



# Large or small? How to measure bank size

## Horses for courses

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For policymakers and customers alike, it is important to know what constitutes a large bank. The former are usually mainly interested in systemic importance and risks to financial stability, whereas large corporations may want to do business with a large bank that can supply a broad range of services worldwide and has the capacity to provide large-scale financing and take on risks from hedging. Several main indicators of bank size exist, each with their own strengths and shortcomings.

**Market cap highlights a bank's current value.** It is undistorted by different measurement rules, but primarily quantifies success rather than pure size.

**Total assets represent the indicator which regulators and academics use most frequently.** It measures the gross nominal volume of a bank's activities, but suffers from significant valuation problems, not only for derivatives, and it does not account for differences in individual bank business models or between financial systems.

**Revenues are a common denominator for the wide range of activities banks (can) engage in,** from traditional commercial and transaction banking to investment banking and asset management. They are cash flow-based and thus generally more reliable, as well as independent of business models and financial structures. Overall, revenues are the single best measure of bank size.

**Equity capital corresponds to the book value of a bank,** which is relatively stable and mostly immune to measurement problems or differences in business models. However, total equity is less up to date and does not reflect a bank's business volume as well as revenues do.

**Other measures such as risk-weighted assets, net income or the number of customers** provide a more partial view on the size of a bank and are thus less useful.

### Best indicators for measuring bank size

No. 1	Revenues	
No. 2	Equity capital	
No. 3 (a tie)	Total assets	Market cap
Other indicators	RWA, net income, number of customers, employees, branches etc.	

Source: Deutsche Bank Research



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## Introduction

Gauging the size of banks is an important issue as banks play a central role in most countries' financial systems and are, for various reasons, tightly regulated and supervised. The size of banks is crucial because the industry i) serves/ services all other sectors, in particular the real economy, where some clients may want to do business only with a large bank, and ii) because it is subject to stability risks which can have potentially far-reaching repercussions for both financial market participants and the economic welfare of society as a whole. As a result, particular attention is paid to the "largest" banks – whatever the definition. The Financial Stability Board uses size as one of the five main categories to judge the systemic importance of global banks (G-SIBs). In the US, "significant" bank holding companies are subject to tighter supervisory requirements. The ECB looks at "large and complex banking groups" to assess risks for the stability of the European financial system.<sup>1</sup> And multinational corporate customers may want to rely on large banks which can support them in their international operations and possess the strength to underwrite large capital issuances or bear substantial risks from hedging. Thus, defining bank size and measuring it is of considerable relevance to regulators, supervisors and clients alike. This paper focuses on the definitions of size and does not look at other concepts such as "systemic relevance", "riskiness", "interconnectedness" or banks' "importance for financing the real economy".

Gauging the size of banks is a thorny issue, as many different indicators exist that have quite divergent features. When considering the size and importance of banks and the banking system, current academic research and official-sector documents often focus on balance sheet totals.<sup>2</sup> Industry analysts tend to look at market capitalisation or total revenues, while a prominent private-sector ranking (The Banker/Financial Times' "Top 1,000 banks") uses banks' capital as the main criterion.

This variety can lead to completely opposing results. To illustrate this, we will compare aggregate numbers for the largest US and European banks, based on their 2016 results. This will either be flow data for the year as a whole, such as turnover statistics, or end-of-period figures, such as balance sheet information. Due to different market structures – in particular market concentration – we will contrast the aggregate for the major seven US banks with the aggregate for the top 23 European banks.<sup>3</sup> This is not a mechanical selection based on a single specific indicator as it is exactly the core objective of this paper to show how much bank size varies depending on the chosen indicator. Here, bank size is depicted by the two samples, which are representative of the European (and US) banking sector in its entirety, both in terms of countries covered and business models. Hence, for Europe, we include banks from the euro area, the UK, Nordic countries and Switzerland. Our US sample covers both the major commercial banks as well as the two largest standalone investment banks. Thus, we aim to cover a sufficiently large share of the banking market in all big national economies in Europe. "Banking market" in turn is defined in a broad, universal sense, including commercial and investment banking, transaction banking and asset management.

<sup>1</sup> See FSB (2016) and BIS (2013), Dodd-Frank Act (2010), section 165, and ECB (2006).

<sup>2</sup> See e.g. IMF (2017), chapter 2, ESRB (2017), Federal Reserve (2016), chapter 4, or Economic Report of the President (2017), chapter 6.

<sup>3</sup> The US banks in our sample are: Bank of America, Citigroup, Goldman Sachs, JPMorgan, Morgan Stanley, US Bancorp, Wells Fargo.

The European banks in our selection are: ABN Amro, Barclays, BBVA, BNP Paribas, Commerzbank, Crédit Agricole, Credit Suisse, Danske, Deutsche Bank, HSBC, ING, Intesa Sanpaolo, KBC, Lloyds, Monte dei Paschi di Siena, Nordea, Popular, RBS, Santander, SEB, Société Générale, UBS, Unicredit.



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The different measures of bank size this analysis will focus on can, by and large, be grouped into three different categories: i) market-/cash flow-based indicators, which include market capitalisation, (total) revenues and net income; ii) accounting-based indicators, including total assets and shareholders' equity; and iii) regulation-based indicators, among them CET1/Tier 1 capital and risk-weighted assets. To demonstrate how significantly any size assessment depends on the preferred choice, see table 1.

Which banks are bigger? It depends...

1

Result*	Indicator
US banks larger than European banks	Market cap (and net income)
European banks larger than US banks	Total assets, revenues (somewhat)
US and European banks largely the same size	Equity capital, risk-weighted assets

\* based on our sample of banks  
Source: Deutsche Bank Research

In the following, we will analyse each of these measures in detail, comparing advantages and disadvantages, and subsequently reach a conclusion on how suited each is as a prime indicator for "bank size". We will illustrate each of our findings with an EU-US comparison for the respective measure.

Overall, the current cacophony of different criteria in use and the strong weight many still assign to total assets do not live up to the importance of the issue. This ought to change. In the end, this study will therefore propose one single indicator that may be best suited to evaluate how large or small a bank really is.<sup>4</sup>

## Market capitalisation

Market cap refers to the number of all shares outstanding of a listed company (not only those floating freely, i.e. not held by a major investor), times the stock price, thus yielding an absolute figure which we convert to EUR if necessary to compare banks from different jurisdictions.

### Advantages

Market cap measures the "true" value of an enterprise as judged by independent investors, not by accounting rules that may reflect historical costs and valuations rather than the current "real" value. It is also one of the figures that are fully comparable, i.e. "apples to apples", undistorted by different measurement rules, business models or risk content.

In addition, market cap has the enormous benefit of being available on a daily basis, instead of monthly, quarterly or even annual figures.

A third advantage is that market cap generally signals the underlying economic strength and relevance of an institution – and its impact on capital markets and the economy – compared with other measures that can show a company as an (illusionary) giant, which in reality is hollow and has feet of clay. Market cap, which is based to a large extent on the longer-term capacity to generate profits and on the outlook for company growth, is probably also the best link among the main measures of size to the viability and sustainability of a bank's business model – misleading cases of artificial and temporary profitability booms notwithstanding.

<sup>4</sup> The question of size must not be confused with other issues, such as systemic relevance. The Basel Committee has already dedicated a lot of effort to this matter. See BIS (2013) and <https://www.bis.org/bcbs/gsib>.



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For all of these reasons, market cap is usually one of the most prominent indicators of bank size looked at by equity research analysts.

### Disadvantages

Market cap is also characterised by a number of weak points, however. For one thing, it is available only for banks listed on the stock market. Newcomers as well as savings banks and cooperative banks – which play a large role in several European countries – are therefore not included within the scope.

Second, in line with the equity market as a whole, market cap is prone to exaggerations, both to the upside and the downside. Irrational exuberance and herding behaviour (including bank runs) may well drive a bank's valuation at times far above or below its "fair" value.

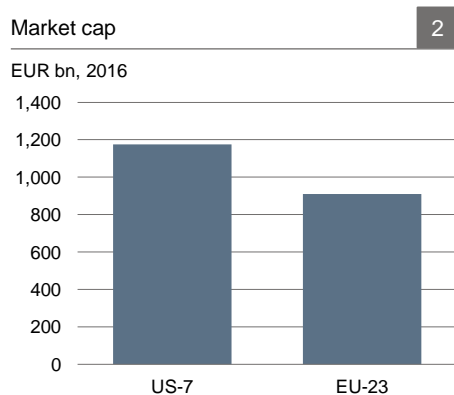
Another related drawback is market cap's inherent volatility, which may be the highest among all the main indicators discussed here. Obviously, this is the flip side of having an enterprise value (according to the market) available anytime. However, this is partly mitigated by two things. First, market valuations mainly depend on medium-term profitability, as the equity market tends to "look through"/ignore short-term noise, i.e. one-off effects. Second, in most cases individual bank stocks will move in the same direction, as they are highly correlated. As a result, the ranking within the industry has stayed remarkably stable, even though the past decade has seen the deepest global financial crisis in a lifetime and a further major crisis in Europe (see table 3 below for a comparison of the top 25 banks worldwide now as well as 5 and 10 years ago).

It is also possible for a bank to (sustainably) be much more profitable than its peers and therefore command a high market capitalisation while still maintaining a relatively limited size and scope of its activities. However, it is hard to think of a substantial number of these outliers continuously distorting the picture, given that small but attractive fish would probably either fall prey to a larger bank – or, even more likely, would try to secure a broader standing and capitalise on its successful business model by expanding itself, thus also becoming a large bank.

### Assessment

The aggregate market cap for the leading banks in Europe (23 institutions) and the US (7 institutions) underlines well the current strength of the US financial system, as well as the weak state of its equivalent in Europe. In spite of their much larger number, reflecting less advanced consolidation at the top level, the most important banks in Europe combined are valued significantly lower by the market than their US counterparts (23% at the end of 2016, see chart 2). To a large extent, this reflects the divergence in bank performance on both sides of the Atlantic since the financial crisis, driven by internal as well as external factors.<sup>5</sup> In the end, this has made US banks stronger and more profitable than ever before (at least in absolute, nominal terms), whereas European banks are still struggling considerably with the repercussions from the twin financial and debt crises and, in some cases, are still searching for a new business strategy, with the necessary adjustments not completed yet.

Overall, market cap may thus be a relevant, useful indicator of bank size, though probably not the very best one, as it captures not just size, but also the success of a bank.



Sources: Thomson Reuters, Deutsche Bank Research

<sup>5</sup> See e.g. Schildbach and Wenzel (2013) and Schildbach (2016).



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### Top 25 global banks by market cap

3

	Market cap in EUR bn	end of 2006	end of 2011	end of 2016
1	Citigroup	207.6	ICBC	175.8
2	ICBC	190.3	China Construction Bank	134.6
3	Bank of America*	181.8	Wells Fargo**	112.0
4	HSBC	160.9	HSBC	105.0
5	JPMorgan	127.1	Agricultural Bank of China	104.5
6	Bank of China	125.5	JPMorgan	97.3
7	China Construction Bank	108.5	Bank of China	93.6
8	Mitsubishi UFJ	100.7	Commonwealth Bank of Australia	61.5
9	UBS	96.8	Citigroup	59.3
10	Royal Bank of Scotland	93.1	Royal Bank of Canada	56.6
11	Wells Fargo**	91.0	Toronto-Dominion	52.1
12	Santander	88.4	Santander	50.3
13	BNP Paribas	76.9	Westpac Banking	48.2
14	ING	74.1	Mitsubishi UFJ	46.3
15	Barclays	70.8	Australia & New Zealand Banking Group	43.4
16	Unicredit	69.2	Bank of America*	43.4
17	Wachovia**	68.3	Bank of Nova Scotia	41.9
18	BBVA	64.8	National Australia Bank	41.3
19	Morgan Stanley	64.8	Sberbank	40.8
20	Goldman Sachs	64.4	Standard Chartered	40.2
21	Credit Suisse	64.3	US Bancorp	39.8
22	Mizuho	64.2	BNP Paribas	36.7
23	HBOS	63.2	UBS	35.3
24	Merrill Lynch*	62.2	Goldman Sachs	34.3
25	Sumitomo Mitsui	60.0	Bank of Communications	33.6
		<b>2,438.9</b>	<b>1,627.8</b>	<b>2,935.3</b>

Banks that were in the top 25 only once in 2006, 2011 or 2016.

\* Bank of America acquired Merrill Lynch during the financial crisis in 2008.

\*\* Wells Fargo acquired Wachovia during the financial crisis in 2008.

Sources: Thomson Reuters, Deutsche Bank Research

## Total assets

Total assets or the balance sheet total is a figure taken from banks' consolidated financial statements, which they are required to publish regularly and which are formally audited by an accounting firm.

### Advantages

The balance sheet total is an indicator that is easily available for virtually all banks, either from individual companies' financial statements or from private databases. In contrast to market cap, unlisted banks also usually report their total assets.

Second, total assets seem to be comparable and based on a straightforward definition: they sum up the volume of a bank's activities. The balance sheet total indicates the gross volume of all exposures combined and is unweighted by their risk, from loans to securities holdings and derivatives.



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Furthermore, total assets are less susceptible than risk-weighted assets to changes in the internal models (or the standardised approach) used to calculate them, as accounting methods – at least for most traditional assets – are closely linked to observable prices and volumes. In most cases, for example, a conventional loan to the private sector will be booked on the balance sheet broadly at face value, whereas determining its risk content is subject to a considerable extent to assumptions and model design. Even for derivatives, their notional amount is often obvious, though assessing their contribution to risk-weighted assets is a much more difficult issue.

To date, total assets remain an indicator that central bankers and financial supervisors are very much in favour of.

### Disadvantages

On the other hand, total assets mix all sorts of exposures and activities, lumping high-risk positions, such as structured credit products or high-yield bonds, together with low-risk positions, such as low loan-to-value (LTV) retail mortgages, sovereign bond holdings or secured corporate loans, without any differentiation. In some ways, total assets can misleadingly suggest nominal equivalence, a “common denominator” for all sorts of positions – but in reality it is comparing apples and oranges, especially in the case of fundamentally divergent business models of both individual banks and entire financial systems.

Measuring the “true value” of financial assets is, by definition, difficult: For some assets, such as equity and debt securities, a market price is usually readily available. Yet this is not the case for the majority of most banks’ assets, i.e. loan commitments (or derivatives). Most of these have to be judged by historical costs and/or internal valuation models. A loan can indeed be worth the full notional amount that was initially booked on the balance sheet. But it is also possible that part of it will not be repaid in time. It is crucial for a bank to assess these probabilities, the losses given default and recovery rates, also depending on the collateral value, and to make the corresponding appropriate provisions. However, due to the very nature of and inherent difficulty in predicting their business, banks find it challenging to precisely forecast future losses, on loans as well as on other claims.<sup>6</sup> This substantial uncertainty is greatest for what are known as Level 3 assets, for which no market price exists, and where “significant unobservable inputs” (i.e. assumptions) have to be used to derive an estimated “fair value”.<sup>7</sup> The amount of Level 3 assets can be significant at complex major banks.

Hence, balance sheet figures usually provide the best estimate possible for claims and exposures, yet they cannot be taken as an exact and absolutely reliable view on what the value of a certain position will really be in future. Measurement and modelling errors are bound to occur, given that valuations are derived partly from subjective assessments and partly based on theoretical assumptions. After all, financial markets are no natural science.

Furthermore, for financial instruments that can reasonably be measured in different variations, it is not straightforward what particular figure should be used for accounting purposes. Take derivatives, one of the most important components of total assets, and specifically credit default swaps, as an example.<sup>8</sup>

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<sup>6</sup> Similarly, there is a debate about credit, debt and funding valuation adjustments (CVA/DVA/FVA) and the treatment of market value losses of own liabilities due to a lower issuer rating as a *gain* for this issuer, which often raises profitability in bad times quite substantially. This is another revealing example for how serious these valuation problems on both the asset and the liability side have become, equally under IFRS and US GAAP.

<sup>7</sup> See e.g. FASB (2006).

<sup>8</sup> We use CDS because available data in this case allows for a comprehensive comparison.

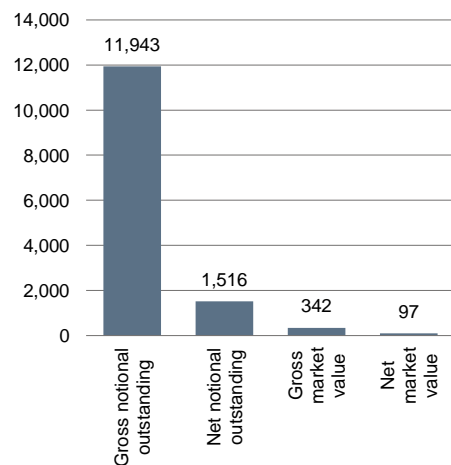


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### CDS market - what is the true size?

4

USD bn, OTC, globally, June 2016



Sources: BIS, ISDA

Their market size can be assessed in at least four different ways:

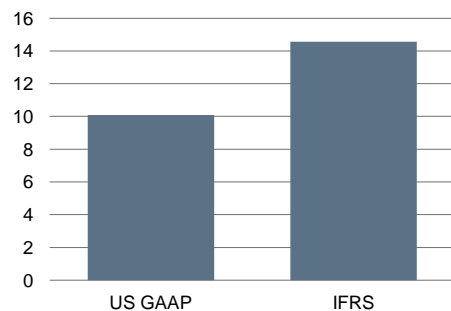
- i. gross notional value (outstanding)
- ii. net notional value
- iii. gross market value
- iv. net market value.<sup>9</sup>

At USD 12 tr, the gross notional outstanding of the global CDS market in summer last year (latest date available) was down 80% from the peak in 2007. Still, it was more than 100 times higher than the smallest measure of market volume, the net market value, which stood at USD 97 bn.<sup>10</sup> At individual (investment) banks, the ratio between the two for the entire derivatives book can even reach more than 1,000: on the one hand, gross notional derivatives of tens of trillions of euros; on the other hand, a net market value of just some billions. In the former case, this number would completely dominate any balance sheet, whereas the latter figure would be almost negligible at a major bank. Neither of the (extreme) measures is used under current accounting rules, but rather something in between. All of the available size figures have their justification and may be the appropriate figure to look at under certain circumstances. However, when drawing up the balance sheet total, only one can be used. Which one may always be debatable – and any decision will be vulnerable to criticism that it either leads to an understatement or an overstatement of business volumes and risks.

### Total assets of US G-SIBs\*

5

USD tr, as of Q2 2016



\* excl. BNY Mellon, State Street

Sources: FDIC, Deutsche Bank Research

Derivatives also pose a further problem for total assets: the rules for calculating them differ substantially across jurisdictions. As a consequence, banks' incentives for steering the business vary considerably between countries. For example, EU banks follow IFRS accounting rules, which hardly allow for derivatives netting, whereas their US counterparts are able to do so under US GAAP. Given that regulators' and investors' focus has partly shifted in recent years from risk-weighted to nominal capital ratios (e.g. a simple comparison of equity capital and total assets), European banks now have a much greater interest in reducing their derivatives exposures, as they do not want to seem more weakly capitalised than their US competitors. Even more importantly, differing national accounting standards render nominal comparisons of total assets almost useless, unless the figures are substantially adjusted. Chart 5 shows how large an impact accounting differences can make. For the six global systemically important US banks<sup>11</sup>, the estimated IFRS balance sheet total would be almost 50% higher than the official number under domestic GAAP. For some individual institutions, especially the more capital market-oriented, the shift to IFRS would even more than double their total assets.<sup>12</sup>

### Total assets of German banks

6

EUR tr



Sources: Bundesbank, Deutsche Bank Research

Total assets lack stability over time, too. Regulators often decide that certain financial instruments should be accounted for differently in financial statements, especially on the balance sheet, but prior data is not realigned accordingly. Examples include a massive shift in reported total assets in Germany at the end of 2010 when trading-book derivatives were included and the balance sheet total suddenly jumped by a staggering EUR 983 bn or 13% (see chart 6). This also obscures the extent of the remarkable longer-term deleveraging that has been taking place in the German banking market since the financial crisis: excluding the rule change, on a comparable basis, total assets fell from 311% of GDP in 2008 to 229% by 2016, but only to 250% per official banking sector

<sup>9</sup> For a discussion of the different forms, see Weistroffer (2009).

<sup>10</sup> See chart 4.

<sup>11</sup> Excluding Bank of New York Mellon and State Street, which are primarily asset managers and custodians rather than commercial or investment banks.

<sup>12</sup> Likewise, on the European side, a number of large banks provided their total assets both under IFRS and US GAAP in their financial accounts for 2006, allowing for an easy comparison of the substantial quantitative differences between the two standards (almost all banks showed higher balance sheet figures under IFRS).





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statistics.<sup>13</sup> Something similar happened in Italy in summer 2010, though on a somewhat smaller scale. Previously off-balance sheet, some securitisation positions were now recognised on the balance sheet, and total reported assets (and liabilities) suddenly surged by EUR 146 bn, or 4%, without any change in the underlying economic fundamentals.<sup>14</sup>

A related problem with total assets stems from the accounting treatment of off-balance sheet exposures in general, including contingent liabilities. These used to be more prominent before the financial crisis, but can still be very sizeable at major banks today. It is not a trivial question whether and how to incorporate commitments like liquidity facilities, guarantees such as trade letters of credit, or acceptances into official financial statements. They are typically not recognised directly on the balance sheet, but rather reported separately, despite potentially having a material impact on a bank's business and quickly turning into formal assets.<sup>15</sup>

When assessing different financial systems internationally by looking at total banking sector assets, another difficulty arises: in some countries, such as most of continental Europe and Japan, the largest share of credit provided to the real economy is coming from the banking sector. Capital market funding for corporations or private households plays a much smaller role. By contrast, in Anglo-Saxon economies, capital markets typically supply most of the funds required by the corporate sector and, indirectly through the securitisation market, most of the credit for private households' housing investments. This explains why on face value, i.e. measured by nominal total assets, banking sectors in Europe seem so much larger than in many other regions of the world, while the total level of debt in the non-financial sectors may well be of a similar dimension.

However, even for those liabilities where the creditors are non-banks, banks are typically involved in crucial ways. Take *securitisation* first. Here, banks often originate loans which they subsequently repackage and sell to institutional investors, thereby removing them from their balance sheets.<sup>16</sup> In that case, ignoring these transfers in an assessment of bank size and narrowly focusing on the reduced volume of assets that banks report is clearly misleading.

Second, the *bond market*. Let's leave those mortgages and corporate loans aside which have been originated by banks, but passed on to the market. What about the argument that at least "plain" (corporate) debt securities – bonds – are not originated by banks and could thus be ignored when assessing the size of the banking system?<sup>17</sup> Just pointing to the fact that the funds in this case indeed come primarily from capital market investors would again discount the role of banks: it is usually (investment) banks that manage the whole process of finding the right instrument, matching it with investors' demand and subsequently guaranteeing enough liquidity in secondary market trading for this crucial funding channel to be viable at all. Thus, the bottom line is that different financing patterns and an overly narrow focus on who provides much of the corporate and mortgage credit in more market-oriented economies tend to

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<sup>13</sup> Note that this mere change in accounting of (existing) assets is different from a reclassification of entire financial institutions, such as the 419 credit unions in Ireland or state-owned development institution Cassa Depositi e Prestiti in Italy, which have been treated as banks from 2008 and 2007 onwards, respectively. Reclassifications of this type affect all financial statements, stock and flow data, i.e. lead to jumps in total assets as well as revenues.

<sup>14</sup> See Banca d'Italia (2010).

<sup>15</sup> Off-balance sheet items are converted into exposures under the RWA and leverage ratio frameworks, though. See e.g. BIS (2014). Similarly, income that a bank generates from these commitments is reflected in its revenues.

<sup>16</sup> This is true for plain-vanilla true-sale securitisation. For the synthetic variant, see Kaya (2017).

<sup>17</sup> A similar argument applies to equity issuance, though this typically accounts for smaller financing volumes.

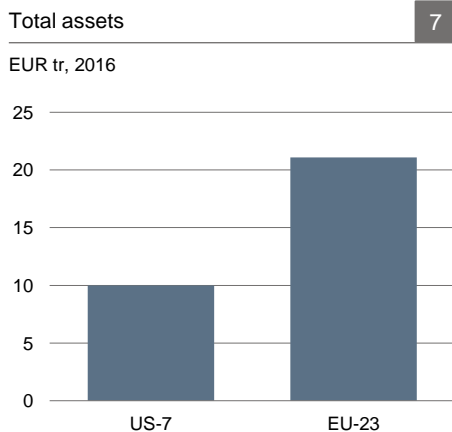


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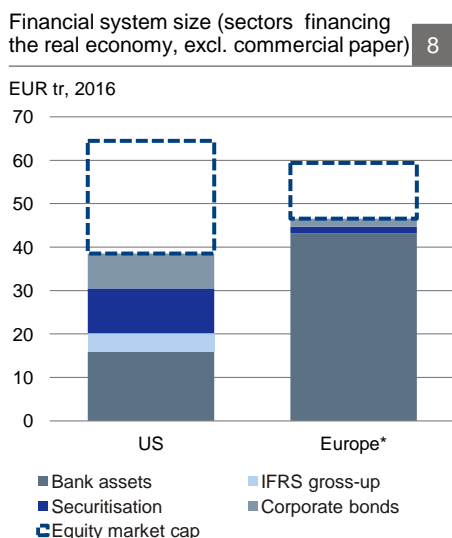
obscure the role and size of banks, at least if looking only at total bank assets as the main indicator.

In addition, i) strong securitisation and ii) bond market activity not only lead to an underestimation of the role of banks for the real economy, if measured by total bank assets; reported assets would also underestimate the true extent of an individual bank's franchise if it runs a substantial capital markets operation. Why? i) Banks which securitise heavily often remain part of the credit chain by collecting borrowers' payments and earning servicing fees for that – on assets they do not report in their financial statements. ii) Similarly, much of banks' corporate finance business hardly shows up on the balance sheet either: origination/underwriting and advisory services for debt and equity issuance and mergers and acquisitions (M&A) essentially do not involve large securities holdings (this partly changes at a later stage of the value chain, in day-to-day trading). In both cases, banks can generate a high share of their earnings from activities linked to capital markets without the need to keep large total assets.

This argument is compounded for banks which also operate a meaningful asset and private wealth management. Especially in Europe, many large banks run a diversified universal banking model. Asset management can play a considerable role for them, generating a steady flow of fees and commissions, even though this is not a balance sheet-intensive business.<sup>18</sup>



Sources: Company reports, Deutsche Bank Research



\* EU for bank assets and corporate bonds

Sources: ECB, FDIC, SIFMA, Eurostat, World Exchanges, Deutsche Bank Research

### Assessment

Generally, total assets are the most prominent size indicator looked at by many official-sector representatives.

However, given the considerations outlined above, it should be obvious that the balance sheet total is fully unsuited to be relied upon as the single most important indicator for bank size. While total assets can serve as a proxy for the total, unweighted business volume, they clearly need to be complemented or rather superseded by other measures that better take account of the nature of an institution's activities, their risk content and overall economic impact. In particular, different individual business models and structural differences in the way the economies are financed on both sides of the Atlantic heavily influence banks' reported (total) assets. Evaluating the size of banks with diverse backgrounds based on this metric would thus not be sensible. The samples of US and European banks constructed above highlight these problematic features. At EUR 21 tr, the aggregate total assets of the leading European institutions are more than twice as large as total assets of the biggest US banks (see chart 7) – each measured by the respective accounting standard. When compared with the market cap figures above, this turns the picture upside down. At the same time, for the market as a whole, the massive gap between both financial systems' size shrinks by more than two-thirds if

- i. the different accounting treatment of derivatives is taken into account
- ii. securitisation markets are included and
- iii. the corporate bond market is included.

Finally, if the different strength of equity capital markets is also taken into consideration, the financial system in Europe does not at all look "outsized" any more (see chart 8).

<sup>18</sup> Assets such as those in mutual funds which a bank only manages on behalf of its clients do not appear on the bank's own balance sheet, of course.



## Total revenues

The term “total revenues” (or simply “revenues”) refers to total income, gross earnings or the sum of

- i. net interest income
- ii. fee and commission income
- iii. trading income and
- iv. other income.

It is calculated as gross revenues minus interest expenses (so as to be less distorted by a high or low interest rate level and related changes). It is somewhat comparable to the “turnover”, or sales volume, of a non-financial company, but it differs in an important way: whereas the purchase price, say, of a newly sold car is included in the turnover of its manufacturer, for a bank, only the interest payment and the fees associated with handing out a mortgage, for example, appears in the profit and loss account (P&L). The total nominal value of the mortgage shows up only on the balance sheet (or disappears once the mortgage has been paid back), not in the income or expense figures of the bank.<sup>19</sup> Because its core product is, in a sense, “money”, a traditional turnover measure does not exist in the banking industry. *Turnover* in all other sectors indicates how much in aggregate people are willing to pay for a product or a service. In the banking industry, *revenues* indicate what customers are prepared to pay for the provision of a particular service. In the example of a EUR 200,000 mortgage, this gross notional volume would appear only on the balance sheet as part of the outstanding loan figure. For the loan’s first year, at a hypothetical 3% interest rate and a 1% origination fee for making the loan actually available, EUR 6,000 would appear under the interest income heading in the bank’s P&L and EUR 2,000 under fees and commissions, resulting in total revenues of EUR 8,000. The next year, only the interest payments would continue to be booked in the P&L, and any repayments would directly reduce the loan amount.

In this respect, banks are handling vastly bigger sums of money than typical industrial or other services companies – the balance sheet size of major banks dwarfs that of major oil or technology firms, for example. Yet turnover of the latter may well be comparable to revenues of the former.

### Advantages

Now, what advantages does the concept of revenues offer for an analysis of bank size?

- i. Revenues are relatively stable and less volatile than market-based indicators such as market cap. Whereas the latter can fluctuate widely, especially in times of crisis such as the recent ones, revenues reflect the core operating trends much better, which tend to move more smoothly than sometimes hectic stock markets.
- ii. Linked to that is another major benefit of revenues: they are based on current actual developments and thus on claims that have already been realised and turned into hard currency, rather than being forward-looking and only driven by expectations about the future as in the case of market cap.
- iii. Revenues are also a “true”, reliable and easily observable figure based on cash flows – in contrast to most accounting and regulatory data, which often rely on complex valuation models and are subject to design issues and assumptions, and where estimated results, by definition, cannot be validated by cross-checking with observable reality. This is

<sup>19</sup> Except for the case the loan turns out not to be repaid in full, which would require the bank to book a loan loss provision through its P&L.



## Large or small? How to measure bank size

- straightforward, recalling the massive miscalculations of risks and exposures in the recent years of the financial and debt crises. To oversimplify a bit: EUR 1 in revenues is a fact; EUR 1 in derivative values is a belief.
- iv. Likewise, revenues are a comprehensive, all-encompassing measure of banks' total operations. This is a significant improvement, particularly on total assets, whose meaningfulness is hampered not least by securitisation and banks' capital market services, as laid out above. In both cases, despite the lack of large asset volumes, banks play crucial roles as originators, servicers and intermediaries, and can therefore earn substantial fees and commissions. Concentrating on total assets would thus underestimate banks' weight, while total revenues would represent their real role much more adequately.<sup>20</sup>
  - v. Related to this is a further advantage – maybe one of the greatest that revenues can offer: they reduce banks' vastly divergent activities to a common denominator. As discussed above, total assets try to do the same, but are bound to fail in treating traditional loans and deposits, securities, derivatives, loss provisions etc. all the same, as well as exposures for which observable market prices exist and those for which they do not, so that a bank has to rely on model calculations for valuing these positions. Revenues only take into account the cash that is flowing back to the bank, irrespective of the type of transaction or claim of the underlying business, thereby “normalising” interest- and fee & commission-generating operations. At the same time, revenues are also an improvement on market cap – which is indeed a common denominator – by providing an indication of the size of the business instead of primarily measuring a bank's ability to produce profits.
  - vi. All three indicators discussed so far – market cap, total assets and revenues – aim at quantifying the value of a bank's business. By contrast, some of the measures to be analysed below refer to a particular *volume* instead of a *value* in EUR terms. Of course, a value figure is preferable to a comparison of the number of customers or the number of employees, for example.

### Disadvantages

- i. Revenues can be inflated by non-bank activities. A bank holding large stakes in non-bank financial subsidiaries (e.g. insurance) and even traditional industrial companies would be able to book higher revenues without significantly affecting the balance sheet total and other similar parameters. However, since conglomerates – particularly those owning manufacturing firms, not to mention bancassurance models – have gone out of fashion, today's credit institutions, at least in industrialised countries, are usually much more focused on their core banking operations.
- ii. In an extreme case, revenues could become a measure of risk rather than of size. If a bank were to engage only in high-risk but also high-yield activities, its impact on the financial system and the broader economy could remain limited in spite of its revenues reaching substantial levels. On the other hand, a bank active entirely in low-risk, low-margin lines of business could have a high market share in relatively safe market segments, such as mortgage lending (secured by the underlying real estate) or public finance. Despite managing a large

<sup>20</sup> The opposite is possible with total assets. In the derivatives business, accounting rules often stipulate very large volumes to be reported in official financial statements, whereas the net economic impact of most of these positions is much smaller than that of a traditional loan of the same size, for example. A large derivatives book on the balance sheet therefore tends to inflate and overstate the respective bank's importance in the financial system and for the economy as a whole.



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balance sheet, it still might earn only moderate revenues on these assets. Hence, specialist banks with a particularly risky business strategy would tend to be regarded too prominently, while institutions with a low-risk profile could be seen as being less important than justified by their position in the banking market as a whole. In such circumstances, total assets needed to be looked at as well as an indicator of size.

Nonetheless, specialist banks in a narrow sense represent a small minority, especially among the largest banks.<sup>21</sup> In addition, many of them did not perform well during the recent crises – think of Hypo Real Estate and Dexia, for example, which are now being wound down or sold to competitors. Most banks in Europe and also the US are, in general, either

- a. commercial banks with a broad mixture of both low- and higher-risk operations (residential mortgages [which often enough turn out not to be very low risk], investment-grade corporate lending on the one hand, and consumer credit and high-yield small-business lending on the other) or
- b. even more diversified universal banks with a meaningful capital markets franchise.

As a result, among the largest banks, purely low-risk or high-risk institutions may be quite rare, thus limiting the distorting effect from “too low” or “too high” revenues, respectively.

### Assessment

Total revenues or gross earnings of a bank are often the second-most looked-at size indicator used by equity research analysts.<sup>22</sup> Adoption by regulators is only moderate though. On a global level, the Basel Committee on Banking Supervision and the Financial Stability Board use a variation of total assets which at least adjusts for accounting differences (“total leverage ratio exposure”) in the catalogue of criteria to measure systemic importance of global banks.

In the US, on the other hand, under the Dodd-Frank Act, the Fed considers a non-bank financial institution as “predominantly engaged in financial activities” either if it derives more than 85% of its revenues from financial activities or if more than 85% of its assets are financial in nature.<sup>23</sup> Yet the Fed uses only total assets to determine whether a bank holding company is “significant” and whether it has to regularly submit resolution plans (“living wills”) and will be subject to annual stress tests of its resilience, among many other requirements.<sup>24</sup> The threshold for these is fixed at USD 50 bn.

In Europe, with regard to the supervision of “significant” banks in the context of the single supervisory mechanism (SSM), the ECB is directly responsible for banks with total assets above EUR 30 bn (or for banks with total assets > 20% of national GDP, and at minimum for each country’s three largest banks by total assets).<sup>25</sup> At the same time, the ECB looks at two different samples for financial stability assessments. On the one hand, the directly supervised institutions are considered “significant banking groups”.<sup>26</sup> On the other hand, to identify a

<sup>21</sup> Based on what is admittedly back-of-the-envelope judgment, only 4 out of the 23 main European banks in the sample used in this study are “specialist” banks in the sense that investment banking or asset management operations account for a dominant share of overall group activities. And even they run a full-range universal bank at least in their home country. This compares to, at group level, 7 universal banks in the narrow sense (which have a substantial capital markets franchise together with retail and corporate banking arms) and 12 predominantly commercial banks.

<sup>22</sup> See e.g. Deutsche Bank Markets Research (2017).

<sup>23</sup> See Federal Reserve (2013).

<sup>24</sup> See Dodd-Frank Act (2010), section 165.

<sup>25</sup> See Council Regulation (EU) No. 1024/2013 (the “SSM Regulation”).

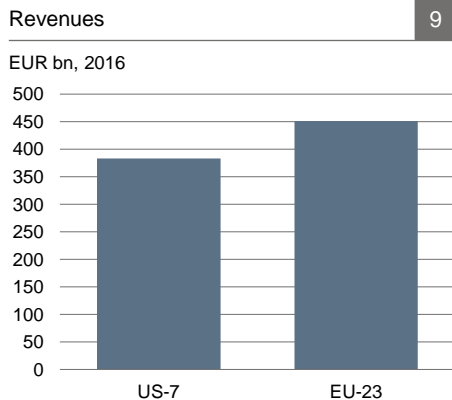
<sup>26</sup> See ECB (2013), box 5.



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smaller set of “large and complex banking groups” active (though not necessarily domiciled) in the euro area, the ECB takes into account five sets of indicators, one of which consists of net interest revenue and net non-interest revenue (in addition to traditional balance sheet items, interbank business, bookrunner role and custodian role).<sup>27</sup>

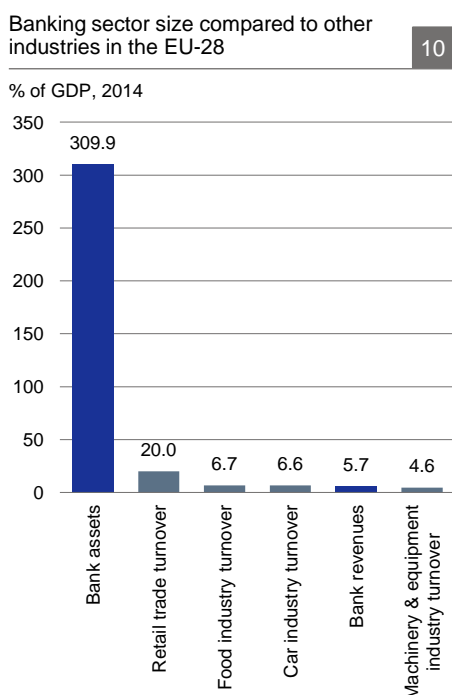
The trio of size indicators discussed so far, together with equity capital which is examined below, represents arguably the most important ones. All of them are value measures, not volume measures, and are hence more useful than some other figures analysed below. Considering the arguments above, among the three, revenues may be the single best proxy for bank size, as they suffer less from the above-mentioned shortcomings of both market cap and total assets. Most crucially, they avoid the problem of a relatively narrow focus on expected future profitability (i.e. the main downside of market cap), on the one hand. On the other hand, revenues circumvent the main downsides of total assets: i) the issue of different banking and financial market structures (i.e. the fact that some economies lean towards market-based financing and others towards bank financing), and ii) the problem of having to equalise very different exposures by a single nominal measure and the difficulty of valuing these positions in a credible, stable way that is not subject to a significant degree of discretion, assumptions and model design (i.e. the issue of accounting rules).



Sources: Company reports, Deutsche Bank Research

Judged by revenues, the huge discrepancies between market cap and total assets of the leading US and European banks disappear (see chart 9). In 2016, the main European banks generated EUR 451 bn in total income and their major US competitors EUR 383 bn, a ratio of about 7:6, compared with ~ 3:4 (favouring the US) in the case of market cap and ~ 2:1 (favouring Europe) in the case of total assets.

A final remark on the comparison between total assets and revenues. One of the reasons for the fascination many policymakers and the media have for total assets might also be the fact that it is easy to compare with GDP and yields impressive numbers. In the EU, for instance, bank assets amount to 310% of GDP, which often triggers comments such as “the banking system is more than three times the size of the economy” (see chart 10). However, these interpretations appear sensationalist and can be profoundly misleading: they compare a stock figure – outstanding bank claims at a given point in time – to a flow figure – the value of all goods and services newly produced by an economy within a year. The appropriate measure for the banking sector would be revenues rather than total assets, as it also allows for a cross-sectoral comparison with turnover in other industries. On this – arguably, the correct – basis, banks look much less frightening, with their size below 6% of GDP.<sup>28</sup> But these figures are less marketable to the public, generate much less attention and are less useful in terms of policymaking, which depends on raising the awareness of a perceived urgent problem. This may at least partly explain why so many politicians, regulators and journalists are fond of using total assets as a sign of an outsized or enormously important banking system.



Sources: ECB, Eurostat, Deutsche Bank Research

## Equity capital

Like total assets, the book value of equity (in contrast to the market value of equity, i.e. market cap) is a balance sheet figure. Regulatory measures of capital are also strictly defined.

<sup>27</sup> See ECB (2006).

<sup>28</sup> The ratio of turnover relative to GDP should not be read as the share of a specific industry in total economic activity though. For this, gross value added may be a better measure, yet this is less straightforward to compute for the banking industry and therefore not used here.



## Large or small? How to measure bank size

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### Advantages

As a measure taken from the financial statements, equity capital combines a number of strengths as an indicator of bank size. First of all, it is easily observable for basically all banks, both listed and unlisted entities.

Second, it measures how much a firm is worth – not quite as good and timely as market cap, but it still gives a reasonable estimate. In that respect, there is no difference between a bank and a non-financial corporation. For a lot of companies listed on the stock market, a price-to-book ratio of 1 serves as a reference point. Thus, total equity is a relevant value indicator similar to total assets, only with a different meaning (looking at the value of the bank instead of the combined volume of its transactions).

At the same time, however, equity capital avoids a number of the drawbacks of total assets. It is hardly affected by differences in business models or financial system structures – the size of the derivatives book and the strength of the corporate bond market or the securitisation market play no major role in how much equity a bank has. Likewise, total equity is more independent of complex hypothetical calculations and far-reaching decisions about how to account for certain financial instruments than risk-weighted assets and total assets. Simplifying somewhat, it is the sum of capital raised from a bank's owners and of profits retained from its operations over the entire lifetime of the business.

This adds a fourth advantage, especially in contrast to market cap: the equity base tends to be rather stable over time and to fluctuate only a little – exceptions during individual or systemic banking crises notwithstanding, of course. Equity capital provides a more neutral view on the pure size of an institution irrespective of whether it is generating no, little or a lot of money with its activities at the moment.

### Disadvantages

Total equity has relatively few shortcomings. One is that it can also be subject to considerable changes due to accounting rules. For example, some losses banks make are not recognised in the P&L, but only go through the balance sheet, i.e. are deducted directly from the capital base. Similarly, CVA/DVA/FVA adjustments bring some volatility to the reported equity despite having little to do with a changing size of a bank, and are often even reversed in the following quarter.

The indicator also suffers somewhat from its reliance on historical values which might not adequately reflect the current franchise value, particularly given a bank's discretion in assessing the extent of necessary impairment provisions – coverage ratios for non-performing loans vary widely between banks – and goodwill writedowns.

Third, it can be debated what should actually count as equity. Several definitions exist (the following is a non-technical overview), each with their own pros and cons:

- i. *Shareholders' equity*. The book value of the enterprise that the owners can claim belongs to them, in a fictional dissolution of the bank.
- ii. *Tangible (shareholders') equity*. The above without goodwill and other intangibles, to provide a number for the core capital base; essentially retained earnings and funds raised from the owners.
- iii. *Total equity*. Shareholders' equity plus minority interests, i.e. capital held by other shareholders in subsidiaries that are majority-owned by the bank. This is the total capital figure that, together with total liabilities, equals total assets/the balance sheet total and, in contrast to some other measures in this list, is usually available for all banks. It is therefore used in this study.



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- iv. *Common Equity Tier 1 (CET1) capital.* A regulatory figure, though based on balance sheet data. Somewhat similar to tangible equity, as it strips out less reliable forms of capital.
- v. *Tier 1 capital.* In addition to CET1, it also includes Additional Tier 1 capital, i.e. subordinated debt instruments which can be wiped out or converted into equity under certain conditions.

This is not even a conclusive list of equity parameters.<sup>29</sup> It shows that deciding on what figure to take is not a trivial matter. Furthermore, not all banks report all of the above, arguably with the exception of total equity and Tier 1 capital (see table 11 for the top 10 largest banks in the world in this regard).

Top 10 global banks by Tier 1 capital, 2015

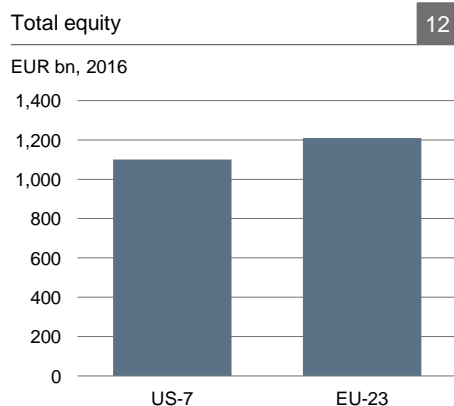
11

		Country	Tier 1 capital in USD bn
1	ICBC	CN	274.4
2	China Construction Bank	CN	220.0
3	JPMorgan	US	200.5
4	Bank of China	CN	198.1
5	Agricultural Bank of China	CN	185.6
6	Bank of America	US	180.8
7	Citigroup	US	176.4
8	Wells Fargo	US	164.6
9	HSBC	UK	153.3
10	Mitsubishi UFJ*	JP	131.8

\* as of March 2016  
Source: The Banker

### Assessment

Equity capital is among those indicators of bank size that are the least volatile and least dependent on financial system structures. In addition, it is only moderately subject to accounting rules, valuation models and assumptions. It may therefore be superior to total assets, market cap or risk-weighted assets. Though there are several possible variants, total equity may be the figure that is most commonly available and easily comparable. Revenues are an even better measure though, due to the direct link to the business volume, because they reflect current circumstances more precisely, and because they are even less affected by different accounting concepts and measurement decisions.



Sources: Company reports, Deutsche Bank Research

On the basis of total equity, the major European and US banks are roughly of the same size (see chart 12). The difference between equity capital of EUR 1.2 tr in Europe and EUR 1.1 tr in the US at the end of 2016 was less than 10% – something that could be turned upside down within a single year, driven both by organic changes and exchange rate movements.

### Risk-weighted assets

Risk-weighted assets (RWA) are the last of the main measures of bank size worth discussing in greater detail before we turn to a number of other parameters which do not belong to the prime proxies, but may be regarded as “second-rank” or “supplementary” size indicators. RWA are a regulatory measure that aims to gauge the risk involved in each position a bank holds, via a “price tag”, and sum up these values to one overall figure.

<sup>29</sup> In Germany, as an example, the *Fonds für allgemeine Bankrisiken*, which is of particular importance for savings banks and cooperative banks, can count towards the equity base even though it is reported separately in the official financial statements. See e.g. Bundesbank (2017).





## Large or small? How to measure bank size

### Advantages

In principle, risk-weighted assets follow a very reasonable approach and have many merits, as they aim for a common denominator (i.e. the “amount” of risk) for banks’ vastly divergent activities. In this regard, they are similar to revenues, and superior to total assets, which lump together different exposures by summing up their nominal volumes. The risk adjustment in the calculation of RWA assigns weights between 0 and 1,250% to the nominal outstanding to derive the RWA figure. Hence, the process normalises different activities based on their risk content and makes them comparable. As the transformation of risk (essentially turning risky loans into riskless deposits) is one of the core functions of a bank, the overall amount of RWA provides a useful indication of the extent of a bank’s business, i.e. of its size.

Second, as a regulatory measure based on the outstanding claims of a bank, RWA for many exposures such as loans are independent of short-term fluctuations in market prices. Thus, the overall figure tends to be relatively stable – provided there is a stable rulebook.

### Disadvantages

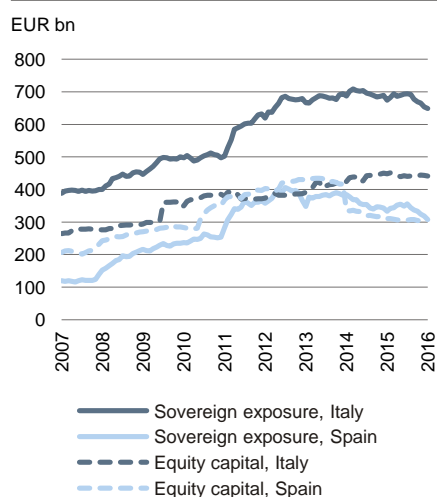
RWA also involve numerous drawbacks, however. Most importantly, they are unobservable and constitute an artificial, “made-up” figure that is entirely based on models, assumptions and banks’ own calculations, i.e. they are dependent on parameter calibration. RWA compound the already serious aggregation problem of total assets by going far beyond the gross, nominal exposures of banks. This has even led supervisors and regulators to question the validity of the results. The current discussion in Basel centres around capital floors and how to ensure that banks’ internal ratings-based calculations do not lead to an underestimation of the true level of risk. Likewise, several policymakers have pushed forward the leverage ratio as an increasingly important complement to the risk-based capital ratio. Essentially, this suggests that even some standard-setters mistrust their own framework for determining risk.

The second drawback is a related problem: RWA are computed using rules set by policymakers and supervisors. As a consequence, they can be i) arbitrary and “politicised” to some extent, and ii) subject to frequent adjustments.

i) It is hard to say what risk weight is really appropriate for a given financial instrument, such as a securitisation that a bank has invested in. The danger is that political pressure enforces regulation which penalises some activities and encourages others. Take the case of exposures towards European sovereigns and subnational entities: instead of relying on the original Basel II framework, which envisaged a strict risk-based methodology for assessing all sorts of claims, European politicians decided to implement Basel II in applicable EU law by creating an exemption for EU sovereign exposures, irrespective of the creditworthiness of the borrower. In regulatory terms, the original Capital Requirements Directive (CRD) thus established by definition a risk-free asset, no matter what the underlying economic conditions are. This even came at a time when governments in the euro area had just given up monetary sovereignty by handing it over to the independent ECB. As a result, they were not able to print their way out of a debt overhang any more, technically turning national debt into subsovereign liabilities. Of course, this exemption helped to lower funding costs and may have contributed to the overindebtedness problem several European sovereigns face today. It also led banks to pile up many more government bonds on their balance sheet than they probably would have done otherwise – e.g. in the two largest peripheral countries, Italy and Spain, banks’ claims on the domestic government are currently higher than their total equity, as chart 13 shows. Even worse, not even the Greek government’s default on its obligations in 2012 changed this doubtful regulatory treatment.

Peripheral banks’ exposure towards the domestic government

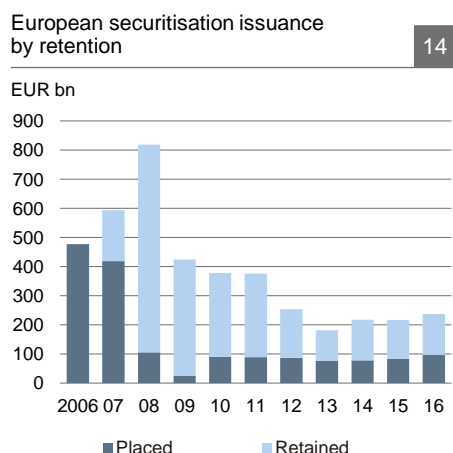
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Source: ECB



## Large or small? How to measure bank size

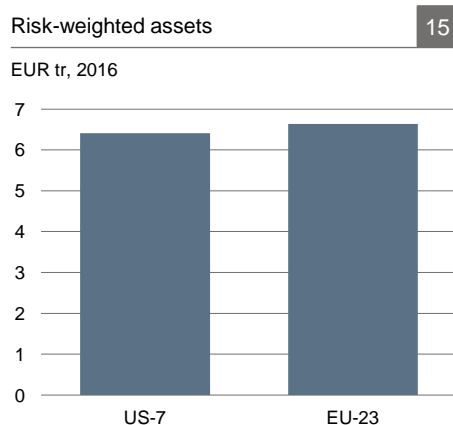


Sources: AFME, Deutsche Bank Research

The opposite approach is evident for securitisation exposures. Despite the European market's higher quality throughout the financial crisis and the past few years, policymakers (possibly driven by a non-differentiating public) were deterred by the poor performance of securitisation in the US and slapped drastically higher risk weights on this market segment when implementing tighter capital requirements for banks after the crisis (Basel 2.5 and its transposition into European law via CRD II and CRD III).<sup>30</sup> This was a crucial reason, though not the only factor, for the slump in European securitisation market volume and its stagnation at a depressed level ever since the crisis (see chart 14). At the same time, the higher risk weights automatically made banks holding securitisations appear "larger" in terms of RWA.

ii) Another issue due to the political nature of the RWA determination process is the lack of stability over time. Frequent changes to the calculation formula have been made in the past few years: Basel II was introduced in the EU at the beginning of 2007 and required a much more granular assessment of borrower creditworthiness than before. The first major amendments as a consequence of the financial crisis came with the CRD II in 2009, followed by CRD III in 2011, before the transitional phase towards the new Basel III accord started in 2014. It will continue until 2019. In addition, there are still a number of ongoing discussions on a further sharpening of the rules, often dubbed Basel IV, which among other things includes a greater focus on the standardised approach (and a more limited application of internal models), a revised and tightened capital floor to mitigate model risk, and the potential introduction of capital requirements for interest rate risk in the banking book (IRRBB). Agreement on these matters would result in further alterations, not to mention that requirements for securitisation exposures could be relaxed again if an EU Capital Markets Union is established successfully. It is clear that these perennial revisions have rendered a comparison of RWA over time nearly useless, and differences in implementation have also significantly complicated cross-country analyses.

Furthermore, because the process of determining risk weights is relatively detached from empirical evidence of volatility in asset prices and historical loss rates and relies instead on percentages set by policymakers, RWA as a size indicator can favour some bank business models and discriminate against others. For example, the current RWA regime tends to disadvantage institutions strongly engaged in traditional "hold-to-maturity" consumer finance and SME lending, as well as those dealing with debt securities. In the first two cases, ratings are usually not available or low and little collateral exists. In the latter case, a bond trading portfolio is treated as a high-risk investment. All this implies high RWA and makes these business models in a world of massively tightened capital standards much less attractive. In addition, these banks appear artificially "large". By contrast, other business models, such as residential mortgage lending (which involves a lot of collateral), public finance (which is favoured by its zero risk weight) or corporate finance (which mostly means advisory and short-term underwriting commitments), are benefiting from a "capital-light" approach. These banks look quite "small". Though there are some good reasons for these differences, the regulatory treatment of risk which is reflected in overall RWA figures is sometimes questionable and can make for an uneven playing field between various types of banks.



Sources: Company reports, Deutsche Bank Research

### Assessment

On the RWA basis, the samples of the major US and European banks are remarkably similar in size, with a gap of less than 4% between EUR 6.4 tr and EUR 6.6 tr, respectively (see chart 15). The outcome is thus not much different from the analysis of equity capital or total revenues. But given the significant deficiencies just discussed – in particular, the arbitrary formula for calculating

<sup>30</sup> See also Kaya (2015).

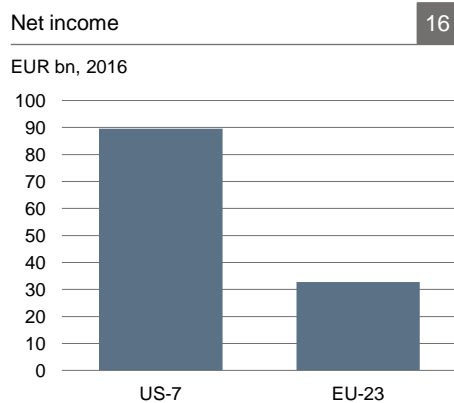


## Large or small? How to measure bank size

RWA, plus the lack of stability and comparability across institutions – this measure may not be primarily suited to quantify the pure size of a credit institution, however helpful it may be to assess its riskiness.

### Other indicators

Finally, there are several other measures that provide an idea about how large and important a bank is. They are highly relevant in certain ways, yet have significant shortcomings, as they yield results that are difficult to compare, particularly across different business models and geographical areas. In a nutshell, they are as follows:



Sources: Company reports, Deutsche Bank Research

- i. **Net income.** Primarily one of the input factors for market cap, which therefore does not require extended discussion. Net income can be heavily affected by one-offs, both in a positive or negative direction – e.g. by a gain from the sale of a subsidiary or a goodwill writedown, respectively. Still, bottom-line profit is a crucial sign of the current strength of a franchise which, of course, has important implications for its future growth.  
Given the transatlantic macroeconomic divergence in recent years, it is hardly surprising to see an enormous gulf in net income between the leading banks in the US and Europe. The former were able to rake in a total of EUR 90 bn last year, while the latter only achieved EUR 33 bn (see chart 16). As most other indicators show that European banks are not substantially lagging behind their US counterparts, a narrow profitability comparison would yield a distorted picture about the true size of the two regions' banking systems.
- ii. **Number of customers.** A valid figure to look at for each business segment separately, yet not useful for an assessment of whether a commercial bank (which usually has many retail customers) or an investment bank (which often has only a few thousand corporate and institutional clients) is larger. In addition, the pure number of customers can be less meaningful in a comparison between emerging market banks (which tend to have many clients, yet generate relatively small amounts of money with each of them) and banks from advanced economies (fewer customers, but greater earnings per client).
- iii. **Number of employees.** The problems here are similar to those above. Retail banking (and banking in emerging markets) is generally quite labour-intensive and often characterised by extensive branch networks with thousands of advisors and staff for administrative tasks. A boutique investment bank can have only a few hundred M&A advisors and traders, but still boast higher revenues, more assets and a larger capital base.
- iv. **Number of branches.** This is even more clearly a measure that makes sense only for banks with a similar business model and geographic orientation. Wholesale as well as private banks (i.e. asset managers) on one side and commercial/retail-heavy banks on the other side have a very different need for branches, and their branches may come across in distinct shapes. The former commonly have rather few, but quite large hubs with many employees, while the latter feature many more branches, though smaller in size. Furthermore, even if the focus is only on commercial banking, national tastes can lead to a broad range of results, depending on the prevalence and adoption of digital distribution channels or the style and size of branches that customers prefer, for example. See, for instance, the considerable differences in branch density in Spain, France and Italy compared to the Netherlands, the UK and Sweden in chart 17 below.



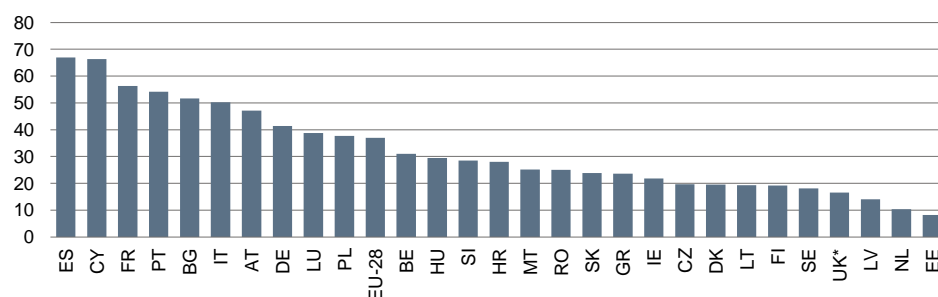
## Large or small? How to measure bank size

- v. *Total lending volume.* Again, this is a sensible indicator for assessing institutions with a very similar business model, though not for an industry-wide analysis of different types of banks. Commercial banks typically have large loan books, but more diversified universal banks with substantial capital market operations and an asset management franchise would be underestimated looking just at their lending portfolio.
- vi. *Gross value added.* Though the main focus of this paper is on individual banks' sizes, for a comparison of banking systems as a whole, especially in an international context, it may be worthwhile to consider gross value added (as a share of the economy's total) as one of the relevant measures.

### Branch density

17

Branches per 100,000 inhabitants, 2015



\* 2014

Sources: ECB, Eurostat, Deutsche Bank Research

## Summary

Overall, the following ranking (table 18) of the large European banks by the five main indicators demonstrates that – with the exception of the ranking by market cap – there is considerable stability in the ranking, taking the revenue ranking as a starting point. However, for a number of banks, there can still be considerable rank volatility. Bank H, for example, is ranked number 8 out of 23 by revenues. When ranked by total assets, it is substantially lower (rank 14), though substantially higher when ranked by risk-weighted assets (5). Similarly, bank J is number 10 by revenues. It is considerably lower when ranked by total equity (14), yet considerably higher when ranked by RWA (6). It does not need to be the case that the rank by revenues is in the middle of the others. Take bank N as an example: it is only ranked number 14 by revenues, but comes in much higher based on total assets, equity and RWA (ranks 4-10). The opposite is true for bank F, which ranks high on revenues (6), but way below that by total assets, equity and RWA (ranks 10-15).

By broadening the scope to include market cap as well, it becomes obvious that this more volatile indicator can even cause banks that otherwise rank quite consistently to rise or fall considerably. Bank D, for example, ranks 3 to 7 for all of the first four measures, but drops to 17<sup>th</sup> place based on market cap. For bank P, the situation is the reverse – it consistently holds rank 16/17 based on revenues, total assets, equity and RWA, yet jumps to 8<sup>th</sup> place measured by market cap.



## Large or small? How to measure bank size

Major European banks: Ranking in letters by... (as of 2016 / full year or end of year) **18**

Rank	Revenues	Equity	Total assets	RWA	Market cap
1	A	A	A	A	A
2	B	C	C	C	C
3	C	B	D	B	B
4	D	E	N	E	F
5	E	G	E	H	I
6	F	D	G	J	K
7	G	N	B	D	E
8	H	O	I	G	P
9	I	I	O	K	H
10	J	H	F	N	M
11	K	F	J	M	G
12	L	M	K	O	N
13	M	K	L	L	O
14	N	J	H	I	L
15	O	L	M	F	T
16	P	P	P	Q	S
17	Q	Q	Q	P	D
18	R	T	T	T	U
19	S	R	R	R	R
20	T	S	S	S	J
21	U	U	U	V	Q
22	V	W	V	W	W
23	W	V	W	U	V

Marked in colour: Deviation from the ranking by revenues by more than 2 places

Sources: Company reports, Thomson Reuters, Deutsche Bank Research

All of this shows how important it is not to rely solely on a single measure to measure bank size. In most cases, a broader picture is needed. However, if only one indicator is to be used, it should be the most comprehensive, comparable and robust one available: revenues. Beyond revenues, total equity may rank as the second-best solution and, as a third-place indicator, both total assets and market cap (see the ranking in table 19). Other measures can serve as complements and provide for a truly comprehensive analysis of bank size across countries and business models.

Best indicators for measuring bank size **19**

No. 1	Revenues
No. 2	Equity capital
No. 3 (a tie)	Total assets                      Market cap
Other indicators	RWA, net income, number of customers, employees, branches etc.

Source: Deutsche Bank Research

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