair value (exit price)	Entry price (replacement cost)
Trigger for provision	Objective evidence	Loan origination and significant credit deterioration	None	None
Horizon for impairment	Residual maturity of impaired loans	Residual maturity if significant credit deterioration; one year for all other loans	Residual maturity of all loans	Residual maturity of all loans
Discounting of cash flows	Discount expected cash flows using original effective interest rate	Discount expected cash flows using original effective interest rate	Discount contracted cash flows using the interest rate a market purchaser would demand	Discount contracted cash flows using the rate that the bank would charge to a new borrower of the same risk
Vulnerable to risk illusion[a]	Yes	Yes	Yes	Yes

Sources: Borio and Lowe (2001), IASB and Bank of England.

(a) Risk illusion is defined here to mean underestimating risk in an economic upswing.

performing loans, for example due to an increased probability of default, are also captured by fair value approaches.

4.2 Differences in the measurement of discount rates

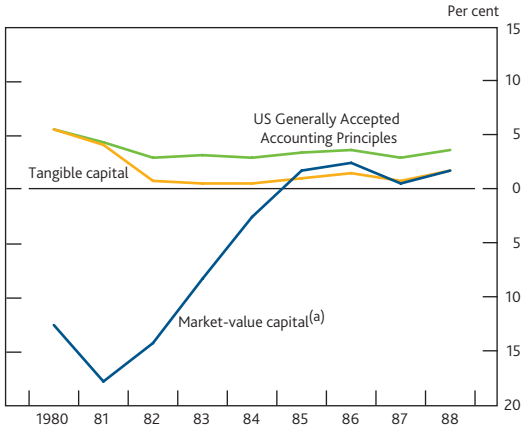
In the absence of hedging, an increase in interest rates would reduce the net income of a bank that makes long-term, fixed-rate loans funded by floating-rate deposits because liabilities would reprice before assets (Jackson and Lodge (2000)). This can create embedded interest rate losses — where the cost of funding a loan exceeds the income it generates. Embedded interest rate losses were at the heart of the S&L crisis. As outlined in Section 2, interest rates rose sharply in the United States in the early 1980s, leading to negative net interest income at S&L institutions, who tended to provide fixed-rate mortgages. On a market-value basis, the industry was insolvent in 1980, before any accounting measure of capital revealed unrealised losses (**Chart 9**). In theory, banks could fully hedge interest rate risk but there is evidence that, in practice, they maintain at least some net exposure (Landier, Sraer and Thesmar (2013), Alessandri and Nelson (2012)).

Of the loan valuation approaches outlined in **Table B**, only fair value (whether defined as entry or exit price) reflects embedded interest rate gains and losses that result from movements in discount rates. Under amortised cost approaches, the value of a loan does not reflect changes in market interest rates after origination.(1) In the United Kingdom, around 40% of household mortgages have a fixed interest rate (**Table C**). Changes in market interest rates are likely to affect the value of these loans relatively more than for short-term and floating-rate loans, where amortised cost is often a reasonable estimate of value.

4.3 Differences in the impact of the informational opacity of loans

Assumptions about the information available to buyers and sellers are important when valuing a loan. The fair value measurement guidance in IFRS 13 emphasises the use of market inputs over entity-specific inputs. So, strictly speaking, a bank should disregard any informational advantage it has about the quality of a loan, instead modelling how an actual or hypothetical buyer would reflect the absence of that information. For informationally opaque loans (where the

Chart 9 Alternative capital to asset ratios for the US Savings and Loan industry



Source: Barth (1991).

(a) Market-value capital is obtained by marking-to-market S&L institutions' fixed-rate mortgage portfolios.

Table C Interest rate characteristics of UK lending, Q2 2014

	Total value	Interest rate characteristics
Mortgages	£1,062 billion	Around 40% have fixed rates. Floating-rate mortgages are typically linked to Bank Rate.
Non-mortgage lending to individuals	£108 billion	Around 65% have fixed rates.
Loans to property-related companies[a]	£188 billion	Around 45% have fixed rates.
Loans to non-property related companies	£252 billion	Mixture of fixed and floating rate.

Source: Bank of England.

(a) Includes loans to construction and real estate sectors.

(1) For example, under IAS 39 expected cash flows are discounted using the original effective interest rate, which is the rate that exactly discounts the initially expected future cash flows to the opening value of the loan (ie the internal rate of return).

originating bank has more information than third parties), valuation approaches that use the bank's private information, such as amortised cost or 'entry price'(1) will, on average, exceed the value that these loans could command if sold ('exit price'). This is because offering the loans for sale may suggest that a bank's private information is 'bad' (Berger, King and O'Brien (1991)). Or, it may simply be difficult for a bank to convey private information about borrowers' creditworthiness to another party.

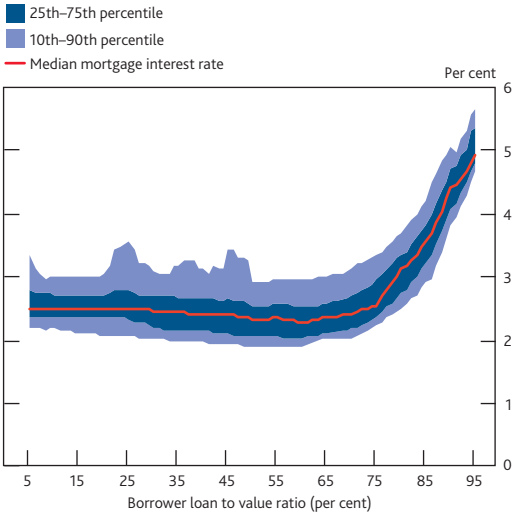
Assuming equal information between the originator and buyer of a loan jars with the traditional role of banks as screening and monitoring informationally opaque borrowers. For example, as Berger and Udell (1998) point out, informational opacity is a defining characteristic of small business finance. Small businesses have less published financial information and press coverage than larger firms. And lending to small firms typically requires a loan officer to conduct an interview with the applicant to gather soft information. Improving the availability of credit data could reduce some of this opacity.(2) But nonetheless, it could be difficult for banks to transmit credibly the soft information they have used to assess and monitor a borrower to a third-party buyer. As a result, fair value approaches based on exit prices are less suitable for informationally opaque loans. And recording opaque loans at fair value may even distort banks' lending decisions. O'Hara (1993) argues, in a theoretical model, that forcing banks to use market-value accounting to value loans causes them to favour short-term over long-term loans when information about borrowers is asymmetric.

Some types of loans are less opaque. In general, loans will be less opaque and more 'transactions driven', if they are backed by collateral, have approval criteria based largely on hard information, or if their values are observable in public markets. Mortgages and credit card loans, in particular, have some of these features, partly due to advances in credit scoring which have led to greater automation of loan approval processes. For example, a reasonable amount of the variation in mortgage rates can be explained by a single piece of hard information: the loan to value ratio of the mortgages (**Chart 10**). Despite greater use of hard information, UK banks' disclosures show that the fair value of most customer loans are not observed directly in active markets (**Chart 11**), although this also applies to 75% of trading book assets.

4.4 Similarities between fair value and other loan valuation approaches

In contrast to the differences outlined above, fair value and amortised cost approaches share a number of features. Both methods are likely to overstate loan values if risk is systematically underestimated (risk illusion). Using a cross-country sample of banks covering the period 1988–99, Laeven and Majnoni (2003) find that, on average, banks create too few provisions in good times, when there is little objective evidence of incurred losses. As downturns emerge — along with evidence of incurred losses — banks increase provisions rapidly, magnifying losses and the size of negative capital shocks. Consistent with this finding, UK banks' impairment rates trebled as a proportion of loans between 2007 and 2009 (**Chart 12**).

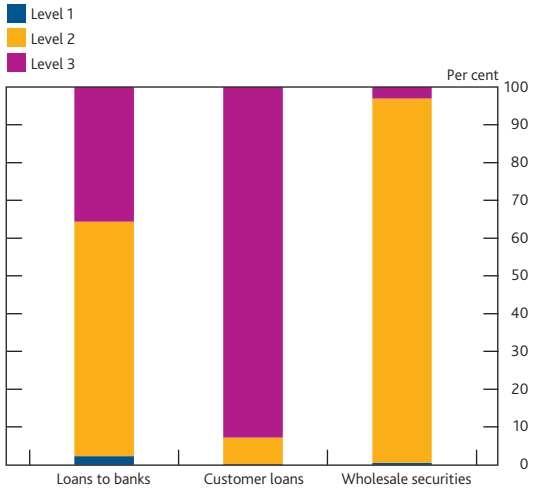
Chart 10 Interest rates charged on new mortgages, by loan to value ratio(a)(b)



Sources: FCA Product Sales Data (PSD) and Bank calculations.

(a) The chart shows the distribution of interest rates charged on new two-year fixed-rate mortgages advanced between July 2013 and June 2014. Mortgages are excluded if no interest rate has been reported or if the reported interest rate is less than 1%.
(b) The FCA PSD include regulated mortgage contracts only, and therefore exclude other regulated home finance products such as home purchase plans and home reversions, and unregulated products such as second charge lending and buy-to-let mortgages.

Chart 11 Methods used by major UK banks to estimate the fair value of their amortised cost assets(a)(b)

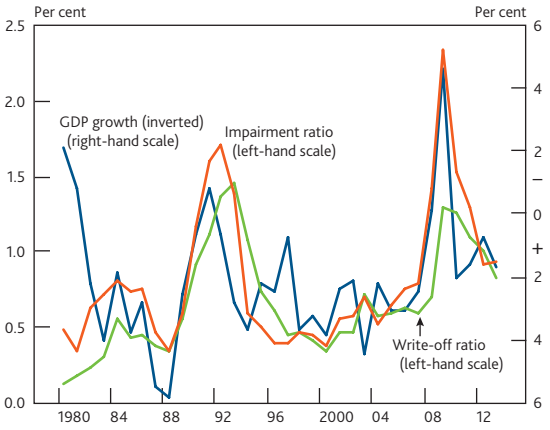


Sources: Bank of England, published accounts and Bank calculations.

(a) Excludes Virgin Money.
(b) See footnote (b) of **Chart 1** for a definition of Level 1, 2 and 3 assets.

(1) The discount rate used in these methods does not necessarily equate to that used by a third party buyer.
(2) See 'Should the availability of UK credit data be improved?', *Discussion Paper*, Bank of England, May 2014.

Chart 12 Impairment charges, write-offs and changes in GDP[a][b][c]



Sources: Bank of England, BBA Statistical Abstract, ONS, published accounts and Bank calculations.

(a) New impairment charge and write-offs less recoveries as a percentage of total loans and advances to customers for the largest four UK banks. The impairment ratio excludes some charges made against problem country debt during 1987–92, as described in the June 2002 *Financial Stability Review*. Many of these impairments were released as the exposures were sold or asset quality improved.
(b) Data before 2000 are drawn from 'Bank provisioning: the UK experience', in the June 2002 *Financial Stability Review*. The original sources of these data are banks' published accounts and the BBA statistical abstract. These data have been reconciled to banks' published accounts on a best-endeavours basis.
(c) From 2004 accounting standards changed. Data from 2004 are on an IFRS basis.

In theory, fair value should reflect expected losses sooner. But in practice, major UK banks' estimates of the fair value of their loans was close to — and in some cases above — the incurred loss value on the eve of the financial crisis (**Chart 2**). This highlights the fact that all valuation approaches based on expected outcomes will be susceptible to risk illusion and procyclicality.

It is debateable whether fair value is more procyclical than amortised cost, either under incurred or expected loss. If the market price of an asset recognised at fair value on the balance sheet exceeds the rational equilibrium in an upswing, then banks realise a gain in their equity, which can create 'surplus capital' above the amount needed to maintain a target level of leverage. To restore leverage to this target, banks may deploy surplus capital by expanding their assets, further fuelling the upturn (Adrian and Shin (2010)). But there are other arguments to support the view that fair value does not exacerbate procyclicality (eg Laux and Leuz (2012), Herring (2011), Shaffer (2010)). In any case, it is unclear whether this debate is relevant to fair value disclosures, which are not reflected in banks' actual income and capital.

Another similarity between valuation approaches is the tendency to report point estimates of valuation. To price uncertainty, investors would need information on the potential range of valuations (Haldane (2012)). There are a number of ways in which banks could give investors a sense of valuation ranges. For example, banks could disclose the 'prudent value' of their loans — which could be defined as the value of a loan that would be realised with 90% confidence. Alternatively, banks could disclose raw data about the characteristics of their loans. This could enable stakeholders to select the valuation approach and judgements that suit their requirements.

4.5 Empirical evidence on the relevance of loan fair value disclosures

Unfortunately, there is limited empirical evidence on the usefulness of loan fair values. A number of academic papers assess the 'value relevance' of fair value disclosures — that is, whether they help explain share prices after controlling for other factors. A selection of key papers in the literature are summarised in Annex 1. The tentative message is that fair value disclosures often seem to be relevant to the market value of a bank. This message also holds for loan fair value disclosures in some cases, but the sample of papers is too small to place much weight on this finding. This is an area that would benefit from more research.[1]

4.6 Summary

In theory, fair value uses the standard asset-pricing technique of discounting a stream of uncertain cash flows over the life of a loan using time-varying discount rates. By incorporating lifetime cash flows and market interest rates, fair values capture elements of valuation absent from amortised cost. But standard asset-pricing theories typically assume, among other things, that all buyers and sellers have access to the same information, which is unlikely to be the case for loans. So the fair value of loans needs to be interpreted with caution, particularly for loans where information is opaque.

5 Conclusion

This paper started with four observations. First, loans are typically the largest asset class on banks' balance sheets. Second, the composition of banks' loans has shifted over time, away from short-term loans to companies and towards longer-term loans, particularly mortgages. Third, there are multiple approaches to valuing loans, each of which can capture different drivers of loan value. Fourth, there has been an information revolution in banking over the last forty years or so, which has led to banks relying, to a greater extent, on hard information when making lending decisions. The paper analysed the implications of these observations for understanding loan fair value disclosures, which banks are required to include in the notes to their accounts.

Given the increase in the heterogeneity of banks' loans, it is unlikely that a single valuation approach will provide all the information that stakeholders require for all types of loans. Fair value approaches include aspects of valuation that are not captured in amortised cost approaches, such as lifetime expected credit losses and embedded interest rate gains and

(1) A methodological challenge is to separate whether findings that fair values are not value relevant are due to inadequate disclosures or conceptual weaknesses.

losses. But there is no direct mapping between fair value discounts on loans, relative to amortised cost values, and banks' resilience. And, like any valuation approach, the fair value of loans comes with health warnings. For example, loan fair values based on exit prices can include a discount that is only relevant to banks' resilience if these loans are sold.

Nevertheless, fair value may provide additional insight into the value of longer-term, less informationally opaque, fixed-rate assets, like mortgages. But this would require more granular disclosures, by type of loan, and details of what is driving fair value estimates (for example, changes in credit risk, interest rates and other factors) to enable users of accounts to assess the reliability and relevance of this valuation technique. More broadly, a pluralistic approach to disclosure, including high-quality supplementary disclosures about the drivers of the fair value of banks' loans, could complement balance sheet measures.

Annex 1
Summary of selected empirical studies on the relevance of banks' fair value disclosures and recognition

Authors (date)	Country; time period; sample	Description of topic	Key findings
Non-loan assets and liabilities			
Barth (1994)	US; 1971–90; around 90 banks	Investigate the association between banks' equity prices and the disclosure of the fair value (FV) estimates of investment securities.	The FV of investment securities has an incremental association with a bank's share price, compared with historic cost. Mixed results about whether movements in the FV of securities have incremental explanatory power relative to other components of earnings.
Venkatachalam (1996)	US; 1993–94; around 100 bank holding companies	Test whether new information about the FV of derivatives (revealed after the introduction of SFAS 119) is reflected in banks' equity prices.	The disclosed FV of banks' off-balance sheet derivatives is value relevant after controlling for the FV of on-balance sheet assets and liabilities.
Ahmed, Kilic and Lobo (2006)	US; sub-periods within 1995–2004; split sample of 146 bank holding companies	Use the introduction of SFAS 133 (which mandated that derivatives be recognised, rather than disclosed, at FV) to test whether recognising versus disclosing the FV of derivatives affected how investors value these instruments.	The FV of derivatives is value relevant if these values are recognised, but not if they are merely disclosed. Results are consistent with the view that FV disclosure and recognition are not substitutes.
Loans and other assets and liabilities			
(i) Barth, Beaver and Landsman (1996) (ii) Eccher, Ramesh and Thiagarajan (1996) (iii) Nelson (1996)	US; 1992–93; (i) around 130 banks (ii) around 300 bank holding companies (iii) 200 bank holding companies	Use the introduction of SFAS 107 (required the FV of all financial instruments to be disclosed) to assess the value relevance of the FV of different types of bank assets and liabilities.	All papers find that the FV of investment securities help explain banks' equity prices relative to book values. But Nelson (1996) finds that this is no longer true after controlling for a bank's future profitability. Results regarding the relevance of loan FVs are sensitive to model specification. Barth *et al* (1996) and Eccher *et al* (1996) find evidence of value relevance for the FV of loans. Barth *et al* (1996) suggest that investors discount loan FV estimates for banks with relatively less regulatory capital.
Beaver and Venkatachalam (2000)	US; 1992–95; 945 firm observations	Decompose loan FVs into non-discretionary, discretionary, and noise components, and test whether markets price each differently.	Non-discretionary components of loan FVs are reflected fully in equity prices. The noise component is not priced. The discretionary component — which signal private information — is priced more than one-for-one.
Song, Thomas and Yi (2010)	US; 2008; around 400 banks	Assess the relative value relevance of Level 1, 2 and 3 FV assets and liabilities.	Banks' equity prices are significantly correlated with the FV of Level 1, 2 and 3 assets and liabilities. Level 3 FV assets and liabilities are less value relevant than Level 1 and 2 assets and liabilities.
Blankespoor, Linsmeier, Petroni and Shakespeare (2013)	US; sub-periods within 1997–2010; several thousand observations	Examine the extent to which bond spreads and bank failure are associated with leverage ratios derived from fair-valued and non-fair-valued financial instruments.	Leverage ratios derived from the FV of financial instruments explains significantly more variation in bond spreads, and has greater predictive power regarding future bank failure, than standard leverage ratios. The FV of loans and deposits appears to be the primary source of incremental explanatory power of the fair-valued leverage ratios.

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