

# Why is the UK banking system so big and is that a problem?

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- Over the past 40 years the size of the UK banking system has grown dramatically and under plausible assumptions it could continue to grow rapidly.
- This article examines a number of issues related to the size of the UK banking system, including why it is so big and what empirical evidence tells us about the relationship between banking system size and financial stability. This evidence suggests that while size can be important, it is the resilience of the banking system that is key for financial stability.

## Overview

Over the past 40 years the size of the UK banking system has undergone a dramatic shift, with total assets rising from around 100% to around 450% of nominal GDP. It is plausible that the UK banking system will continue to grow rapidly.

Though there are a number of ways to define the size of a banking system, on each standard metric the UK banking system is large relative to most other major economies. What also makes the UK banking system stand out is its international nature: not only are foreign banks a particularly large part of the UK banking system, but UK banks have large operations abroad.

Why is the UK banking system so big? One reason is that the wider financial system has benefited from firms and people locating near one another in clusters. Partly as a result, the United Kingdom may be able to provide banking services more efficiently than other countries. In other words, it may have a 'comparative advantage' in international banking services. A first mover advantage may also have played a role: the pre-eminence of the UK financial system can, in part, be traced back to the rise of London as a financial centre in the 18th and 19th centuries. Another possible reason for the size of the UK banking system has been the implicit government subsidy associated with banks that are too big to fail. This can lead to an oversupply of banking services relative to the amount that would be most beneficial for society.

From the Bank of England's perspective, it is important for the Financial Policy Committee and Prudential Regulation Authority to understand how much banking system size matters for financial stability. The empirical analysis in this article does not find a strong link between banking system size and the probability or output cost of a crisis, at least once the resilience of the system is taken into account. In line with other evidence, low leverage ratios (equity divided by total assets) and periods of high credit growth are found to have been more robust leading indicators of banking crises. But the direct fiscal costs associated with banking crises have tended to be larger for big banking systems. Furthermore, evidence from the crisis suggests that the structure of the banking system — for example, the mix of domestic banks and foreign subsidiaries and branches — can also matter for financial stability.

The importance of the resilience of the banking system for financial stability is why the Bank of England, in conjunction with other organisations including the Financial Stability Board, is pursuing a wide-ranging set of reforms to improve the resilience of the banking system, including to remove the implicit government subsidy.

[Click here for a short video that discusses some of the key topics from this article.](#)

(1) The authors would like to thank Jamie Coen and Catherine Shaw for their help in producing this article.

Over the past 40 years the size of the UK banking system has undergone a dramatic shift, with total assets rising from around 100% to around 450% of GDP. And it is plausible that the UK banking system will continue to grow rapidly.

Some have suggested that the current size of the UK banking system represents a material risk to economic stability and that action should be taken to reduce its size. This position is prompted, in part, by the fact that the recent economic downturn was the deepest and most prolonged since the Great Depression, and that this contraction was preceded by a banking crisis. In a speech last year, Governor Carney noted this view, but argued that the United Kingdom can host a large and expanding financial sector safely if comprehensive reforms are implemented to underpin its resilience.<sup>(1)</sup>

This article attempts to shed light on this debate by examining a number of issues related to banking system size and resilience. The first section sets out some metrics of the size of the UK banking system, and projects how big it might become under some simple but plausible assumptions. The second section examines why the UK banking system has become so large. The third section analyses the relationship between banking system size and financial stability. The final section concludes. A short video explains some of the key topics covered in this article.<sup>(2)</sup>

## How big is the UK banking sector?

The size of a banking system is often measured by the sum of assets held by banks on their balance sheets.<sup>(3)</sup> These assets include loans to households and companies, as well as securities, such as bonds and equities, and other assets. How different types of assets are measured, among other factors, can have a material impact on estimates of banking system size.<sup>(4)</sup> Banking assets are often expressed as a share of nominal GDP. While there is no mechanical link between the two variables, this gives a measure of the size of a banking sector relative to overall economic activity.<sup>(5)</sup>

Broadly speaking, there are two commonly used definitions of banking system size. Applied to the United Kingdom, these are:

- **Ownership basis** — this typically includes UK-owned monetary financial institutions' total assets, including the assets of their non-resident branches and subsidiaries, but excludes the assets of foreign-owned banks' UK subsidiaries and branches.
- **Residency basis** — defined as assets of monetary financial institutions located in the United Kingdom regardless of the nationality of their ultimate owner. This includes UK-owned banks' UK assets and the (UK) assets of foreign banks' UK subsidiaries and branches.

While different definitions produce different sizes, there are three key features of the UK banking system that emerge regardless of the definition used, summarised on **Figure 1**.

First, the UK banking system is big (top panel of **Figure 1**). Looking at a sample of countries comprising the United States, Japan and the ten largest European Union countries, the United Kingdom has the largest banking sector on a residency basis.<sup>(6)</sup> Relative to GDP, it stood at around 450% in 2013 compared to 100% in 1975.

Second, foreign banks are a particularly large part of the UK banking system. This is arguably its defining feature. There are 150 deposit-taking foreign branches and 98 deposit-taking foreign subsidiaries in the United Kingdom from 56 different countries. Foreign banks constitute around half of UK banking sector assets on a residency basis, with the combined assets of the largest ten foreign subsidiaries in the United Kingdom (including their non deposit-taking entities) totalling around £2.75 trillion.<sup>(7)</sup> Foreign branches account for around 30% of total UK-resident banking assets and around a third of UK interbank lending. Nearly a fifth of global banking activity is booked in the United Kingdom, and UK-resident banks' foreign assets and liabilities account for over 350% of UK GDP, more than four times the median figure for Organisation for Economic Co-operation and Development (OECD) countries. Some of these statistics are shown on the left-hand panel of **Figure 1**.

Third, non-loan assets constitute a high proportion of total UK banking assets (right-hand panel of **Figure 1**). Only around half of UK-owned banks' assets are loans to non-bank borrowers. For the largest foreign subsidiaries in the United Kingdom, this figure is even lower: less than 10% of assets are loans to non-bank borrowers, with derivatives and reverse repos representing around 60% of assets.<sup>(8)</sup> The flipside of this asset composition is that only around half of UK-owned banks' liabilities are customer deposits; derivatives and interbank deposits are the next largest liabilities. As a result, there is a significant difference between the gross size

(1) See Carney (2013).

(2) <http://youtu.be/Qs0GYqWMXv4>.

(3) Some measures of the banking system use 'total claims' rather than 'total assets' — 'claims' is a narrower measure which excludes certain assets, such as gold bullion and fixed assets.

(4) For example, the value of the largest UK banks' derivative exposures varies between roughly £80 billion and £110 trillion depending on how they are measured. The £80 billion figure refers to banks' reported derivatives exposures after netting assets and liabilities with the same counterparty and collateral placed, whereas the £110 trillion figure is banks' reported notional value of derivatives — defined as the face amount that is used to calculate payments made on the derivative. Data are as of end-2013 and include Barclays, Lloyds Banking Group, HSBC and Royal Bank of Scotland.

(5) One part of the measure is a stock concept (total banking assets) and the other part is a flow concept (annual GDP). Throughout this article GDP refers to nominal GDP.

(6) The UK banking sector is also relatively large on an ownership basis, at around 350% of GDP in 2013.

(7) Foreign deposit-taking subsidiaries account for around 15% (£1 trillion) of total UK-resident banking assets.

(8) A reverse repo involves the purchase of securities, with an agreement that the purchaser will sell the securities back to the seller at an agreed date in the future.

of the UK banking system and the net size once exposures between banks are taken into account.

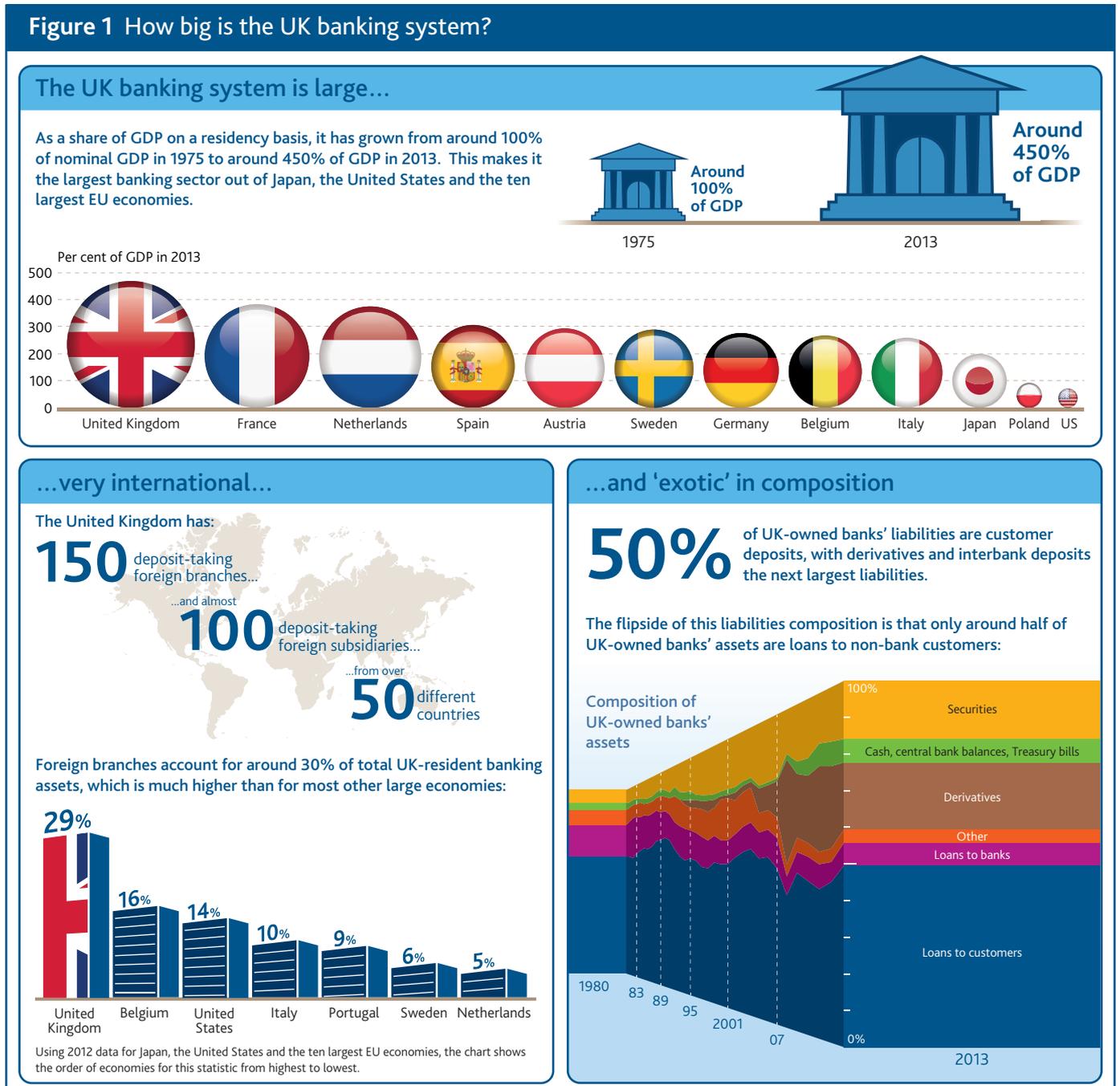
An alternative way of measuring the size of a sector is by its share of output. These data are easier to obtain for the financial sector as a whole (which as well as banks includes other financial institutions such as asset managers) than for the banking sector. That said, measuring the output share of the financial sector is not straightforward and involves a number of assumptions. **Chart 1** shows that the UK financial sector is large by international standards on the basis of gross value added (a measure of the contribution to the economy of a particular sector). But, again, what really distinguishes it is its international nature. **Chart 2** shows that the

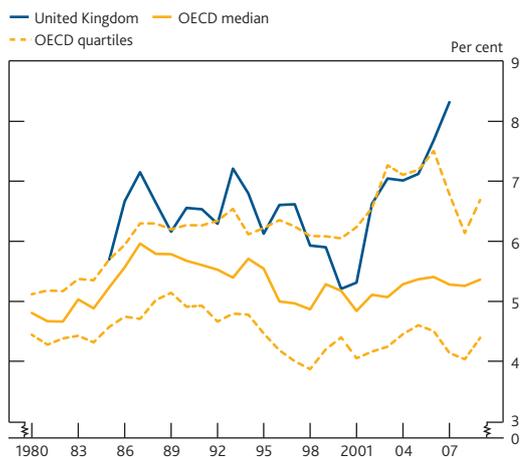
United Kingdom's net trade in financial services far outstrips that of other (OECD) countries.

**How big might the UK banking system become?**

Looking ahead, any judgement on the size of the UK banking system needs to consider its potential trajectory as global economic integration and financial deepening continues. This requires a model of how economies might grow in the future and how their demand for financial services may change as a result. To get a sense of how these factors might evolve, we use a simple three-step framework that was employed in Haldane (2011). While this framework is simplistic — for instance it omits a number of factors, such as the evolution of future regulation and demographic changes — it can be used

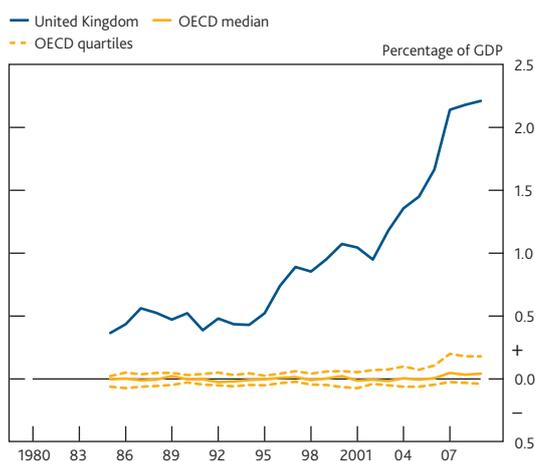
**Figure 1** How big is the UK banking system?



**Chart 1** Financial sector share of gross value added<sup>(a)</sup>

Sources: OECD and Bank calculations.

(a) OECD figures exclude Chile and Turkey. Figures may not be fully comparable due to differences in accounting for Financial Intermediation Services Indirectly Measured.

**Chart 2** Net trade in financial services<sup>(a)</sup>

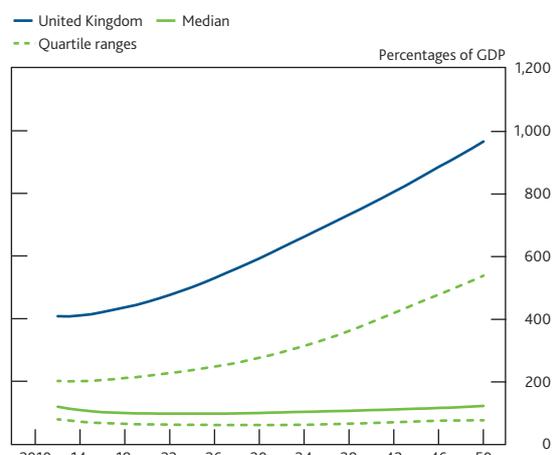
Sources: OECD and Bank calculations.

(a) OECD figures exclude Chile and Turkey. Figures may not be fully comparable due to differences in accounting for Financial Intermediation Services Indirectly Measured.

to provide a rough idea of how the size of the UK banking system might evolve over time.<sup>(1)</sup>

In the first step, we project how individual countries' income per capita might converge over time towards the income per capita of a chosen advanced economy (here taken to be the United States).<sup>(2)</sup> In the second step, we use each country's projected path for income per capita to project forward its ratio of financial assets to GDP, based on the historical relationship between these two variables for each country. Consistent with the first step, we assume that when a country's income per capita reaches the level of the United States, then its financial depth will also be equal to that of the United States (a proxy for 'steady-state' financial depth) which on our definition is around 425% of GDP. In the final step, we project forward the size of individual G20 banking systems by assuming that they grow in line with G20 financial assets.

Using this framework, **Chart 3** shows that the size of the UK banking system might roughly double from its current size to over 950% of GDP by 2050, far outstripping the projected increase in other G20 banking systems. In money terms this would represent a rise in UK banking assets from over £5 trillion to around £60 trillion. The main drivers of this result are the relatively large share of global banking assets that the United Kingdom currently has, coupled with the projection of global financial deepening. So not only is the UK banking system big now; based on plausible assumptions, including that the United Kingdom retains its share of global banking services, it could get substantially bigger.

**Chart 3** Projected size of G20 banking systems<sup>(a)(b)</sup>

Sources: European Central Bank, SNL Financial and Bank calculations.

(a) For detail on the methodology see the main text.

(b) For consistency with other G20 countries, this chart shows banking system size on an ownership basis. The starting value for the United Kingdom is 410% of GDP.

## Why is the UK banking system so big?

To assess the potential impact of the size of the UK banking system on financial stability it is important to identify what factors have led the UK banking system to its current size, and which of them may affect its future growth.

This article identifies four main factors: the benefits from clustering in financial hubs; comparative advantage; historical factors; and the implicit subsidy associated with 'too big to fail' (TBTF) banks. The first three of these factors are closely related to the international nature of the UK banking system.

### The benefits of financial hubs

One factor behind the existence of international financial centres, including the United Kingdom, is likely to be the gains from clustering, when firms and people locate near one

(1) The framework also assumes that the relative sizes of countries' banking systems are fixed over time. While this is a simplification, history has shown that the concentration of banking assets in large financial centres has persisted over time (discussed more in the following section of this article).

(2) See Barro and Sala-i-Martin (1992) and Mankiw, Romer and Weil (1992). This model also incorporates projections for population growth from the United States Census Bureau.

another in cities and industrial clusters (Glaeser (2010)). The benefits of clustering include higher productivity and wages and a competitive advantage in world trade for industries within the agglomeration (Crafts and Wolf (2013)).

It is plausible that agglomeration benefits have exacerbated the trend towards larger, and more geographically concentrated, international financial centres. As highlighted by the economist Alfred Marshall, writing in the late 19th century, in some industries, companies have a tendency to locate close to one another:

*'When an industry has thus chosen a locality for itself, it is likely to stay there long: so great are the advantages which people following the same skilled trade get from near neighbourhood to one another. The mysteries of the trade become no mysteries; but are as it were in the air, and children learn many of them unconsciously.'*<sup>(1)</sup>

In Marshall's day, particularly striking examples of this phenomenon could be seen in UK manufacturing. For example, Lancashire was home to almost 50% of world cotton spindles.<sup>(2)</sup> More recently, towns and cities in China have become very important suppliers of particular products; to give one example, Qiaotou produces 60% of the world's buttons and up to 80% of its zips.

Such spatial concentration provides evidence that there are gains for firms in some industries from locating near each other. Three factors are thought to explain gains from clustering:

- local access to specialised labour;
- local access to specialised inputs; and
- services and knowledge spillovers.

There is some evidence that finance is characterised by such gains to clustering. Consistent with this view, Kindleberger has documented the tendency for financial activity to concentrate in a few large international financial centres.<sup>(3)</sup> Others have noted the steep gradation in rents between city centres and suburbs in financial centres (Drennan (1996)), which is evidence that financial firms place a high value on being located close to one another. Out of the three reasons put forward for the existence of clusters, the availability of specialised labour is likely to be particularly relevant to financial hubs. But the availability of other inputs to production (such as legal and accounting services) and knowledge spillovers may also be important.

Some theories suggest that the social benefits of clustering are not fully taken into account by individual firms when they are deciding where to locate. This is because they do not consider the benefits to other firms of their location decision. The spillovers which are neglected have been termed

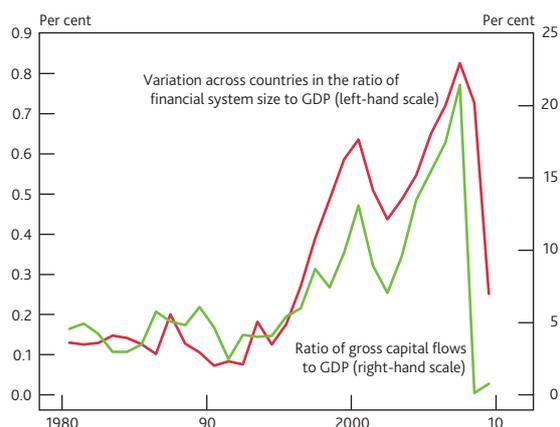
'agglomeration externalities'. These theories tend to suggest that, all else equal, sectors with agglomeration externalities are the right size or may even be too small from a national welfare point of view.<sup>(4)</sup>

### Comparative advantage

But why is there a financial centre in the United Kingdom? One explanation may be that the United Kingdom is able to produce banking services more efficiently than other countries. In other words, it may have a comparative advantage in providing international banking services. The sources of this advantage may include the United Kingdom's central time zone location between the United States and Asia, its openness to trade and capital flows, its language and its robust legal and regulatory structure.

Chart 4 shows some supporting evidence that openness has been an important factor in the growth of financial centres. The green line shows a measure of financial openness — the ratio of gross capital flows to world GDP. The red line shows a measure of the cross-country variation in banking system size relative to GDP. When this line is low, banking systems across the world are similarly sized. But when it is high, some are much larger than others. The chart shows that when financial openness has been high, there has been a tendency for financial activity to cluster in a few large international financial centres and *vice versa*. This is consistent with the fall in UK banking system size relative to GDP since the 2008–09 crisis: over the past four years it has shrunk by 100% of GDP on a residency basis.

**Chart 4** Variation in financial system size and gross capital flows<sup>(a)</sup>



Sources: International Monetary Fund (IMF) *World Economic Outlook* (October 2014) and OECD.

(a) Variation in financial system size is measured as the coefficient of variation of financial sector output shares of GDP. Gross capital flows are shown as a percentage of world GDP. The sample includes all OECD member countries excluding Luxembourg.

(1) See Marshall (1890).  
 (2) See Crafts and Wolf (2013).  
 (3) See Kindleberger (1974).  
 (4) See Baldwin and Krugman (2004) and Norman and Venables (2004) for further analysis of the policy implications of agglomeration externalities.

## The origins of London as a pre-eminent financial centre

The rise of a major financial centre is often closely linked to the economic power of the country that hosts it (Cassis (2005)). This was the case with London, which replaced Amsterdam as the world's financial centre at the turn of the 19th century. Britain had built up a dominant position in the world economy during the 18th century, particularly during the industrial revolution in the last third of the century.

Trade encouraged financial development. The number of private banks increased from fewer than 30 in 1750, to 50 in 1770 and to 70 in 1800 and listings of large companies such as the English East India Company spurred the development of a centralised market for shares. The correspondent banking system, in which banks like the Bank of England (established in 1694) had branches in the regions and a head office in the same place, was a force for centralisation. Given its status as the main port, the capital city and the centre of the railway network, 'the system had no choice but London' for the financial centre (Kindleberger (1974)).

The United Kingdom's economic and financial dominance continued in the 19th century, helped by globalisation,

industrialisation and war. The United Kingdom provided around 20% of world trade in 1850 and about 25% in the 1860s. The Port of London, the largest in the world, bordered the financial district and was a key factor in explaining London's enduring role as an entrepôt.

Demand for capital from big businesses, including from abroad, led to the further development of financial markets. Railway companies are a good example. In 1853 railway stock representing a nominal capital of £194 million was listed on the London Stock Exchange (LSE) — equivalent to 30% of nominal GDP at that time — and was the second most common type of security after government securities. From 1853–73, the nominal value of the securities on the LSE went from £194 million to £374 million, and that of foreign railway securities (including the British Empire) from £31 million to £354 million. In the early 1870s, issues on behalf of American railways represented around 70% of all the railway issues placed in London.

London and Paris were vying for top spot as the leading global financial centre in the second half of the 19th century. But following France's military defeat against Prussia in 1871, London became the main settling house of exchange transactions in Europe.

### 'Path dependence'

Comparative advantage is unlikely to be the only reason why the United Kingdom hosts an international financial centre. A particular location for a cluster can become preferred over time, even if there was no clear reason to prefer one location over another before the industry developed. The role of history in shaping current outcomes is sometimes called 'path dependence'.

The pre-eminence of the UK financial system can, in part, be traced back to the rise of London as a financial centre in the 18th and 19th centuries. The box above provides some evidence on London's rise as a financial centre up to the end of the 19th century, attributing it in part to the United Kingdom's dominance in world trade during that period and in part to a dose of luck.

### Implicit government subsidy

Another possible factor behind the growth in the United Kingdom and other banking systems is that they have benefited from an implicit government subsidy. This is an example of a market friction — something which, according to economic theory, leads to the over or undersupply of a good or service relative to the amount that would be most beneficial for society.

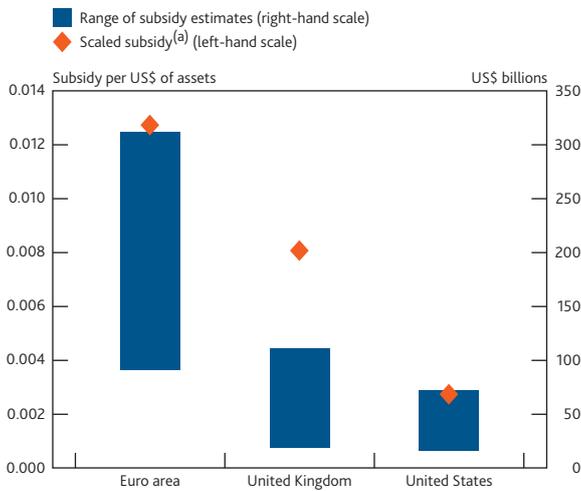
The implicit government subsidy arises because some banks effectively receive insurance from the government without

fully paying for it. Specifically, unlike with most other firms, holders of certain banks' debt have historically not faced sufficient risk of loss because they expect the government to prevent banks from failing, as they did in a number of cases in the recent financial crisis. To the extent that banks and creditors do not pay for this guarantee, it can be considered an implicit subsidy (Noss and Sowerbutts (2012)).

Estimates of the extent of the implicit subsidy vary by sample period and the estimation method used, but it is material on most measures. For instance, a study by the IMF (2014) suggests that in 2011–12 the implicit subsidy was in the range of US\$20 billion to US\$110 billion for major UK banks, US\$15 billion to US\$70 billion for major US banks, and US\$90 billion to US\$300 billion for major euro-area banks (Chart 5).

To try to make the implicit subsidy estimates more comparable across regions, the orange diamonds on Chart 5 show a proxy for the subsidy per unit of asset for major banks in each region. This proxy is only a partial picture — for example, it covers only the global systemically important banks (G-SIBs) — but on the face of it, it suggests that the scale of the implicit subsidy in the United Kingdom was no bigger than in the euro area and therefore it is unlikely to explain why the United Kingdom has a much larger banking system as a share of GDP.

**Chart 5** Estimates of the implicit subsidy value for G-SIBs in the euro area, the United Kingdom and the United States, 2011–12



Sources: Federal Deposit Insurance Corporation, IMF (2014) and Bank calculations.

(a) Calculated for each region as the mid-point of the range of subsidy estimates shown in the chart divided by the total assets of G-SIBs in that region. US bank assets have been adjusted to make them more consistent with International Financial Reporting Standards.

There is some evidence that implicit (and explicit) government guarantees lead banks to overinvest in risky assets.<sup>(1)</sup> Microprudential regulation — implemented in the United Kingdom by the Prudential Regulation Authority — aims to mitigate this, in part, by ensuring that banks have sufficient levels of capital and liquidity to reflect the risks that they take. And macroprudential policy — carried out in the United Kingdom by the Financial Policy Committee — aims to ensure the resilience of the financial system as a whole.<sup>(2)</sup>

Moreover, to the extent that an implicit subsidy results in an oversupply of banking services, there could be a broader misallocation of financial and human capital towards the banking system and away from potentially more productive uses.<sup>(3)</sup> This is consistent with the finding in some academic studies that an oversized banking system may inhibit economic growth. Specifically, some recent empirical studies have suggested that there is an n-shaped relationship between the ratio of credit to GDP (a measure of the size of the banking system) and economic growth, with the evidence suggesting that countries with credit to GDP ratios above 100% exhibit lower growth (Arcand, Berkes and Panizza (2012)); the United Kingdom currently has a credit to GDP ratio of close to 160%. However, it is not clear how much weight policymakers should put on this result when considering the size of the banking system: the relationship between credit to GDP and economic growth is fairly weak, and the focus of this study is on domestic credit rather than total assets (the latter measure also incorporates banks’ foreign activities and wholesale banking operations).

It is also difficult to say to what extent the negative impact on society from the implicit subsidy to banks is offset by other

factors. One reason for this is that we have a poor grasp of the quantitative importance of agglomeration externalities and how they interact with other desirable drivers of banking system size discussed in this section. But, looking ahead, there are a range of initiatives in train to end the TBTF problem and associated implicit subsidy, including recent Financial Stability Board (FSB) proposals on ensuring that G-SIBs have adequate loss-absorbing capacity.<sup>(4)</sup> Indeed, there is some evidence that the subsidy has already been substantially reduced (see Carney (2014)).

### The impact of banking system size and growth on financial stability

This section considers the relationship between banking system size and financial stability outcomes, drawing on the experiences of different countries between 2005 and 2012. It focuses on three questions: was banking system size a robust leading indicator of the crisis? Did countries with larger banking systems suffer larger falls in output following the crisis? And were the direct fiscal costs of the crisis larger for countries with larger banking systems?

Establishing empirically whether banking system size is a leading indicator of banking crises is not straightforward. The approach taken here is to use regression analysis to test whether the countries that experienced a systemic banking crisis tended to have larger banking systems (as measured by the ratio of banking system assets to GDP).

**Table A** shows summary results from two sets of regressions using two measures of financial crises. In the first set (columns (1) and (2)), the dependent variable takes the value 1 if a systemic banking crisis was avoided in the country in question and value 0 if there was a crisis.<sup>(5)</sup> In the second set (in columns (3) and (4)), the dependent variable is another measure of the health of banking systems in the crisis — the minimum market-based leverage ratio experienced in 2008–09. This ratio is defined as banks’ market capitalisation as a share of total assets, so a very low value would typically signal that the bank is close to failure. To obtain this measure for banking systems, this measure is computed for individual banks and then aggregated up to country level.

The results show that countries that avoided systemic banking crises (column (1)) and had higher market-based leverage ratios (column (3)) did tend to have significantly smaller banking systems. The negative relationships are shown by the negative signs and the statistical significance by the stars. So on the

(1) For example, see Marques, Correa and Saprizza (2013) and Gropp, Gruendl and Guettler (2013).

(2) See Farag, Harland and Nixon (2013) and Tucker, Hall and Pattani (2013).

(3) See European Systemic Risk Board (2014).

(4) See FSB (2014) and Gracie, Chennells and Menary (2014).

(5) The data are taken from Laeven and Valencia (2012).

**Table A** Was banking system size a robust leading indicator of the crisis?<sup>(a)</sup>

Dependent variable	(1)	(2)	(3)	(4)
	Avoidance of crisis in 2007–08		Market-based leverage ratio	
Estimation method	Logistic		Ordinary least squares	
Bank assets to GDP ratio, 2005	- ***	+	- ***	+
Change in bank credit to GDP ratio, 2004–05		- **		- **
Leverage ratio, 2005		+ **		+ ***

Sources: Capital IQ, IMF *International Financial Statistics*, Laeven and Valencia (2012), *The Banker*, Thomson Reuters Datastream and Bank calculations.

(a) All regressions use data from 47 countries. + and - denote the sign of the coefficient. \*, \*\* and \*\*\* denote statistical significance at thresholds of 0.9, 0.95 and 0.99 respectively. The variables are described in greater detail in the main text of the article.

face of these simple bivariate regressions, having a smaller banking system did offer some protection from the crisis.

But this relationship could be misleading if there are determinants of banking crises which are correlated with banking system size. To check for this, regressions (2) and (4) also include two other variables that many have claimed are important determinants of crises — a measure of credit booms and a measure of capital resilience. Credit booms are proxied by the change in the credit to GDP ratio from 2004 to 2005 and the measure of capital resilience is the banking system accounting leverage ratio in 2005. The accounting leverage ratio is the ratio of the accounting (or book) value of common equity to total assets.<sup>(1)</sup>

When taking into account credit booms and leverage ratios, the relationships between banking system size and our crisis measures disappear: there is no clear statistically significant relationship between banking system size and banking crises identified in columns (2) and (4). **So once credit booms and capital resilience are taken into account, banking system size would not have helped to predict which countries suffered a crisis.**

Even so, it is possible that economies with larger banking systems experienced weaker economic growth following the crisis. To investigate this possibility, columns (1) and (2) in **Table B** use a measure of post-crisis output performance — the difference between average output growth in 2008–12 and in 2000–07. The coefficient on banking system size is not significantly different from zero in these regressions, **so this calls into question the importance of banking system size in explaining countries' post-crisis output performance.**

Finally, columns (3) and (4) investigate the relationship between banking system size and the direct fiscal costs of the crisis, taken from Laeven and Valencia (2012). The main components of direct fiscal costs are the costs of recapitalising banks and purchases of impaired assets (both gross of any

**Table B** Did countries with larger banking systems suffer larger output or fiscal costs following the crisis?<sup>(a)</sup>

Dependent variable	(1)	(2)	(3)	(4)
	Post-crisis output performance		Direct fiscal cost	
Estimation method	Logistic		Ordinary least squares	
Bank assets to GDP ratio, 2005	-	-	+ ***	+ ***
Change in bank credit to GDP ratio, 2004–05		- ***		+ ***
Leverage ratio, 2005		-		+ ***

Sources: Capital IQ, IMF *International Financial Statistics*, IMF *World Economic Outlook* (October 2014), *The Banker*, Thomson Reuters Datastream and Bank calculations.

(a) All regressions use data from 47 countries. + and - denote the sign of the coefficient. \*, \*\* and \*\*\* denote statistical significance at thresholds of 0.9, 0.95 and 0.99 respectively. The variables are described in greater detail in the main text of the article.

recoveries). Liquidity support and asset guarantees are excluded from this measure. In contrast to the results above, there is a positive association between banking system size and the direct fiscal costs of the crisis which does survive inclusion of other variables, suggesting that **banking system size may have raised the direct fiscal costs of a crisis.** In the future, this correlation should disappear if reform measures designed to end the TBTF problem are successful, with taxpayer support for the banking system no longer necessary.

While there are many causes of financial crises and associated costs, **Tables A and B** are consistent with claims that countries which experienced credit booms and which had banking systems with lower leverage ratios were more likely to suffer a crisis. Moreover, economies with credit booms suffered more from the crisis, both in terms of output costs and direct fiscal costs.

We can cross-check these findings by looking at the experience of some other (smaller) countries with large banking systems relative to the size of their economies. At the onset of the recent financial crisis, Ireland (which did suffer a banking crisis) and Hong Kong and Singapore (which did not) all had similarly sized banking sectors, relative to their economies, measuring around 600% of GDP. But in the period between 2000 and 2005, Ireland's banking system grew rapidly, roughly doubling in size relative to GDP, whereas the size of the Hong Kong and Singapore banking systems were broadly unchanged. Moreover, Hong Kong and Singapore had better-capitalised banking systems with levels of regulatory capital some 25% higher than in Ireland when compared to risk-weighted assets.

Evidence from the crisis also suggests that the structure of the banking system, for a given size, can matter for financial stability. One aspect of structure is the presence of foreign-owned subsidiaries and branches and the role they

(1) This is calculated in the same way as the market-based leverage ratio except that it uses the accounting value of common equity rather than the market value.

play in providing critical economic functions. As discussed above, this is particularly important for the United Kingdom as the international aspect of the UK banking system is one of its key features. The provision of credit to UK borrowers from foreign branches, including to the UK corporate sector, fell sharply during the crisis and by much more than that from UK-owned banks and foreign-owned subsidiaries. This might reflect the fact that the funding structure of foreign branches is more fragile, and that lending by foreign branches in the United Kingdom was more concentrated in sectors that were more sensitive to the recent domestic economic cycle (such as commercial real estate).<sup>(1)</sup>

## Conclusion

The UK banking sector is big by any standard measure and, should global financial markets expand, it could become much bigger. Against that backdrop, this article has examined a number of issues related to the size and resilience of the UK banking system, including why it is so big and the relationship between banking system size and financial stability.

There are a number of potential reasons why the UK banking system has become so big. These include: benefits to clustering in financial hubs; having a comparative advantage in international banking services; and historical factors. It may also reflect past implicit government subsidies.

Evidence from the recent global financial crisis suggests that bigger banking systems are not associated with lower output growth and that banking system size was not a good predictor of the crisis (after controlling for other factors). On the other hand, larger banking systems may impose higher direct fiscal costs on governments in crises. That said, there are aspects of banking sector size that were not considered in this paper but that might have a bearing on financial stability, such as the possibility that the banking system becomes more opaque and interconnected as it grows in size and the link between banking system size and the rest of the financial system. Moreover, further work is needed to improve our understanding of the drivers of the n-shaped relationship between the ratio of credit to GDP and economic growth and on the quantitative importance of agglomeration externalities in banking.

The importance of the resilience, rather than the size, of a banking system for financial stability is more clear-cut. For example, evidence from regressions and case studies suggests that less resilient banking systems are more likely to suffer a financial crisis. This is, in part, why the Bank of England, in conjunction with other organisations including the FSB, is pursuing a wide-ranging agenda to improve the resilience of the banking system. These policy initiatives will also mitigate some of the undesirable reasons why the UK banking system might be so big, for example, by eliminating banks' TBTF status and implicit subsidy.

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(1) See Hoggarth, Hooley and Korniyenko (2013).

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