C Recent trends in euro area banks' business models and implications for banking sector stability[1]

This special feature reviews recent trends in business model characteristics, discusses their relationship with bank stability and performance, and looks at how this relationship has changed over time, comparing the period before the crisis with the crisis years and the current situation.

Key trends in banks' business activities since the financial crisis

The financial crisis and new regulatory requirements have had a profound impact on banks' activities and business models. Pre-crisis profitability levels of many banks were boosted by high leverage and/or reliance on relatively cheap wholesale funding as well as, in some cases, elevated risk-taking (such as real estate lending or securitisation exposures) in order to generate revenues. Changes in banks' behaviour and in the regulatory framework have rendered some of the (previously) most profitable business strategies less viable which, coinciding with weak macroeconomic and financial market conditions, has led to deteriorating financial performances since the crisis. Accordingly, banks' return to sustainable profitability and thus banking sector stability will depend on their ability to adapt their business mix to the new operating environment.[2] By the same token, business model challenges and profitability risk have been identified by ECB Banking Supervision as being high-level microprudential priority risks for 2016.[3]

In response to these challenges, in the past few years banks have made substantial efforts to reshape their business models. Business model adjustments have been driven by at least three factors. First, the regulatory reforms implemented in the wake of the crisis have materially affected business models by requiring bank balance sheets to contain more high-quality capital, liquid assets, bail-inable debt and more stable funding sources. More specifically, regulation has made certain business lines more costly (in particular, trading activities), leading a number of banks to scale down these types of activity. Furthermore, some of the new regulations (such as the Bank Recovery and Resolution Directive and structural bank reforms) will have a direct impact on business models, by forcing banks to adapt their operating structures to new requirements. In addition, some business model changes have been triggered by conditions laid down in the restructuring plans of banks that received state aid, which often required affected banks to focus on more traditional banking activities. Second, banks have also implemented (or are still implementing) changes to their business models to respond to market pressures from investors. As an example, some banks have exited low-margin activities to

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1 This special feature was prepared by Christoffer Kok, Csaba Móré and Monica Petrescu, with contributions from Fabio Franch, Sándor Gardó, Benjamin Klaus and Dawid Żochowski.

2 See, for example, the special feature by Kok, C., Móré, C. and Pancaro, C. entitled "Bank profitability challenges in euro area banks: the role of cyclical and structural factors", in *Financial Stability Review*, ECB, May 2015. See also Hałaj, G. and Żochowski, D., "Strategic groups and banks' performance", *Journal of Financial Theory and Practice*, Vol. 33, Issue 2, 2009, pp. 153-186; and Roengpitya, R., Tarashev, N. and Tsatsaronis, K., "Bank business models", *BIS Quarterly Review*, December 2014.

3 See *ECB Banking Supervision: SSM Priorities 2016*, ECB, January 2016.

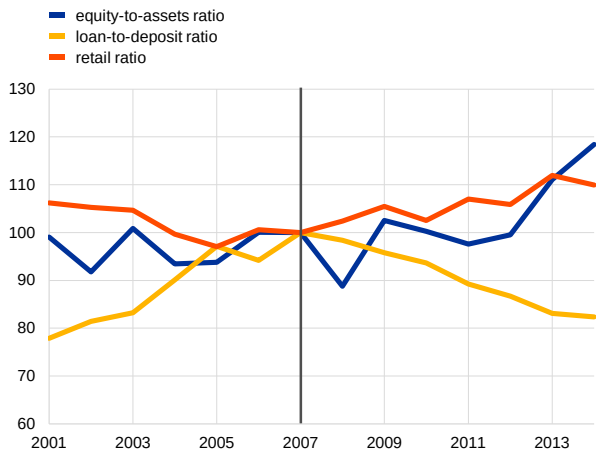
boost returns. Third, business model changes may, to some extent, also reflect banks' own initiatives on account of their altered risk-return preferences.

Chart C.1

Shift in EU banks' business models since the crisis to lower leverage, reduced reliance on wholesale funding and higher reliance on retail activities

Changes in EU significant banking groups' key business model characteristics after the crisis

(2001-14; index: 2007=100)



Sources: Bloomberg, SNL Financial and ECB calculations.
Notes: The index is based on the median value for each indicator. The retail ratio is calculated as the ratio of customer deposits plus (net) customer loans over total assets.

As a result, euro area banks have scaled back their activities in several areas that involved higher risk-taking, while strengthening core business activities. While the analysis presented in this special feature suggests that bank business models (and their impact on bank risk) tend to be rather stable, since the crisis a number of key trends shaping banks' business activities and strategies can be identified. These are outlined below.

Shift towards retail businesses from investment banking and wholesale lending activities: Looking at the evolution of business models over time, retail banking appears to have gained ground post-crisis, reversing a pre-crisis trend. This is also indicated by the gradual increase in banks' retail ratio since the crisis (see **Chart C.1**). This trend is likely to continue in the next few years. For instance, the results of the European Banking Authority's June 2015 risk survey show that retail activities are among the business lines most frequently mentioned by banks as an area they are planning to expand.[4] This trend reflects both a shift towards retail funding and a reduction in non-retail assets. In particular, several large banks have downsized certain investment banking activities as well as legacy securitisation exposures that were particularly affected by new regulatory requirements. Banks have also scaled down some wholesale lending activities (e.g. international leasing, trade finance and shipping) as well as certain lending activities in higher-risk sectors (e.g. commercial real estate).[5]

Reduced leverage and wholesale funding: Before the crisis, euro area banks were more highly leveraged, on average, than their global peers – although some of this was related to prevailing institutional settings such as mortgage balance sheet retention and differences in accounting standards (in particular, the different treatment of derivatives under IFRS and US GAAP). After the crisis, banks' adjustment to higher capital requirements has contributed to lower leverage (see **Chart C.1**). In a similar vein, new regulatory requirements and the increased cost of wholesale funding have pushed EU banks to reduce their over-reliance on wholesale funding sources, as indicated by the steady decline in the loan-to-deposit ratio.

Some retrenchment in foreign activities: As part of the shift towards core business activities, a number of EU banks have reduced their international presence by selectively withdrawing from non-core markets. This has involved the reduction of

4 See *Risk assessment of the European banking system*, European Banking Authority, June 2015.

5 See also Box 5 entitled "Deleveraging by euro area banks", in *Financial Stability Review*, ECB, May 2013.

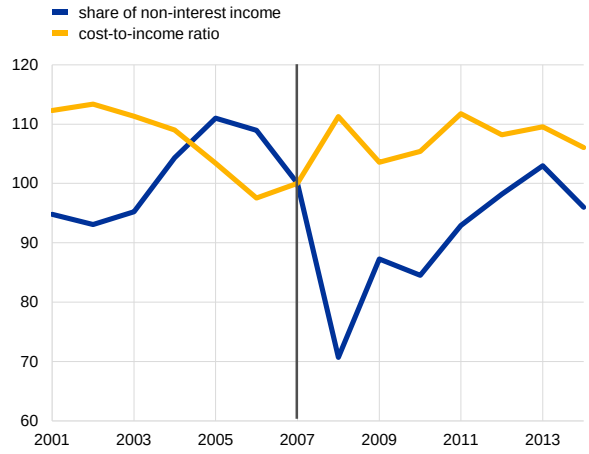
both intra-euro area exposures, in particular to countries most affected by the sovereign debt crisis, and of extra-euro area exposures, for instance those relying on foreign currency-denominated funding (e.g. in Asia and the United States). This notwithstanding, some banks have sought to selectively increase their foreign presence, possibly also reflecting limited growth opportunities in domestic markets.

Chart C.2

Income diversification gradually increased compared with crisis lows, while cost efficiency did not show any improvement in the post-crisis period

Changes in EU significant banking groups' non-interest income share and cost-to-income ratio after the crisis

(2001-14; index: 2007=100)



Sources: Bloomberg, SNL Financial and ECB calculations.
Note: The index is based on the median value for each indicator.

Income diversification and cost efficiency: Since the crisis, many EU banks may have sought to maintain or improve profitability by diversifying their income sources and better managing their cost base. Thus, following a significant drop in the share of non-interest income (largely owing to trading losses), this share gradually increased, bringing it back close to pre-crisis levels (see **Chart C.2**). In the same period, the composition of non-interest income has shifted from more volatile trading income towards fee and commission income. A number of banks have also implemented restructuring plans since the crisis, aiming to reduce operational costs. These plans involve branch network rationalisation and headcount reductions. Nevertheless, largely due to low income growth EU banks' cost-to-income ratio, on average, remains above pre-crisis levels (see **Chart C.2**). Furthermore, significant differences remain across banks and countries in terms of cost efficiency, as indicated by the wide range of cost-to-income ratios across euro area countries in 2015 (from 43% to 70%).[6]

A push towards less complex banking groups: Certain aspects of regulation intended to make the system more resilient – by reducing too-big-to-fail risk – may diminish the benefits of economies of scale as they entail additional costs for large and complex banking groups (for instance global systemically important institution (G-SII) buffers and total loss-absorbing capacity (TLAC) requirements). In addition, several large banks incurred significant costs as a consequence of past misconduct, mainly related to their investment banking operations (see Box 1). As a response to the increasing regulatory costs and other costs of complexity, some banks are endeavouring to rationalise their strategies by focusing on business activities/geographical regions in which they have sufficient economies of scale and better profit margins.

Business model implications for bank stability

In view of these trends, it is important to understand what implications business model characteristics have for banks' overall riskiness. In the context of changing regulation and large-scale restructuring after the financial crisis,

[6] Based on data for the first three quarters of 2015. Notably, the cost-to-income ratio is only one, simplistic metric and hence deductions about bank efficiency using this measure only should be interpreted with caution.

increased attention has been devoted to identifying the nature of risk attached to different bank activities. While it can be difficult to disentangle the effect of individual balance sheet features, existing empirical studies suggest that banks' business models can have substantial stability implications.

A number of factors related to business model structures can affect bank default risk. For instance, funding structure is a business model feature commonly found to have risk implications: higher reliance on deposits is associated with lower bank risk, while reliance on wholesale funding is associated with higher risk, though, importantly, the effect may differ by bank type.[7] Income structure is another potential business model determinant of bank riskiness. Some findings suggest that banks with more diversified income structures were less risky during the crisis, and that diversification raises their distance to default even though it increases the volatility of returns.[8] Non-interest income indicates diversification as it can be derived not only from payment services, but also from engagement in a variety of activities such as trading, market-making and capital market services such as underwriting or securitisation. Cost structures may also affect risk. Some studies suggest that banks that are less cost-efficient tend to have lower distance to default.[9] Findings regarding the implications of bank size for banks' probability of default are ambiguous overall. Some findings suggest that large banks are less stable[10], but others that they are more stable in the long run.[11] Corporate governance (e.g. ownership structure) may also affect bank risk. Notably, some studies find that depending on the prevalence of financial safety nets and explicit (or implicit) government guarantees, more shareholder-friendly governance structures may encourage bank risk-taking.[12] Box 2 illustrates how such bank-specific features can be used to cluster banks into different business model groupings.

Business model features related to risk are often correlated: banks more reliant on deposit funding are smaller, have less non-interest income and make traditional bank loans, while banks more reliant on wholesale funding are more involved in trading and capital market activities, are larger and have higher costs.[13]

This special feature empirically explores the relationship between business models and default risk for euro area banks. To empirically assess the impact of

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7 See, for example, Altunbas, Y., Manganelli, S. and Marques-Ibanez, D., "Bank risk during the financial crisis: do business models matter?", *Working Paper Series*, No 1394, ECB, 2011; Blundell-Wignall, A., Atkinson, P. and Roulet, C., "Bank business models and the Basel system", *OECD Journal: Financial Market Trends*, Vol. 2013(2), 2014, pp. 43-68; and Prabha, A. P. and Wihlborg, C., "Implicit guarantees, business models and banks' risk-taking through the crisis: Global and European perspectives", *Journal of Economics and Business*, Vol. 76, 2014, pp. 10-38.

8 See, for example, Altunbas, Y., Manganelli, S. and Marques-Ibanez, D. (op. cit.); and Köhler, M., "Which banks are more risky? The impact of business models on bank stability", *Journal of Financial Stability*, Vol. 16, 2015, pp. 195-212.

9 See Prabha, A. P. and Wihlborg, C., op. cit.

10 See Köhler, M., op. cit.; and Altunbas, Y., Manganelli, S. and Marques-Ibanez, D., op. cit.

11 See Mergaerts, F. and Vander Vennet, R., "Business models and their impact on bank performance: a long-term perspective", *Working Papers*, Faculty of Economics and Business Administration, Ghent University, No 15/908, 2015.

12 For a review, see Laeven, L., "Corporate governance: What's special about banks?", *Annual Review of Financial Economics*, Vol. 5, 2013, pp. 63-92.

13 See Ayadi, R. and De Groen, W. P., "Banking Business Models Monitor 2015: Europe", 2015; and Roengpitya, R., Tarashev, N. A. and Tsatsaronis, K., op. cit.

banks' business model characteristics on bank stability, a dynamic panel model for a large set of euro area banks is employed. The analysis covers bank-level data for 143 euro area banking groups over the period 1995-2014.[14] The linear dynamic panel regression model is given by:

$$y_{it} = \alpha y_{it-1} + \beta \boldsymbol{X}_t + u_i + \varepsilon_{it} \qquad (1)$$

where the dependent variable y_{it} is a measure of bank risk for bank i in period t, y_{it-1} is the lagged dependent variable, and $\boldsymbol{X}_t$ is a (1 × m) vector of explanatory variables including bank-specific characteristics, macroeconomic and financial conditions, and structural market features. The empirical approach is based on system generalised method of moments (GMM) estimators to properly account for endogeneity.[15]

In this analysis, the employed measure of bank risk is the so-called "z-score", which captures the bank's distance to default (i.e. a lower value indicates higher risk). In this analysis, an accounting-based z-score is used.[16] The z-score is defined here as the sum of the return on assets and the equity-to-assets ratio over the standard deviation of return on assets (computed using a five-year moving window). In the base case specification (model 1), the z-score[17] is regressed on its own lagged variable and a number of bank-specific business model characteristics, including the retail ratio, an efficiency measure (cost-to-income ratio), a measure of income diversification (non-interest income over total revenue), a leverage ratio (equity-to-assets ratio) and size (the logarithm of total assets).[18]

The results of the base case regression are shown in column (1) of Table C.1. It is observed that the lagged dependent variable is a positive and significant regressor, which suggests persistence of bank riskiness over time. Over the full sample period, larger banks and more retail-oriented banks (measured by the retail ratio) are associated with lower default risk. Likewise, banks with more diversified income sources and more cost-efficient banks are generally less risky. As would be expected, better-capitalised banks have lower default risk.[19]

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14 The banking data are taken from Bankscope, Bloomberg and SNL Financial.

15 The inclusion of a lagged dependent variable in a panel framework might yield biased and inconsistent estimates owing to the correlation between the lagged dependent variables and the error terms (so-called Nickell bias). The GMM estimator is employed to address this issue and to tackle the possible endogeneity of the bank-specific explanatory variables owing to their possible correlation with the error term. Hence, equation (1) is estimated using a system GMM estimator that combines the regression in differences with the regression in levels. In this context, the explanatory variables are instrumented by using "internal" instruments.

16 Alternatively, a z-score based on market prices could be used, but owing to superior data availability for this analysis the accounting-based z-score was the preferred measure.

17 Owing to the fact that the distribution of z-scores is highly skewed, the natural logarithm of the measure is used in the empirical analysis; see, for example, Laeven, L. and Levine, R., "Bank governance, regulation and risk taking", *Journal of Financial Economics*, Vol. 93, 2009, pp. 259-275; and Köhler, M., op. cit.

18 In addition, lagged loan growth (bank-specific) and the Herfindahl-Hirschmann concentration index (HHI) for national banking sectors are included as control variables, alongside three country-specific macroeconomic variables, namely real GDP growth, inflation and the short-term interest rate.

19 As regards variables not strictly related to business model characteristics, it is notable that stronger real GDP growth and lower short-term interest rates tend to be associated with lower bank default risk.

Table C.1

Regression results – determinants of euro area banks' distance to default, 2000-14

		(1)	(2)		(3)	
	Lagged z-score	0.669*** (0.132)		0.623*** (0.0933)		0.601*** (0.097)
Bank-specific factors	Bank size	0.495** (0.228)	Pre-crisis	0.268** (0.117)		
			Crisis/post-crisis	0.147 (0.107)		
	Retail ratio	0.239 (0.584)	Pre-crisis	-0.283 (0.581)	G-SIBs	1.343** (0.575)
			Crisis/post-crisis	0.425 (0.499)	Other banks	-0.159 (0.458)
	Income diversification	0.040** (0.017)	Pre-crisis	-2.528*** (0.674)	G-SIBs	-1.772*** (0.505)
			Crisis/post-crisis	0.042*** (0.013)	Other banks	0.051*** (0.013)
	Cost efficiency	-0.143* (0.080)	Pre-crisis	-1.420** (0.621)	G-SIBs	-0.899*** (0.278)
			Crisis/post-crisis	-0.113* (0.063)	Other banks	-0.094** (0.043)
	Short-term borrowing over total assets	0.985 (0.709)	Pre-crisis	0.686 (0.481)	G-SIBs	2.464*** (0.788)
			Crisis/post-crisis	0.431 (0.535)	Other banks	-0.161 (0.607)
	Leverage (equity-to-asset ratio)	0.276*** (0.052)		0.201*** (0.051)		0.223*** (0.051)
	Loan growth (lagged)	-0.008 (0.042)		-0.009 (0.039)		-0.038 (0.025)
Structural factors	Herfindahl-Hirschmann concentration index	-2.000 (3.745)		-3.614 (3.326)		-1.191 (3.042)
Macroeconomic factors	Real GDP growth (%)	0.085*** (0.028)		0.022* (0.011)		0.055*** (0.019)
	Inflation	0.008 (0.053)		-0.066*** (0.022)		-0.042 (0.043)
	Short-term interest rate	-2.929** (1.297)		-0.019 (0.027)		0.023 (0.092)
	chi2	3295		341.0		7681
	Hansen p-value	0.094		0.028		0.148
	AR(2) p-value	0.704		0.382		0.568
	Number of observations	1007		1007		1007

Source: ECB.
Notes: Heteroskedasticity and autocorrelation robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1. The Hansen test of over-identifying restrictions confirms that the (internal) instruments are valid, and the Arellano-Bond test rejects significant second-order serial correlation in the error term. The Wald test indicates that all the estimated coefficients are jointly significant.

Bank default risk has been subject to large swings during the last two decades. As the sample period (2000-14) was characterised by highly differentiated macro-financial environments, the regression results shown in column (2) distinguish between a pre-crisis period (2000-2007) and a crisis/post-crisis period (2008-14). For the pre-crisis period, two notable differences relative to the base case specification should be highlighted. First, income diversification in this period tended to be associated with higher default risk. With the emergence of the financial crisis, however, more diversified banks performed better and displayed lower default risk levels, as they were less dependent on single business lines. Second, the effect of higher cost efficiency on reducing risk was stronger prior to the crisis. Interestingly, in

the crisis/post-crisis period, bank size in itself was no longer an important determinant of bank default risk, which could reflect that being a large bank was not necessarily an effective shield against default risk during the crisis.

These findings notwithstanding, specific business model characteristics might be more or less important depending on the size and complexity of the bank. Thus, in column (3) of Table C.1 a distinction is made between global systemically important financial institutions (G-SIBs) and smaller, less complex banks. While leverage contributes to bank default risk to a broadly similar degree, cost efficiency is a more important factor for G-SIBs than for other banks. This suggests that an inefficient business model can be more detrimental to larger and more complex banking groups. Furthermore, it is found that income diversification tends to lead to higher default risk for G-SIBs, while for other banks it tends to reduce overall riskiness. Again, this could indicate that diversification is beneficial up to a point, but for a certain level of banking group complexity, its effect on bank risk reverses. Lastly, a higher retail ratio reduces risk for G-SIBs, indicating that shifting to retail activity can have stability benefits for complex banking groups.

Future prospects: challenges and obstacles

Looking ahead, banks' business strategy (activity mix) and risk-taking will be shaped by their adaptation to a diverse set of external factors. These challenges include new regulatory requirements, the low interest rate environment and strengthening competition from non-banks engaging in bank-like activities. In recent years, these diverse factors have made it difficult for banks to continue operating efficiently with their existing business models.

There is no "one-size-fits-all" strategy for business model adjustment. While some of the post-crisis trends in banks' business model structures have no doubt contributed to making banks safer and more stable (i.e. lower leverage, more stable funding, lower complexity), the results presented in this special feature highlight that, in the current context, there is not necessarily one specific business model that is distinctly superior to other models in terms of risk and performance. The preferred strategy will likely depend on the starting point of the individual bank and on its operating environment. Adjusting business models is a complicated and costly process, especially for more complex institutions, and each banking group will need to build on existing strengths and identify weaknesses that are likely to be exacerbated in the future unless concerted actions are taken to address them by bank management.

Accordingly, some banks will be incentivised to focus on the retail segment and fee-generating activities. As reflected in the above-mentioned survey by the European Banking Authority, many banks plan to revitalise their retail banking operations. Moreover, given the (cyclical) profitability challenges arising from the low interest rate environment, banks will be incentivised to diversify revenue sources, in particular by increasing the share of fee and commission income. An international comparison suggests that euro area banks have significant room to expand this type

of income. However, such a shift is likely to be gradual and is also dependent on the rate of development of capital markets as well as on competition both within and from outside the banking sector (e.g. from fintech companies) which has the potential to limit the growth of fee income.[20]

Another avenue to address profitability pressures is to further increase cost efficiency. This can be done in various ways, such as by changing operating models, improving multichannel distribution capacities (e.g. via higher reliance on digital platforms) and improving IT systems. Such measures may, however, entail additional costs in the short term, with efficiency gains likely to be realised only in the longer term.

Cyclical profitability challenges are in some cases exacerbated by structural factors, such as overcapacity in certain banking markets. Excess capacity and fragmentation along national lines are to some extent hampering the profitability and performance of some euro area banking sectors.[21] The banking union, including single supervision and resolution mechanisms, in principle provides ideal conditions for banks to capitalise on new cross-border merger and acquisition opportunities. However, progress in both domestic and, in particular, cross-border bank consolidation remains limited to date. In fact, EU banks' merger and acquisition activity has significantly slowed since 2007, in terms of both the number and the value of transactions.[22] More efforts could be initiated to foster further cross-border consolidation within the euro area. Ultimately, the euro area economy needs banks that are large and efficient enough to operate and diversify risks on a cross-border basis within a European single market, but small enough to be resolved with the resources of the Single Resolution Fund. This would help reap the full benefits of the banking union and improve the trade-off between financial stability and economic efficiency.[23]

From a financial stability perspective, an important challenge is ensuring that the adaptation of banks' business models to the new operating environment is not accompanied by excessive risk-taking. Given the profitability challenges arising from the low nominal growth and low interest rate environment, banks might be tempted to take greater risks, for instance by increasing the share of riskier (lower-rated) exposures, taking on higher duration risk in their bond portfolios or loosening credit standards to increase volumes. This highlights the need for the close monitoring of interactions between business model changes, bank risk-taking and systemic risk.

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20 For recent reviews of the challenge that fintech poses to traditional banking, see, for example, "Modular Financial Services: The New Shape of the Industry", Oliver Wyman, January 2016; "Digital Disruption: How FinTech is Forcing Banking to a Tipping Point", Citi GPS, March 2016; and "Technological Innovation and the Dutch Financial Sector: Opportunities and Risks for Financial Institutions, New Market Participants and Supervision", De Nederlandsche Bank, January 2016.

21 In fact, there is some empirical evidence that euro area banks operating in less-concentrated markets tended to be less profitable in the period between 1991 and 2013 (see Kok, C., Móré, C. and Pancaro, C., op. cit.).

22 See *Report on financial structures*, ECB, October 2015.

23 See also the speech given by Benoît Cœuré entitled "From challenges to opportunities: rebooting the European financial sector" at Finance Day 2016, Frankfurt am Main, 2 March 2016.

Box 1

Global banks' legal costs: trends, drivers and implications[24]

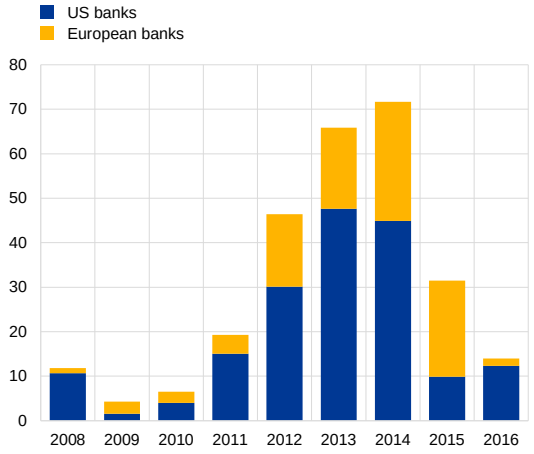
Banks across the globe have been confronted with rising legal risks since the onset of the global financial crisis. Despite the large number of concluded cases and court settlements to date, the running and expected costs of past misconduct remain substantial (not only in financial terms, but also reputationally), thereby weighing on bank profitability via both increased provisioning needs for expected costs as well as higher operating expenses in conjunction with the need to enhance internal controls and compliance, handle customer complaints and manage legal proceedings. In addition, legal costs may hurt bank capitalisation either directly through unexpected and/or under-provisioned charges, or indirectly via banks' impaired internal capital-generating capacity on the back of lower profits, while they may also hamper banks' intermediation capacity and impede the provision of new credit to the economy.

Chart A

Global banks' legal costs have increased markedly since 2008

Legal costs in the United States and Europe

(2008 – May 2016; USD billions)



Source: Authors' compilation based on publicly available information from regulatory, bank and law firm notices.

Legal costs have been material for the largest global banks, in particular for US institutions. A sample of 26 global banks[25] headquartered in the United States, the United Kingdom, Switzerland and the euro area suggests that cumulative legal costs (including damages, fines, settlements and litigation costs)[26] have reached almost USD 275 billion since 2008.[27] From a backward-looking perspective, aggregate developments to date suggest a strong pick-up in legal costs in the period 2009-14, with more than half of these costs (around USD 140 billion) incurred in 2013-14 (see **Chart A**). This development was predominantly attributable to US banks which were confronted with the legal costs earlier and in much larger volumes than their European counterparts. Hence, looking at legal costs by bank origin, US banks account for almost two-thirds of the total since 2008 (see **Chart B**). European banks recorded more legal costs than their US peers for the first time in 2015, albeit amid a marked drop in overall legal costs for global banks. Around 57.5% of the remaining USD 95 billion of legal

[24] Prepared by Sándor Gardó and Benjamin Klaus.

[25] The sample covers the 22 global systemically important banks (G-SIBs) and four non-G-SIBs. The US sample includes Bank of America, BNY Mellon, Citigroup, Goldman Sachs, JPMorgan, Morgan Stanley, State Street and Wells Fargo, while the European sample comprises two Swiss (Credit Suisse and UBS), five UK (Barclays, HSBC, Lloyds Banking Group, Royal Bank of Scotland and Standard Chartered) and eleven euro area (BNP Paribas, Commerzbank, Crédit Agricole, Deutsche Bank, ING, Intesa Sanpaolo, Groupe BPCE, Rabobank, Santander, Société Générale and UniCredit) banks.

[26] The analysis relies on data based on regulatory, bank and law firm notices, as well as data obtained from banks' annual reports. When comparing the findings from the two datasets, a potential overlap may arise as agreed and announced legal costs may not yet have been paid for, while they have already been recognised as provisions in banks' books.

[27] This estimate is, however, surrounded by a large degree of uncertainty and might be rather conservative given the lack of sufficiently granular, publicly accessible information as well as often undisclosed settlement agreements (e.g. in respect of civil claims).

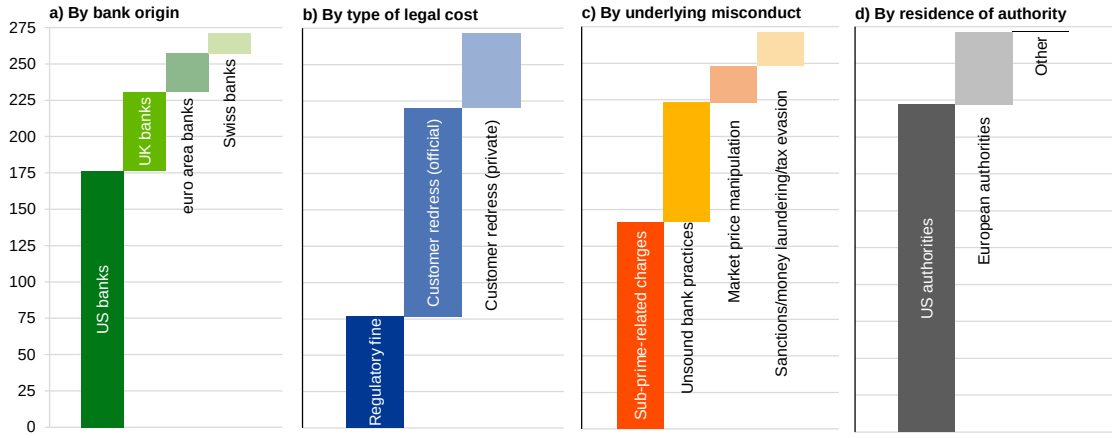
costs for European banks is attributable to UK institutions, 27.5% to euro area banks and 15% to Swiss banks.

Chart B

A large part of legal costs relates to settlements of US banks with US authorities in the form of customer redress for sub-prime-related misconduct

Legal costs of global banks by bank origin, type of legal cost, underlying misconduct and residence of the involved authority

(2008 – May 2016; USD billions)



Source: Authors' compilation based on publicly available information from regulatory, bank and law firm notices.
Notes: Regulatory fines comprise all penalties levied by national regulators on banks. Official customer redress comprises legal costs related to the compensation of customers ordered by public authorities. Private customer redress indicates bilateral and class action lawsuit settlements with private counterparties, i.e. individual/institutional investors. Sub-prime-related incidents cover legal costs related to the issuance, structuring, marketing and sale of residential mortgage-backed securities and collateralised debt obligations, as well as to the underwriting, origination and servicing of mortgage loans. Unsound bank practices include, inter alia, the mis-selling of payment protection insurance, disclosure, reporting and compliance failures, as well as investment advice failings. Market price manipulation includes legal costs for fraudulent behaviour in interest rate, foreign exchange, swap, gold and silver price fixing. The category sanctions/money laundering/tax evasion comprises legal costs related to the failure to comply with international sanctions, anti-money laundering failures and banks' involvement in or assistance of tax evasion.

In terms of the type of legal costs, customer redress arrangements agreed with regulators and regulatory fines cover the bulk of legal costs. 53% of the total relates to the former, and 28% to the latter. 19% relates to settlements with private individuals and institutional counterparties, in particular in class action lawsuits (see **Chart B**). US banks have been more exposed to private settlements, while European banks have mostly faced regulatory fines.

As regards the underlying misconduct, US banks' legal costs are mainly sub-prime-related, while European banks mostly face legal costs for unsound bank practices and market manipulation. Sub-prime-related legal costs mainly penalise misconduct relating to the issuance, structuring, marketing and sale of residential mortgage-backed securities and the servicing of mortgage loans. Legal costs for unsound bank practices refer, in particular, to the mis-selling of payment protection insurance (PPI) in the United Kingdom, while market price manipulation costs mainly relate to LIBOR/EURIBOR fixing. Failure to comply with international sanctions and anti-money laundering requirements, and involvement in or assistance of tax evasion captures the remaining portion of legal costs, which is relevant in particular for euro area banks (see **Chart B**). Overall, the differences in the level of costs faced by banks can largely be explained by banks' differing involvement in various business activities (retail/universal banking vs. wholesale/investment banking) as well as country specificities (e.g. the importance of sub-prime lending in the United States prior to the crisis).

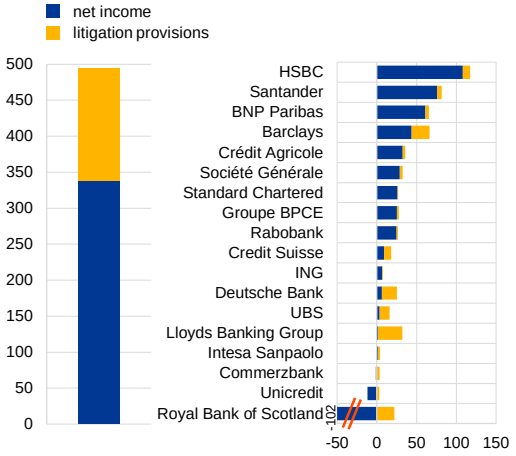
Concerning the residence of the authority involved, the majority of settlements was concluded with US authorities. Federal regulators, as well as various oversight bodies, states and courts in the United States have levied over 80% of the total costs (see **Chart B**). The rest is mostly attributable to UK authorities, in particular for costs relating to payment protection insurance.

Chart C

Heightened provisions for legal costs continue to weigh on bank profitability

European banks' net income and flow of provisions for legal costs

(2008-15; cumulative flows, USD billions)



Sources: SNL Financial and banks' annual reports.
Note: Net income after taxes, minority interests, and extraordinary and other after-tax items.

Legal costs had a substantial impact on European banks' profits. Since the onset of the global financial crisis, European banks have set aside USD 160 billion in provisions to cover expected legal costs. This amount represents almost half of European banks' net income earned between 2008 and 2015 (see **Chart C**). To put it differently, banks' net income could have been one-third higher over the same period were it not for these legal costs, which could have been used to strengthen capital buffers in the form of retained earnings. The stock of European banks' provisions for legal costs has tended to increase relative to banks' equity capital, reaching some 3.5% of their total equity as at year-end 2015. Heterogeneity across individual institutions is high though, with the stock of provisions for legal costs ranging from 0.5% to almost 12% of banks' equity capital.

Despite the large number of concluded cases and settlements to date, the expected costs of past misconduct remain substantial. More granular data on the stock of provisions for legal costs obtained from the annual reports of IFRS-reporting European banks provide a rough measure of expected future legal costs, though these estimates are surrounded by a large degree of uncertainty. The figures indicate that as at the end of 2015 European banks expected to face additional legal costs amounting to around USD 50 billion. Almost half of this amount has been put aside by UK institutions, in particular for settling costs arising out of PPI-related misconduct. The underlying trend in the stock of provisions suggests that the peak may not yet have been reached for many UK and euro area banks. This may suggest further pressures on banks' profitability and internal capital-accumulation capacity going forward.

Rising legal costs may foster banks' efforts to adjust their business models. The large number of legal cases still pending and uncertainties surrounding the magnitude and timing of forthcoming settlements may also lead to changes in banks' business models as banks downsize or fully withdraw from business lines which were at the heart of past misconduct and are currently the subject of regulatory scrutiny.[28]

[28] For further details, see the Report on misconduct risk in the banking sector, ESRB, June 2015.

Box 2

A statistical approach to classify euro area banks according to business model characteristics[29]

This box presents a statistical approach to classify euro area significant institutions according to business model characteristics. There are various ways in which to identify business models and different classifications may serve different purposes, also at the ECB. The bank business model classification presented here should only be seen as an illustrative example of how European banks can be grouped according to selected characteristics and of how these groupings have changed over time. Importantly, it is not used for microprudential purposes by the ECB.

This multifaceted nature of banks' business models poses challenges for the classification of banks based on their business activities. Banks undertake a variety of activities, ranging from more traditional intermediation functions, such as granting loans and taking deposits, to more capital market-oriented functions such as market-making, trading and advisory services. This diversity is reflected in the heterogeneous balance sheet structures with which European banks operate, both in terms of asset decomposition and in terms of funding sources.

Banks' business models can be classified using different methods. One approach often applied is to group banks according to certain predefined criteria (e.g. a specific share of retail products on a bank's balance sheet).[30] Other, more data-driven approaches use statistical clustering techniques. It is important to emphasize that while classifying business models using purely statistical methods (as in this box) can be useful in providing an objective information set, one should be careful in drawing firm conclusions as results are highly contingent on the quality of the underlying data. Moreover, for practical (prudential) usage such business model classifications should also incorporate relevant qualitative information and expert judgement.

The clustering approach is a statistical method aimed at identifying the proximity of specific data points using a metric of distance. In other words, banks are grouped according to the similarities in the input data and, given that past strategic decisions by bank management are inevitably reflected in the structure of banks' assets and liabilities, the resulting clusters can be associated with different business models. The smaller the differences between the characteristics of banks' balance sheets, the higher the likelihood that the banks will be classified into the same cluster. More specifically, the approach uses average and least square differences between the banks' characteristics variables. Drawing upon existing studies[31], business models were investigated using six variables: risk-weighted assets (or size), net fee and commission income as a share of operating income, customer funding as a share of total liabilities, interbank funding as a share of total liabilities, trading assets as a share of total assets and domestic exposure as a share

29 Prepared by Fabio Franch and Dawid Żochowski.

30 See, for instance, Ayadi, R. and de Groen, W. P., op. cit.

31 See, for example, Ayadi, R., Arbak, E. and de Groen, W. P., "Business Models in European Banking: A pre-and post-crisis screening", Centre for European Policy Studies (CEPS), Brussels, 2011; Altunbas, Y., Manganelli, S. and Marques Ibañez, D., op. cit.; Ferstl, R. and Seres, D., "Clustering Austrian Banks' Business Models and Peer Groups in the European Banking Sector", *Financial Stability Report*, 24, Oesterreichische Nationalbank, 2012, pp. 79-95; and Lucas, A., Schaumburg, J. and Schwaab, B., "Bank business models at zero interest rates", mimeo, April 2016.

of total assets. The analysis covers 113 significant institutions that are supervised by the ECB, using data for 2007 and 2014.[32]

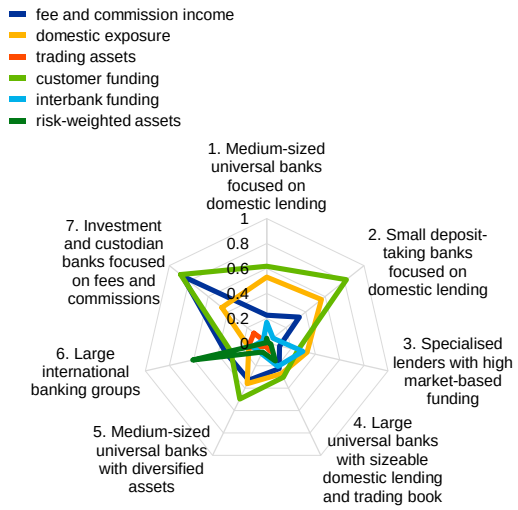
The clustering analysis suggests that key determinants for the grouping of banks into different business models primarily relate to bank size, non-domestic exposures and funding profiles (see **Chart A**). Looking at the balance sheet characteristics of clusters of banks in 2014, the following business models can be identified: (1) medium-sized universal banks focused on domestic lending; (2) small deposit-takers focused on domestic lending; (3) local or specialised lenders with a significant share of market funding; (4) large universal banks funded by deposits with sizeable domestic exposure as well as sizeable trading assets; (5) medium-sized universal banks with diversified assets largely relying on deposit funding; (6) large international banking groups with internationally diversified assets, a substantial share of market funding and sizeable trading assets; and (7) investment and custodian banks focused on fee and commission income.

Chart A

Business model classification driven by size, internationalisation and funding profile

Balance sheet structure of different business models

(2014; ratios and percentage shares)



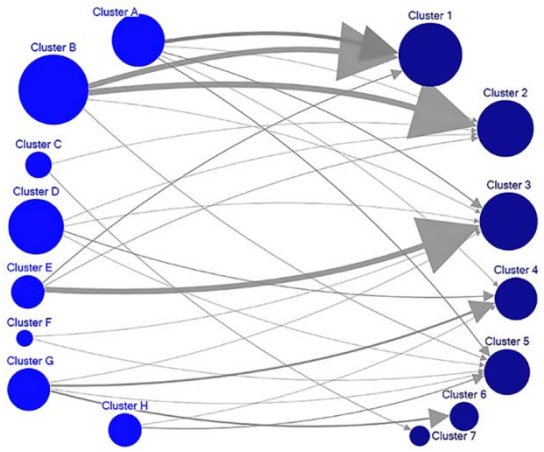
Sources: Bankscope, Bloomberg, SNL Financial and ECB calculations.
Note: The chart shows the median of variables used for the identification of clusters for each of the seven clusters identified for the year 2014.

Chart B

Banks have mostly remained within the same business model clusters over time

Evolution of business model clusters between 2007 and 2014

(left-hand side: 2007; right-hand side: 2014; percentage of total equity)



Sources: Bankscope, Bloomberg, SNL Financial and ECB calculations.
Notes: The bubble size represents the number of banks in the bank cluster. The thickness of the arrows represents the number of banks that remain in the same cluster or move across clusters.

According to the chosen clustering approach, eight business model clusters are identified for 2007 and seven clusters are identified for 2014. Moreover, the classification to clusters seems to be relatively stable over time (see **Chart B**). While some banks migrated across clusters between 2007 and 2014, most of them remained in the same group. This shows that banking business models tend to be relatively "sticky" and cannot be seamlessly adapted to a changing environment or in anticipation of stress. This may have particular implications for financial stability, since some groups of banks may be more prone to systemic stress than others. This, in turn, could lead to a concentration of systemic risk in some clusters of banks.

[32] Data from Bankscope, Bloomberg and SNL Financial were used to produce a more consistent and complete picture of euro area banks' balance sheet in the pre- and post-crisis era.