TOWARDS MORE CONSISTENT, ALBEIT DIVERSE, RISK-WEIGHTED ASSETS ACROSS BANKS

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Following the financial crisis, the new regulatory framework will increase the level and quality of capital ratios for the banking system. However, in order to achieve an accurate risk measurement that allows for proper comparability of these capital ratios, the consistency of risk-weighted assets (RWA) across institutions and geographies acquires more relevance than ever. Advances on this issue have been relatively scarce until now, whereas empirical evidence points to significant divergences in RWA density across banks, not only between the US and Europe but also within Europe. In this article, we review the main determinants behind these differences, concluding that while risk profile and risk management are justifiable factors behind observed divergences, a necessary quantification of their precise impact is pending and complicated. Other elements are easier to address and could contribute to attaining more consistency in RWA in a relatively short period of time. In particular, two possible courses of action are considered. On the one hand, more comparable disclosure in Pillar 3 would allow for effective market discipline. On the other hand, more international coordination among supervisors, mainly in the validation and approval processes of internal risk-based models, would be beneficial.

1 Introduction

The regulatory reform undertaken by the Basel Committee on Banking Supervision following the financial crisis has significantly increased the level and quality of capital requirements for the financial system.[1] However, the bulk of the reform has focused on capital, with minor changes in the denominator of the ratios, i.e., the risk-weighted assets (RWA). The experience prior to the crisis shows that competition for capital across banks was very aggressive and entailed different areas, with RWA not being an exception. The downward trend in RWA in percentage of total assets during the last decade, barely adjusted during the crisis, combined with persistent discrepancies across banks, points to the need for addressing the issue of RWA consistency before the new regulation for capital comes into force. Going forward, in a framework of tougher requirements, an accurate comparability of capital ratios becomes more relevant than ever. In addition, more aggressive competition for capital must not be discarded. Against this backdrop, the aim of all economic agents should be to preserve a fair risk valuation through a consistent framework for RWA. This framework could pursue two objectives. On the one hand, it should preserve the differences in risk profile and risk management across banks, creating incentives for more prudent risk-taking. On the other hand, undue divergences across entities and jurisdictions should be minimized.

The debate on the consistency of RWA across banks and geographies has been very subdued until very recently. However, several factors have underscored this matter as a priority.

First, the expected transition of the US financial system towards Basel III[2] has emphasized the substantial divergences in the ratio of RWA versus total assets between the US and Europe. Even though accounting rules and different business models could play a major role in explaining these divergences, the lack of detailed and comprehensive research on this issue has cast doubts on which other factors also determine part of these discrepancies. This issue was particularly conveyed by James Dimon, JP Morgan's CEO and Chairman: "RWA has to be done fairly around the globe … [risk weighting is] 70% of our assets…

1 See BCBS (2010).
2 The US financial system has firstly to adopt Basel II. Nonetheless, even after this implementation, expected for coming months, significant differences with Europe will remain.

adjusting for accounting differences, in Europe it is like half of that. So some banks have far more aggressive risk-weighted asset calculators than we do. That has got to be done fairly too." In order to avoid unnecessary doubts regarding this issue, some work has to be done to disentangle the factors behind these discrepancies.

Second, in recent months, an increase in domestic capital requirements beyond the forthcoming minimum required by Basel III has been carried out or considered in some countries due to different reasons ranging from crisis management to reinforcement of solvency for large institutions. This is the case of several European countries, among them Switzerland, Sweden, Spain and the UK. In this framework, the consistency of RWA across jurisdictions acquires more relevance than ever. There is a likelihood that, after adjusting by risk profiles, a very high capital ratio in one country will not be as stringent as a supposedly more moderate one in another, for example. Moreover, the upcoming capital add-ons, such as that for systemic risk, calculated in terms of RWA, will add pressure for greater comparability of RWA across jurisdictions.

Third, the use of internal-risk based (IRB) models for some banks and supervisors over the last three years, although it is too soon to properly assess their implementation, has allowed some global banks to be aware of significant divergences in risk treatment of the same banking products and business lines in different countries. In this vein, doubts mount over the consistency of validation and approval processes of these models across countries.

In more general terms, the discussion on the consistency of RWA is frequently linked to the use of IRB models. However, at present, with a lack of sufficient evidence on this issue, these models should not be converted into the scapegoat of existing shortcomings in the assessment of RWA. This is especially true if we take into account that both features, the downward trend in RWA density and the persistent discrepancies across banks, occurred prior to the implementation of IRB models.

Finally, the financial crisis underscores the need for proper risk valuation. Higher capital surcharges will probably not be enough to avoid financial crises in the future. However, incentives for prudent risk management will play a major role in safeguarding financial stability. A more consistent framework for RWA, avoiding undue distortions in their assessment, will contribute to this target.

Therefore, whereas there are several reasons that justify a growing focus on RWA, research on this issue is still very limited. Apart from some work conducted by regulators and supervisors, and empirical evidence provided mainly by financial analysts, there is no comprehensive study of RWA determinants. In this article, we focus on the analysis of RWA, in both time and cross-sectional dimensions, in order to obtain a better understanding of their main determinants. In our view, three main determinants of RWA can be identified: risk profile (including business model, macro and institutional factors), risk management and supervisory practices. Arguably, divergences in RWA across banks and jurisdictions are justifiable because of different business models, institutional differences, risk management and recovery practices, accounting practices and, finally, modeling choices in the case of IRB models. To what extent current divergences are too broad and whether or not there are additional factors in these discrepancies are the main issues in assessing the consistency of RWA.

Our main conclusion is that although some divergences are overly justified, there is room for improvement in some factors in order to create a level playing-field. In this sense, the RWA working group recently launched by the Standards Implementation Group (SIG) in the Basel

Committee on Banking Supervision is undoubtedly a step forward in the needed consistency in RWA. Having acknowledged that, it should be recognized that the issue is so complex that short-term and long-term objectives for this working group should probably be considered. In this sense, a feasible and beneficial target could be addressing firstly the existing divergences in supervisory practices across countries, and, in particular, those regarding the validation and approval processes of IRB models. With this aim, experience accumulated over the last three years should be worthwhile. In this sense, knowledge gathered in dealing with IRB models offers a unique opportunity for understanding risk and achieving greater consistency for RWA. Harmonization of Pillar 3 could also be helpful in order to enhance market discipline.

The structure of this paper is the following: In Section 2, we analyze the empirical evidence on the evolution and current developments of RWA. In Section 3, the main determinants of RWA are addressed. Section 4 offers some suggestions for greater consistency in RWA. Finally, Section 5 concludes.

2 Empirical evidence regarding RWA

Accurate risk valuation requires all the different business lines and products within a bank to be qualified in terms of their level of riskiness. If properly done, two important consequences could be obtained: the level of capital fitting better with the risk profile of different institutions and each bank possessing a good tool for achieving more prudent risk management, thereby improving practices in risk appetite and monitoring. Enhancing risk sensitivity was primarily the aim of the reform undertaken by Basel II. This was a significant advance compared to Basel I, in which capital requirements for each credit exposure was based on predetermined risk weights. Broadly considered, it is expected that the ratio of RWA over total assets, a standardized measure of the density of RWA within an institution, will evolve over time and across institutions reflecting different risk profiles and mutating macroeconomic conditions. This is especially true under the Basel II agreement. Against this background, RWA could be analyzed in two dimensions: time and cross-sectional. That analysis is the purpose of this section.

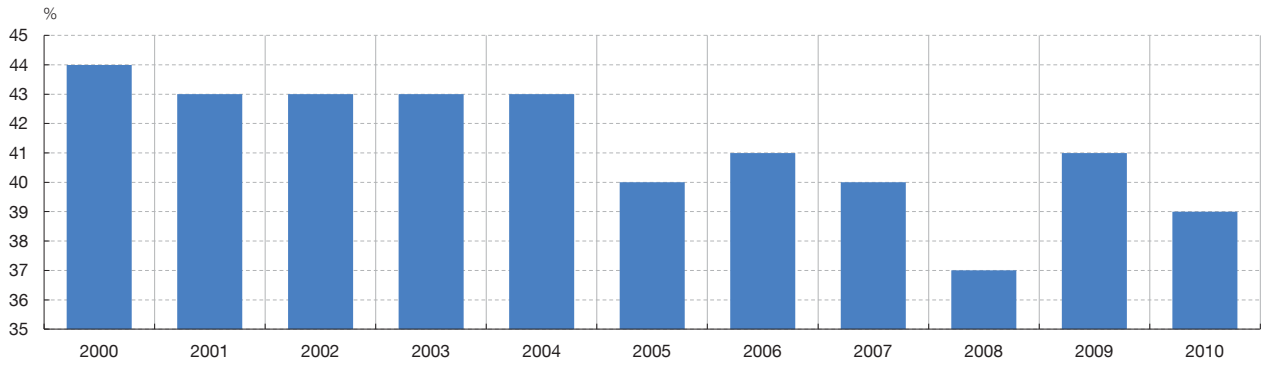
2.1 TIME DIMENSION

Starting with the time dimension, RWA density has shown a downward trend over the years,[3] barely modified by the unfolding of the financial crisis in 2007. As shown in Chart 1, from the beginning of 2000 to 2010, a weighted average of RWA for a broad sample of US and European banks diminished from 44% to 39%. This trend was widespread in all jurisdictions. For EMU banks, RWA density diminished from 40 to 33%, for US banks the reduction was from 74% to 58%, British banks showed a reduction from 51% to 36%, and Swiss banks changed from 25% to 18%. In Chart 2 a wider sample of banks is considered, including institutions from Canada, Australia, Japan and continental Europe. The evolution is quite similar in all the geographies considered.

This downward trend is most likely related to changes in business models, deviating activities from more risk-weighted products and business lines towards less risk-weighted activities, regardless of the regulatory framework. In general, a reduction in loan activity over total assets has taken place during the last decade in a context of greater competition and search for yield that leads to higher diversification of activities on bank balance-sheets. Due to the fact that credit risk accounts for the bulk of RWA requirements, the reduction in total density of RWA over total assets could be partly explained by this reduction in loan activity share. Significantly, the introduction of Basel II in 2008 does not suppose a change in the evolution of RWA. Whereas a reduction in RWA of three percentage points is observed, this change is quite similar in magnitude, for example, to that occurred

3 The evidence shown in this section is obtained from financial statements of different banks, according to their reports in different moments of time and under different regulatory regimes: for some countries such as the US, Basel I is used for the whole period, whereas European banks moved from Basel I to Basel II in 2008.

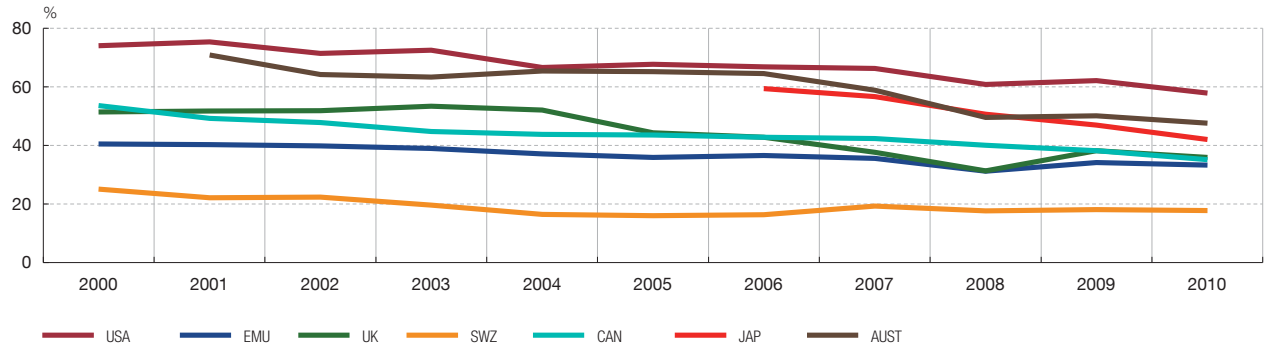
RWA IN PERCENTAGE OF TOTAL ASSETS FOR US AND EUROPEAN BANKS (a) CHART 1



SOURCE: Financial reports by individual banks.

a Weighted average of the following banks: for Germany (GR), Commerzbank and Deutsche Bank; for the US (USA), Wells Fargo, Bank of America, JP Morgan, Goldman Sachs, Morgan Stanley and Citi Bank; for Spain (SP), Santander and Banco Bilbao Vizcaya Argentaria; for France (FR), BNP Paribas, Crédit Agricole and Société Générale; for the Netherlands (NETH), ING; for Italy (IT), Intesa San Paolo, Banca Monte dei Paschi di Siena and Unicredito; for the United Kingdom (UK), Royal Bank of Scotland, Hong-Kong Shangai Bank Corporation, Barclays and Lloyds Banking Group; and, finally, for Switzerland (SWT), Crédit Suisse and UBS.

RWA IN PERCENTAGE OF TOTAL ASSETS FOR BANKS IN DIFFERENT GEOGRAPHIES (a) CHART 2



SOURCE: Financial reports by individual banks.

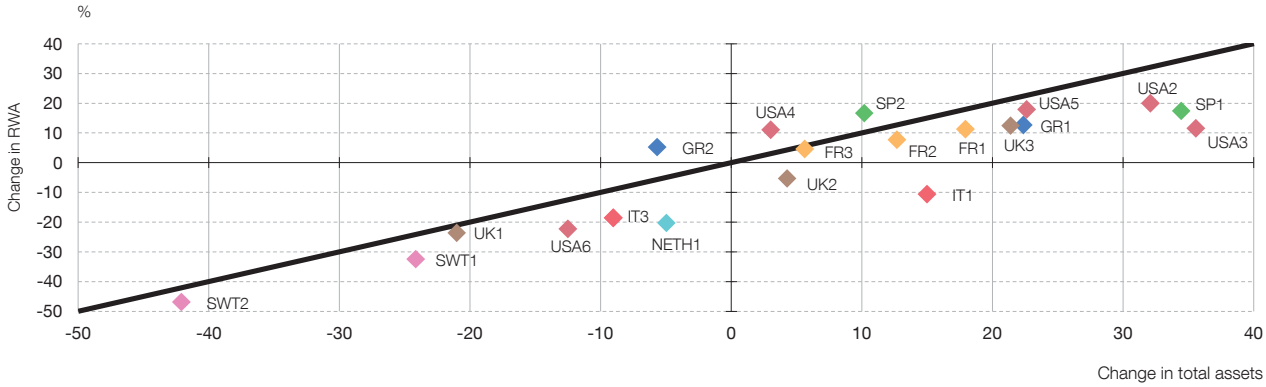
a Weighted average for each country. Apart from banks considered in chart 1, we include the following banks: for Canada (CA), Bank of Nova Scotia, BMO Financial Group, Canadian Imperial Bank of Commerce, Canadian Western Bank, Royal Bank of Canada and Toronto-Dominion Bank; for Australia (AUS), Australia and New Zealand Banking Group Limited, Commonwealth Bank of Australia Group, National Australia Bank and Westpac Banking Corporation; and, afinally, for Japan (JAP), Mitsubishi UFJ Financial Group and Mizuho Financial Group.

in 2005. In view of these data, there is no clear evidence of a casual relationship between the introduction of IRB models and the downward trend in RWA density.

More remarkable than this persistent downward trend in RWA over total assets is the lack of pro-cyclicality of RWA during the crisis. This feature has been widespread, which constitutes a significant puzzle. As is well-known, some years ago, broad consensus emerged on the additional pro-cyclicality of capital under Basel II in those countries committed to applying the new regulation. This issue was pointed out by several authors, among them Kashyap and Stein (2004) and Repullo and Suárez (2009). Whereas IRB models were considered a significant advance in risk measurement at institutional level, their aggregate impact in terms of more cyclicality of capital requirements was under question. In fact, these models are supposed to intensify the pro-cyclicality of RWA, due to the fact that they are computed as an increasing function of the probability of default (PD), loss-given default (LGD) and the exposure at default (EAD).[4] All these variables

4 There are other determinants of RWA such as a correlation factor set by regulators as a function of borrower type, a one-year probability of solvency, and the remaining maturity of the loan.

CUMULATED CHANGE IN TOTAL ASSETS AND RWA DURING THE PERIOD 2007-2010 FOR A SAMPLE OF EUROPEAN AND US BANKS (a) CHART 3



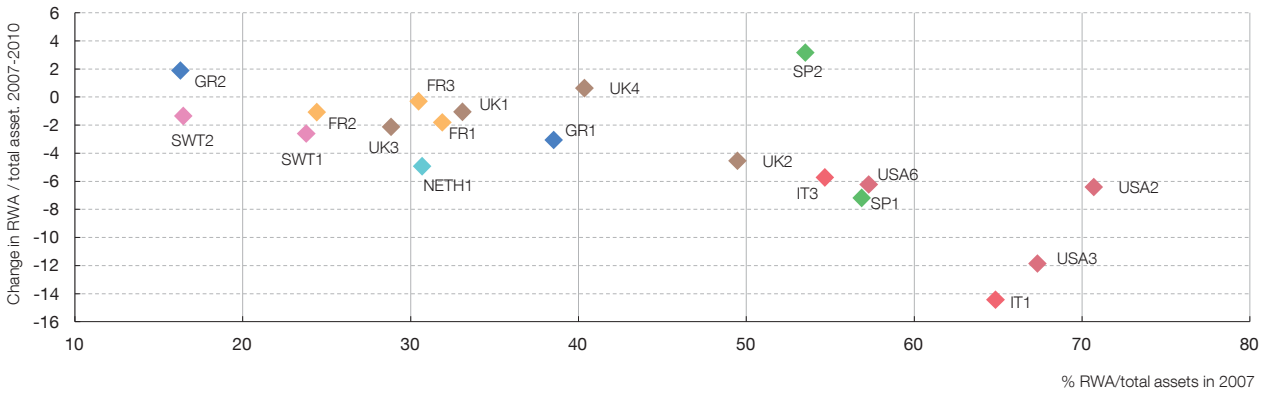
SOURCE: Financial reports by individual banks.

a Wells Fargo and Lloyds Banking Group are not included in this Figure. Both of them double their size during this period due to corporate mergers. Banca Monte dei Paschi di Siena also increases its size significantly, but in that case without an increase in RWA. For Goldman Sachs and Morgan Stanley, the considered change refers to the period between 2008 and 2010.

should increase during downturns, increasing capital requirements and making it more difficult for banks to grant loans, thereby supposedly increasing the sensitivity of the supply of credit to economic conditions. Mounting concern over this outcome in the period prior to the implementation of Basel II leads to significant effort being devoted to mitigating the pro-cyclicality of Basel II, especially within the academic world. The article by Gordy and Howells (2006) offers two possible ways to reduce pro-cyclicality: either by using through-the-cycle adjustment of the default probabilities or by smoothing the resulting capital requirements, computed from point-in-time default probabilities. Some regulators were also aware of this potential increase in pro-cyclicality and designed monitoring processes to identify significant shifts in capital requirements, as was pointed out by Benford and Nier (2007) of the Bank of England.

However, the empirical evidence during the crisis has not supported this concern. Instead of the expected upward movement, RWA in terms of assets has remained overly stable during the worst financial crisis of the last seventy years, albeit decreasing, giving rise to their puzzling behavior. Moreover, there have been no significant divergences in this path among laggards and leaders in the implementation of Basel II. In retrospect, different explanations for this behavior are possible. First, a significant deleveraging process may have been undertaken by most institutions, especially focused on more risky assets. Second, optimization of RWA through different business strategies could possibly have been carried out. Third, the massive use of different techniques for mitigating cyclicality could also have played a role. This may have been an over-reaction to concerns over excessive pro-cyclicality that dominated in the period prior to the implementation of Basel II and, by ill-timed coincidence, to the unfolding of the financial crisis. Finally, forbearance of some supervisors in a backdrop of fierce competition for capital might also have been present during this period. In this sense, some changes in IRB models within a single bank from point-in-time default probabilities to through-the-cycle calculations in the middle of the crisis could have been considered as a way to avoid some upward pressure on RWA. Unfortunately, apart from anecdotal evidence, financial institutions have not provided enough information on a regular basis in order to gauge the impact on RWA evolution of these potential switches in cycle adjustment methodologies during the crisis.

RWA OVER TOTAL ASSETS IN 2007 AND CUMULATED CHANGE DURING THE PERIOD 2007-2010 FOR SAMPLE OF EUROPEAN AN US BANKS (a) CHART 4



SOURCE: Financial reports by individual banks.

a For Goldman Sachs and Morgan Stanley, the change is computed between 2008 and 2010.

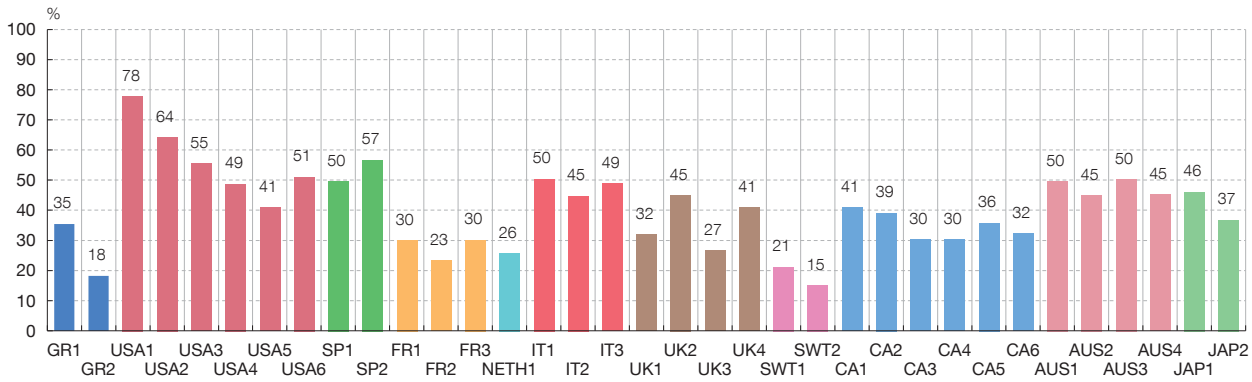
In order to better understand the behavior during the crisis, we have plotted the change in total assets during the period 2007-2010 against the change in RWA in the same period. Some differences emerge, as shown in Chart 3, thereby pointing out different patterns of behavior. First, a group of institutions has been in a deleveraging process all through the crisis, getting rid of more risky assets, thereby reducing the density of RWA over assets. This is particularly the case of Swiss banks, most likely encouraged by their domestic authorities. Second, among the banks that have increased in size during the crisis, the evolution is significantly different, with reductions or very limited increases in RWA in most cases and with just a small group of banks increasing RWA above the rise of their total assets. Whether some institutions have achieved a reduction in their risk profile or some other factors have helped them in reducing RWA will provide some clues in order to solve the puzzle of the cyclical behavior of RWA.

However, this pattern of behavior should not be considered in isolation from RWA density in the period prior to the crisis. Banks embarked on fierce competition for capital most likely had very low RWA density and have supposedly been more prone to increasing this density throughout the crisis. Nonetheless, empirical evidence does not fully support this result. In effect, taking into account the initial level of RWA density, with the exception of US banks, where significant reduction of RWA density has occurred, starting from very high RWA in terms of GDP, there is no evidence that during the period 2007-2010 a greater convergence was undertaken. In particular, European banks show greater divergence than before, as illustrated in Chart 4.

2.2 CROSS-SECTIONAL DIMENSION

At the same time as the evolution of RWA density shows a clear downward trend over the last decade, the differences in the level of RWA over total assets across different jurisdictions remain persistent during the whole period. As shown in Chart 5, significant divergences occur across different geographies. In fact, divergences among continental European institutions are quite remarkable. German and Swiss banks are those with lower density of RWA, followed by French and Dutch banks. On the other hand, Spanish and Italian banks are those with higher density of RWA. Outside Europe, Australian and, to a lesser extent, Japanese banks also display higher RWA than the average. Several factors account for these differences, as is shown in the next section. Chief among them: risk profiles, risk management and also supervisory practices among different geographies.

RWA IN PERCENTAGE OF TOTAL ASSETS BY COUNTRIES. 2010 CHART 5



SOURCE: Financial reports by individual banks.

In other words, whereas over the last few months the focus of RWA divergences has been on the transatlantic debate, the issue is noticeably not circumscribed to these two areas.

Nonetheless, focusing on the debate between the US and Europe, it is remarkable that, on average, US banks exhibit higher density of RWA than their European peers. There are at least two specific, though not sole, explanations for this divergence, as pointed out recently by some institutions in an attempt to answer the above-commented statement by James Dimon.

The first explanation is accounting divergence. Whereas European banks use IFRS, US banks release their balance-sheets using US-GAAP. A priori, differences in the impact of both accounting principles are difficult to gauge. However, as pointed out by BNP (2011) in a recent equity report, some useful information in assessing this factor could be obtained from the Deustche Bank summary balance sheet published under both US-GAAP and IFRS. As a matter of fact, according to this summary, the total assets of Deustche Bank amounted to €1,906 under IFRS in the fourth quarter of 2010. Under US-GAAP, after excluding derivatives netting, existing and pending, and reverse repo netting, the adjusted-assets could be €1,210, achieving a reduction in the balance-sheet of about 37%. As a result, RWA density would increase from the observed 18% to a chart close to 29% when the US accounting standards are considered. Applying this calculation to BNP would reduce their total assets from a chart of €1,998 bn to €1,612 at the end of 2010. This would account for an increase in its density of RWA from the current 30% to 37%. Conversely, adding netting agreements to total assets in a US bank such as JP Morgan would increase assets from $2,118 bn to 3,567, reducing its RWA density from 55 to 33%. Whereas all these charts are only for illustrative purposes, they could indicate that, due to accounting principles, total assets in European banks are significantly higher than in US banks, leading to significantly lower density of RWA. After adjusting by this factor, a significant part of this divergence would vanish.

The second explanation for the divergences between the US and Europe is business model. Splitting the activity into wholesale and retail banking, risk weights in the wholesale business are roughly comparable between the US and Europe. Moreover, the ongoing regulatory reform, through the increasing requirements for market risk, securitizations and counterparty risk included in Basel 2.5, will lead to greater convergence, albeit incomplete, in this business line across banks. As pointed out by BernsteinResearch (2011), European banks hold a large share of government bond portfolios which are actually non-RWA consumption. However, risk weights for retail banking are the main cause of divergences in RWA as most

analyses have underscored, such as those of Citi (2011) and BernsteinResearch (2011). Loan breakdown reveals a higher share of mortgages and consumer credit in US banks and a lower level of corporate loans than European banks. Regarding mortgages, US banks normally securitize a significant portion of their mortgage portfolios, removing best quality and low-risk loans from the balance-sheets. Remaining mortgages on their balance-sheets are normally those with a lower rating and, as a result, with higher risk weight. With a minor but also significant impact, US banks are involved in a credit card business that has a very high risk weight. As a result of these two elements, total risk weight in retail banking is normally higher in the US than in Europe.

In sum, the bulk of existing divergences between the US and Europe could be due to accounting divergences and business models. Alternative explanations could also be considered, such as the magnitude of banking losses in the US, clearly superior during the last crisis to the write-downs in the European banking sector, and the implementation of Basel II, and as a result, of IRB models in Europe, leading to more room for maneuver in the assessment of RWA. The US still has to adopt Basel II. In this process, some differences with Europe will still remain, due to the fact that the US has established that it will apply standard model floors to IRB models in the measurement of RWA [see, i.e., Federal Reserve (2011)].

After reviewing this cross-sectional evidence, in the following section we address the main determinants behind these discrepancies, in order to disentangle to what extent they are overly justifiable and to analyze if there is some room for increasing consistency and comparability across different banks and jurisdictions.

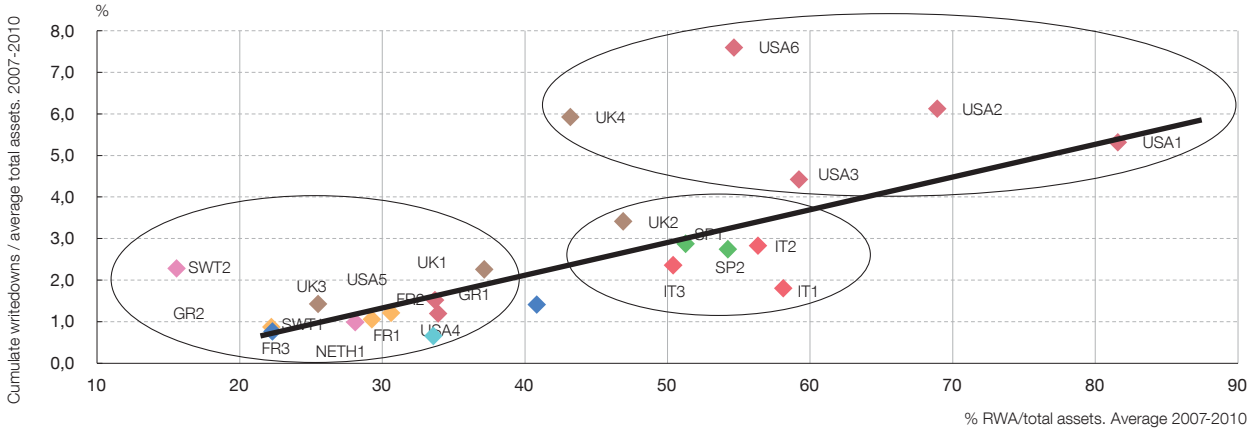
3 Main determinants in the evolution of RWA

Due to the importance of greater consistency of RWA in a world of greater competition for capital, the lack of a comprehensive analysis of the determinants of RWA is more important than ever. At present, references to this issue are very limited and driven more by practitioners than by academic researchers. However, mounting interest among US and British regulators is patent, as revealed by recent comments publicly made by some regulators. In the UK, A. Haldane (2011) points out that there is a great deal of uncertainty about the calculation of PDs in IRB models, thereby creating significant distortions in the assessment of capital. He mentions three different exercises in order to better understand these differences. The first is the analysis of the mortgage portfolios of two large banks simulated under two different distributions for PDs. The second approach is the provision of a hypothetical portfolio of sovereign, wholesale and corporate exposure to different UK banks in order to calibrate capital requirements. This was an exercise conducted by the FSA (2010) and aimed at gauging capital requirements for this portfolio by each institution, according to their own estimation of PDs. The results show a significant range of capital requirements across different banks, especially for sovereign exposures. Finally, in order to gauge the accuracy of RWA, he suggests a review of past evidence taking into account losses incurred during the crisis.

Following the latter approach suggested by Haldane, Chart 6 plots total write-downs for a sample of European and US banks during the period 2007-2010 against the average RWA during this period. Broadly considered, there is a positive correlation. However, three different groups of banks emerge: French and German banks have relative low write-downs as well as very low RWA density; Spanish and Italian banks show higher write-downs and relatively more RWA density; British and US banks are the worst performers with high write-downs and elevated RWA density, but in some cases, RWA are lower than the average given the level of write-downs. This evidence supports the idea that higher RWA density in the US is due to backward losses, which are considerably higher than in other countries.

WRITE-DOWNS AND RWA IN PERCENTAGE OF TOTAL ASSETS FOR THE PERIOD 2007-2010
FOR A SAMPLE OF EUROPEAN BANKS

CHART 6



SOURCE: Financial reports by individual banks.

However, it also points to some deviations in a few countries in relation to the average behavior: in particular, higher than expected RWA density in Italy and Spain and the opposite in some British and US banks.

This suggests that other factors should also be considered in order to explain differences across banks.

The diversity of factors behind the evolution of RWA is also emphasized by D. Tarullo (2011). Against the background of the high RWA in US banks in comparison to their competitors, he recognizes that different risk profiles are not enough to explain ongoing disparities. In addition, in the same vein as Haldane, Tarullo underscores the differences in the calculation of risk-weighted assets across banks as an area that deserves more attention. After welcoming the initiative of a forthcoming peer review process by the SIG, he points out the compelling need for an effective comprehensive monitoring process which goes beyond simple stocktaking exercises and should develop a suitable mechanism to validate RWA under international standards.

Financial analysts, from his point of view, have also conducted some research on the issue of RWA determinants. Chief among them, Keefe, Bruyette and Woods (2011), after a detailed analysis of the RWA of different portfolios for a sample of European banks, conclude that it is almost impossible to check the appropriate risk weight and put forward an extra margin of safety for banks with low risk weights. Focusing as well on European banks, Barclays Capital (2011) points to random swings in RWA over time, suggesting some scope for subjectivity in RWA calculation. Both analyses underscore the need for improving disclosure of Pillar 3, promoting more consistent reporting across institutions, in order to enhance market discipline and allow greater comparability in RWA.

In sum, the identification and analysis of the main determinants of RWA is not an easy task. However, we are going to try to classify them into three different groups of factors: the first element is the bank risk profile, which encompasses business models and also all the institutional and macroeconomic factors that determine risk for the whole financial industry within a particular jurisdiction; the second element is risk management in a broad sense, including all decisions adopted by banks in relation with risk monitoring, recovery practices and modeling choices in the case of those financial institutions embarked on IRB models; and, finally, the third element is the role of supervisory practices in different

jurisdictions, which is also more crucial for banks that are following IRB models. In the next subsections, a brief description of each of the above-mentioned determinants of RWA is provided. Whether these factors lead to justifiable divergences in RWA and to what extent they should be adjusted in order to avoid undue distortions in the assessment of risk weights are the main issues to be scrutinized in this analysis.

3.1 RISK PROFILE

Undoubtedly, each financial institution has a different risk profile. This is the result of the combination of several interconnected elements ranging from individual choices such as business models to macroeconomic and institutional elements that determine the nature of risk undertaken by the bank. In other words, both micro and macro factors determine the risk profile of a particular institution.

Starting with the latter element, institutional factors, different from one jurisdiction to another, will lead to legitimate differences in RWA across countries. These divergences encompass from legal frameworks such as bankruptcy laws and foreclosure practices to market practices such as the existence of specialized lenders in some segments, conventions in underwriting standards and the level of competition within the banking sector. Regulatory elements are also included in this category: rules regarding the level of LTV or accounting policies play a major role in risk profile. A case in point is the role of loan provisions, with significant divergences across jurisdictions. Other institutional factors will also alter risk profile in a significant manner, such as the existence of a home loan guarantee agency (such as Crédit Logement, created in France in 1975 with banks as the main stakeholders), making a difference in mortgage risk profile, thereby diminishing average PDs in the mortgage portfolio across the board. In fact, French banks in general exhibit lower PDs and LGDs in mortgage loans in IRB models than their European peers as shown in Chart 7. In particular, PDs for French banks range between 0.3 and 1.0%, much below the average of 1.7% for the other banks considered in this sample, those that provided detailed information in their Pillar 3 reporting. Although it is reasonable that guarantee schemes will allow for a reduction in PDs and, arguably, in LGDs, the extent of this change is not properly calibrated, and further work should to be done in order to gauge the impact of this factor.

Macroeconomic factors will also matter in risk profile within the financial industry. Loss rates in different economic sectors, the growth and volatility of GDP and employment and the level and volatility of interest rates constitute privileged indicators of the aggregate risk profiles of the financial industry in one particular country.

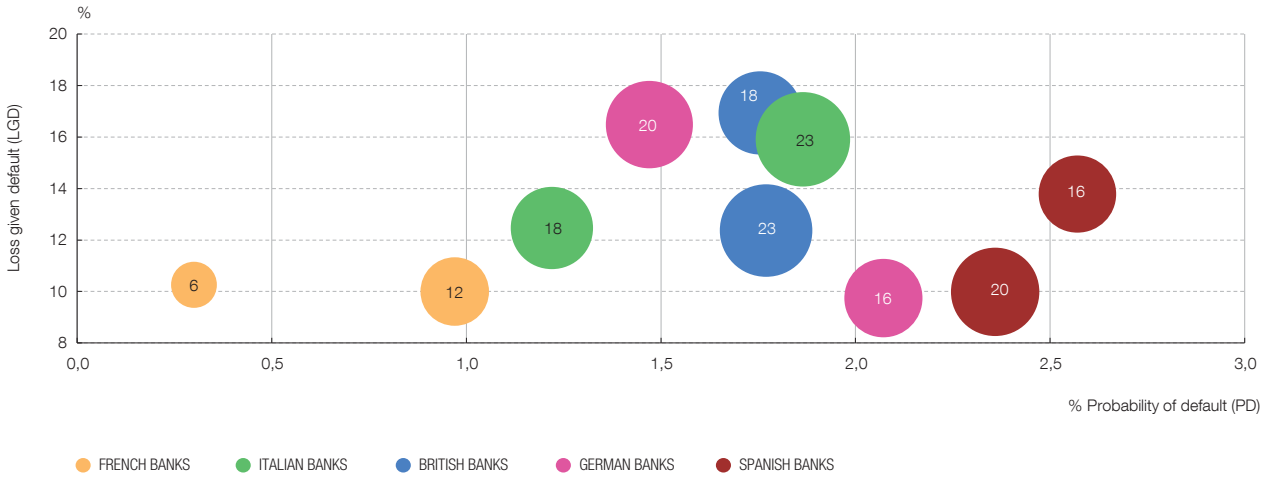
In addition, individual choices by a company are most likely the principal factors behind the evolution of RWA. In particular, the portfolio mix and the geographic mix shape the risk profile of each institution. A significant correlation can be found between the share of loan portfolio in total assets and the density of RWA. To illustrate this point, we could divide RWA over total assets as follows:

$$RWA/TA = (RWA_{CR}/L)*(L/BB)*(BB/TA) + (RWA_{MR}/TB)*(TB/TA) + (RWA_{OP}/TA) \quad [1]$$

where TA is total assets, BB is the banking book, TB is the trading book, and L is the total customer loan exposure. In addition, RWA_{CR} is RWA related to credit risk, RWA_{MR} refers to market risk and RWA_{OR} to operational risk. Thus, business mix and, mainly, loan portfolio over total assets L/TA are important components of RWA in terms of assets.

Chart 8 shows the breakdown of RWA over total assets for European banks according to identity [1], except that the terms L/BB and BB/TA have been aggregated as L/TA for

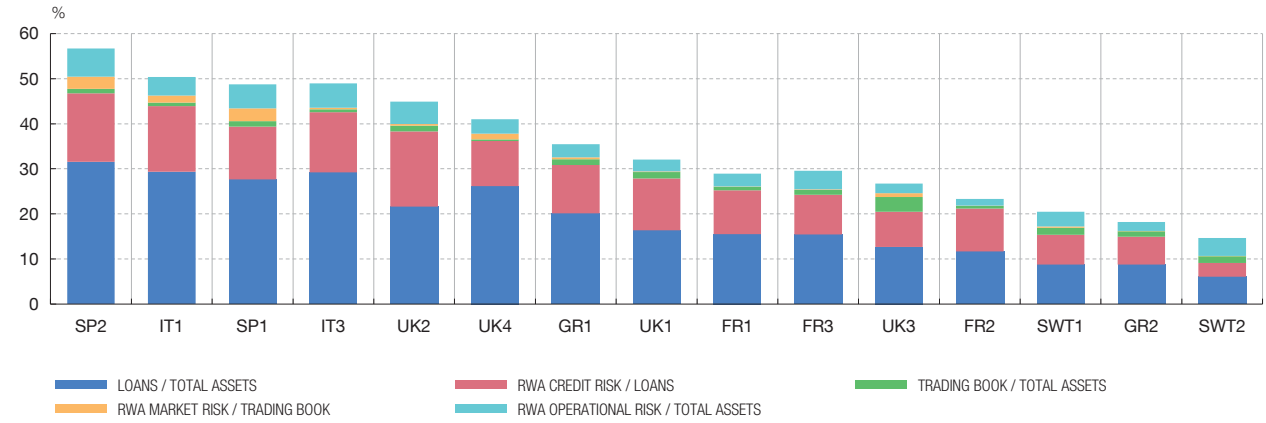
RWA FOR MORTGAGES PORTFOLIOS IN IRB MODELS FOR A SAMPLE OF EUROPEAN BANKS. BREAKDOWN BETWEEN PD AND LGD. 2010 (a) CHART 7



SOURCE: Pillar 3 reporting by individual banks

a Bubble size represents the RW for each bank in mortgage portfolio. The sample of banks reporting detailed PD and LGD for mortgage exposures includes: Commerzbank, Deutsche Bank, Santander, Banco Bilbao Vizcaya Argentaria, Crédit Agricole, Société Générale, Intesa San Paolo, Unicredito, Royal Bank of Scotland and Lloyds.

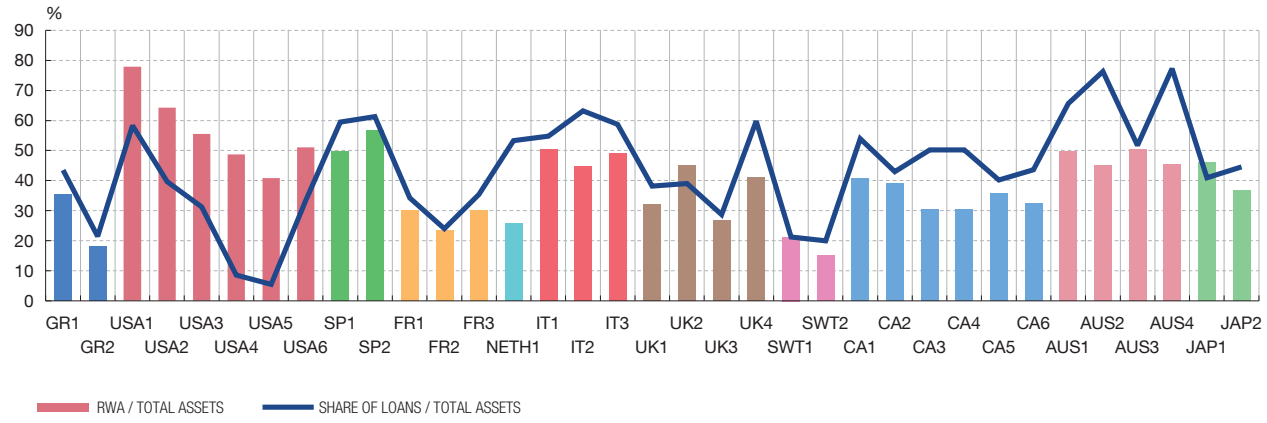
BREAKDOWN OF RWA OVER TOTAL ASSETS FOR EUROPEAN BANKS. 2010 CHART 8



SOURCE: Pillar 3 reporting by individual banks.

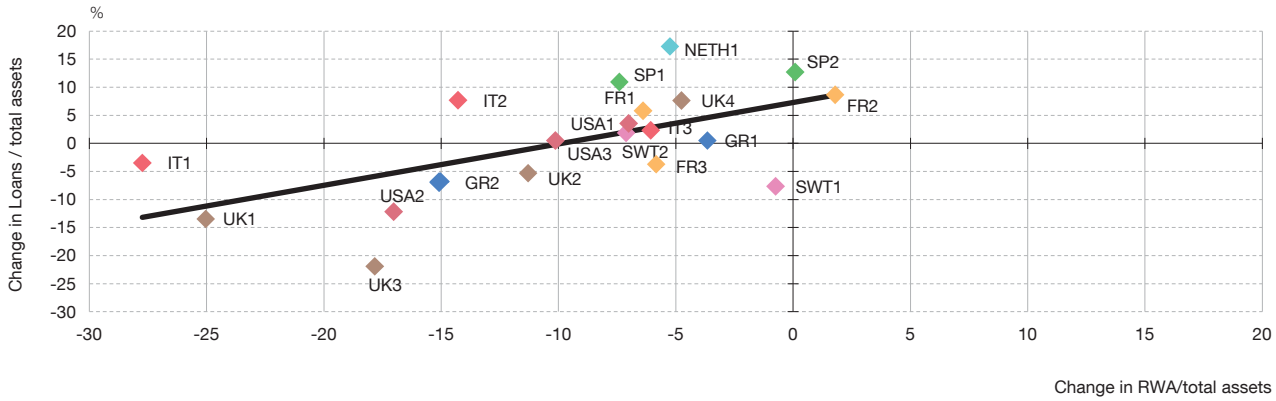
simplicity. As is shown in this Chart, the first term of identity [1], RWA for credit risk (the first two bars in the Chart), is the most important component of RWA. Two elements constitute this component: the weight of loans in total assets, reflecting the business model, and the credit risk over loans. In particular, business model accounts on average for slightly more than 50% of the total RWA density, with significant variations across institutions. Almost a third of RWA density is due to the contribution of RWA of credit risk in terms of loans, a component which also shows significant deviation across banks. The second term of identity [1] is composed of two elements: trading book in terms of total assets, with an average contribution of 1.1% to RWA density, and RWA for market risk in terms of trading book with less than 0.7% contribution, but still with significant differences across banks. Paradoxically, for some banks with a business model more focused on banking book, market risk has a relatively higher contribution to RWA density. Finally, the last term of identity [1], RWA for operational risk in terms of total assets, has an average contribution of 3.5%, with very large dispersion across banks. In conclusion,

RWA AND SHARE OF LOANS IN PERCENTAGE OF TOTAL ASSETS BY COUNTRIES. 2010 CHART 9



Source: Financial reports by individual banks.

CHANGE IN RWA AND LOANS IN PERCENTAGE OF TOTAL ASSETS BETWEEN 2001 AND 2010 CHART 10



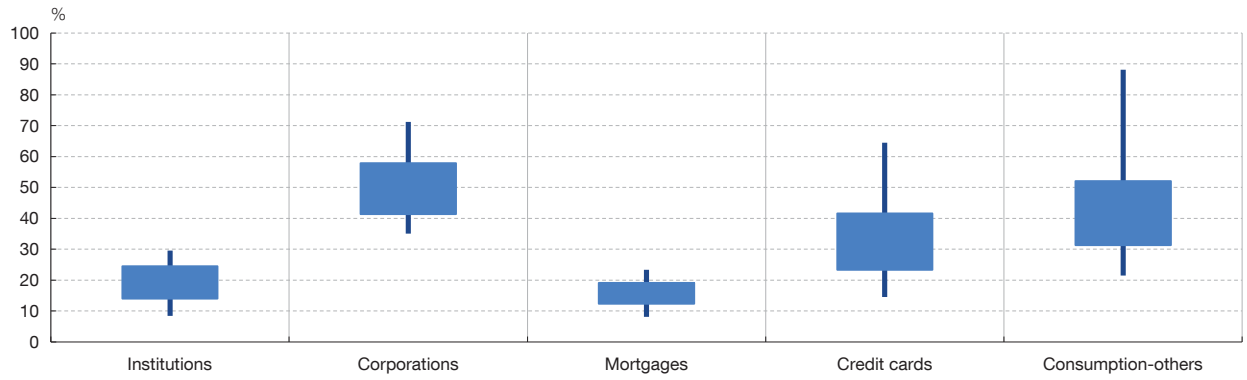
Source: Financial reports by individual banks.

significant differences in the composition of RWA density are shown, with business model being an element that influenced this evolution to a large extent. Below we focus in more detail on this factor.

Thus, Chart 9 again shows RWA density for a broader sample of banks, adding the level of loans over total assets. As expected, a correlation between both variables is found. For example, German and Swiss banks show the lowest RWA density in combination with a low share of loans as a percentage of total assets, followed by French banks. On the other hand, some deviations are also very significant. Dutch, Italian, Canadian and Australian banks have a very low RWA density in comparison to their elevated loan activity. Exactly the opposite happens in the US.

With a longer-term approach, taking into account the evolution over the last ten years, there is a positive relationship between changes in the share of loans and those in RWA density. On average, the reduction in RWA density has been significant, whether or not institutions diminished the loan portfolio as a percentage of total assets. However, deviations to this average behavior are significant. Accordingly, in some cases, as shown in Chart 10, increases in loan portfolios have been accompanied by reductions in RWA density. This evidence points to the fact that business mix, being an important determinant of RWA, is not enough to explain the whole reduction in RWA.

RISK WEIGHTS IN IRB MODELS IN 2010 FOR A SAMPLE OF EUROPEAN BANKS. PERCENTILES (a) CHART 11



Source: Pillar 3 reporting by individual banks.

a The Figure illustrates 5%, 25%, 75% and 95% percentiles for risk weights of the above mentioned European banks. Two exceptions have been considered in the sample: RWA for the mortgage portfolio of HSBC and for the credit card portfolio of Crédit Suisse.

Within the credit portfolio, changes in composition also determine significant divergences across banks. Banks with a high portion of corporate loans, especially to the SME sector, should have a higher RWA density; at least structured finance (i.e., asset-based finance, project finance) has been implemented, reducing the total risk of the corporate loan portfolio.

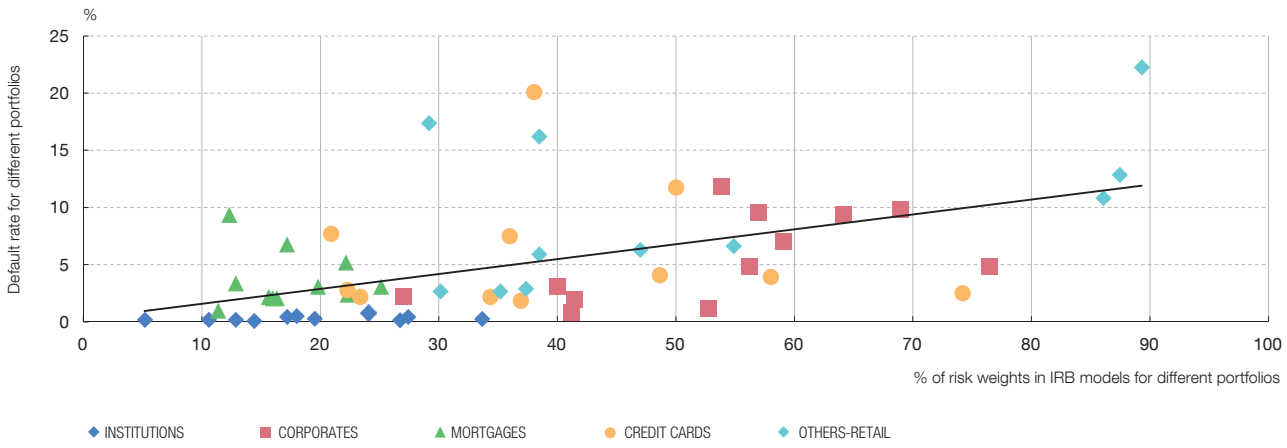
After reviewing all these factors, an initial conclusion emerges: most of the divergences in risk profiles are unavoidable and justifiable and effectively constitute a major determinant of differences in RWA. The main issue going forward is the extent of these divergences: calibration of the impact of institutional, macroeconomic and business model in RWA is not an easy task. A preliminary, and probably simple, approach has suggested that existing divergences in RWA within the same type of loan portfolio are too large to be explained by these understandable factors.

In order to illustrate this point, Chart 11 shows risk weights used in IRB models for different segments of the loan portfolio for a sample of European banks. The Chart shows four percentiles of the distribution: 5%, 25%, 75% and 95%. As illustrated, risk weight fluctuates between 8 and 30% for this sample of banks in the segment of institutions and between 35 and 71% for corporations. In a first approach, both ranges seem too large even taking into account all differences in risk profile across financial institutions. A similar result is obtained for consumer loans: the range of risk weights fluctuates between 8 and 23% for mortgages, 15 and 65% for credit cards and 21 and 88% for other consumer loans. Other factors, apart from risk profile, have to be considered in order to explain the extent of these differences, and we cannot discard that, even after considering these additional factors, a portion of these discrepancies remains unexplained.

When we plot these risk weights for IRB models against default rates for different portfolios from 2010, a positive correlation is found as expected and as seen in Chart 12. However, there are significant outliers and the analysis in specific portfolios does not always show this positive correlation. In particular, it fails for mortgages, institutions and credit cards.

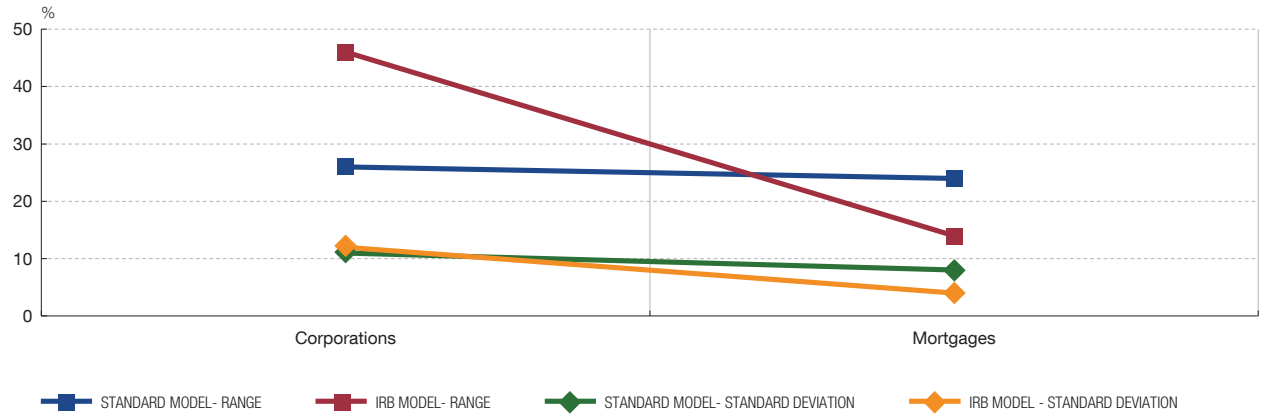
In addition, as is well-known, whereas the roll-out to IRB models has been significant over the last few years, this roll-out is highly diverse across institutions, with some banks still keeping a significant amount of their exposures under standard models. For that

RISK WEIGHTS AND DEFAULT RATE FOR DIFFERENT PORTFOLIOS IN IRB MODELS IN 2010 CHART 12



Source: Pillar 3 reporting by individual banks.

MEASURES OF DISPERSION (STANDARD DEVIATION AND RANGE) OF RWA IN IRB AND STANDARD MODELS FOR CORPORATIONS AND MORTGAGES (a) CHART 13



Source: Pillar 3 reporting by individual banks.

a Calculations are based on detailed information reported by thirteen European banks: Commerzbank, Deutsche Bank, Santander, Banco Bilbao Vizcaya Argentaria, BNP, Crédit Agricole, Société Générale, Intesa San Paolo, Unicredito, Royal Bank of Scotland, HSBC, Barclays and Lloyds.

reason, it could be useful to look at dispersion of risk weights in both standard and IRB models in order to assess if differences have increased under IRB models.

In Chart 13, two measures of dispersion are included: the range between the maximum and minimum value and the standard deviation. They are both calculated for IRB and standard models for thirteen banks in Europe, focusing on two portfolios: corporations and mortgages. Results show significant dispersion under both standard and IRB models and a more puzzling lack of a common pattern of behaviour in these two portfolios.

In the case of corporations, dispersion of risk weights in IRB models is higher than that of standard models. In theory, this result possibly fits the expected outcome better: arguably, IRB models are supposed to increase dispersion due to both a more accurate measure of risk profiles and greater room for discretion in model choices and in model validation processes. However, in the mortgage portfolio, the outcome is exactly the opposite with lower dispersion shown in IRB models. Different explanations could be found for this result. First, differences in risk profiles could be significant, thereby justifying to a greater extent

the dispersion of RWA found in IRB models. Moreover, conversely to intuition, IRB models could have contributed to mitigating these differences. This could question the role of further discretion in these models. Second, the roll-out towards IRB models has given rise to a geographical bias in the coverage of both models: IRB models cover mostly European exposures, whereas standard models focus on other countries, with different risk profiles. The type of exposures could also be different in both kinds of models, which affects the final RWA, due to diverse treatment of commercial and residential exposures. All these factors make the comparability of dispersion of both types of models unfair and keep open the question of additional factors, other than risk profiles, affecting the level of RWA in IRB models. Finally, regulatory discretion at domestic level could also play a role in standard models with, for example, different risk weights considered for mortgages with the same loan-to-value (LTV) in different countries, due to the lack of uniformity in LTV thresholds across jurisdictions in the implementation of standard models. Disentangling all these factors is not an easy task, but it seems unavoidable in order to identify the relative weight of different factors in current RWA divergences, and, in particular, in order to gauge if risk profiles could be considered the main determinant of RWA divergences across banks.

3.2 RISK MANAGEMENT

Decisions taken by each bank in order to manage and compute risks are an important factor, mainly after Basel II has allowed for more appropriate risk measurement. Different policies across banks in terms of credit analysis, monitoring and recovery, and tools for discriminating clients/operations according to risk appetite have an impact on main risk parameters, and, in particular on PD and LGD, thereby playing a crucial role in the assessment of RWA. Recovery practices make an important difference across financial institutions. Very often we observe that when different banks share a loan to the same firm, RWA are lower for those banks with a higher recovery rate than for others. Therefore, banks will benefit from their recovery track record and, in this way, achieve a lower risk weight in these syndicate operations.

Since the implementation of IRB models following Basel II, modeling choices have become another strategic variable in gauging risk management. The quality and quantity of historical portfolio data or the features of some portfolios make methodological choices very important in the assessment of risk. In the understanding that these modeling choices are prudent and respect the principles of an accurate risk assessment, they could constitute justifiable divergences across banks.

Whereas risk management as a whole is most likely not very important in magnitude in justifying divergences in RWA across banks, it creates incentives for innovation in risk technologies and IT systems and for advances in risk monitoring and recovery practices. Arguably, its benefits could compensate any potential shortcoming. Quantification of these factors is even more difficult than that of risk profile, thereby requiring detailed information of risk management from different institutions.

3.3 SUPERVISORY PRACTICES

The recognition of an important role for supervision in risk assessment constitutes an important advance in Basel II. Approval and validation processes of IRB models become a privileged learning experience for both banks and supervisors involved in these processes. This is especially true for global banks that have to deal with different supervisors in the various jurisdictions where they are located. They also have the opportunity to be aware of the differences in approval and validation processes and, particularly, of their potential impact on RWA differences across countries.

In their brief existence, IRB models have contributed to a better understanding and measurement of risk. With the cumulative experience of this period, it is time for revisiting

some practices which will help to achieve greater consistency in RWA across jurisdictions. With some perspective, and based on the experience of global banks, it is feasible to identify a comprehensive list of factors that, during the validation and approval processes of IRB models, increase the divergences in the calculation of RWA. In order to be effective, it is preferable to focus on some specific factors that most likely play the main role in these discrepancies. Chief among them are the following:

First, different criteria for cycle adjustment are applied in different jurisdictions. Some jurisdictions use through-the-cycle models in their assessment of PD, while others choose point-in-time methodologies and some others implement hybrid approaches. Common criteria for cycle adjustment will increase consistency. Moreover, changes in the methodology of cycle adjustment within a single bank over time should be avoided in order to prevent undue distortions from occurring.

Second, the establishment of minimum criteria for the acceptance of IRB models for some activities will lead to greater harmonization across countries.

Third, the definition of downturn becomes an important factor. The calculation of downturn LGD and EAD poses a challenge for most financial institutions and supervisors. Several approaches have been put in place using different cyclical indicators as reference, e.g., GDP growth and output gap. One case in point is mortgage portfolios for which different variables have been used in order to gauge the downturn in the housing market. Following the experience of recent years, a review of current methodologies should be conducted, assessing whether these calculations make sense or not across different jurisdictions.

Fourth, differences between expected losses and provisions across countries create differences between local and consolidated ratios for global banks. As a matter of fact, the treatment of non-performance loans has been extremely diverse across countries, giving rise to significant divergences in total RWA.

Fifth, in the segmentation of portfolios included in IRB models, there is a trade-off between data availability and richness versus data homogeneity. For that reason, some supervisors prefer a broader sample of data in each segment, thereby splitting the portfolio into a limited number of segments; whereas others tend to choose a greater number of segments, each with a limited number of data points but with a high degree of homogeneity. As a result, there is a distinction between models with a limited number of PD buckets with no direct relationship with ratings versus those with a one-on-one relationship between ratings and PDs. This makes comparability across RWA unfair.

Finally, global banks located in different countries will benefit from common criteria for the methodology and approval of models for global portfolios (e.g., sovereign debt, financial institutions, global corporations). Supervisory colleges will play a major role in this process, limiting room for discretion at domestic level.

Most of these divergences could be adjusted with the adoption of specific common guidelines, a process that would strongly benefit from information-sharing among supervisors, as explained in the next section.

4 Proposals for achieving greater consistency in RWA

After reviewing the main determinants of RWA, the main conclusion is that divergences in RWA are to some extent justifiable due to different risk profiles and risk management. However, gauging the appropriate magnitude of these divergences at international level will

probably take time and will require a more complex analytical framework than that used by FSA (2010) consisting of the calibration of a benchmark portfolio by different financial institutions. Institutional and macroeconomic factors, absent in the FSA approach, will play a significant role in explaining divergences in RWA across countries. Moreover, business mix and risk management, both across banks and over time, will also have to be calibrated in a comprehensive framework. Quantification of all these factors will require detailed and comparable information coming from different financial institutions and jurisdictions.

Having recognized this difficulty, the need for greater consistency in RWA in a tougher framework for capital requirements constitutes a good incentive for improvement. This reality has been recognized by the Basel Committee on Banking Supervision by endorsing the SIG to conduct a working group on RWA. Feasible targets, achievable in a relatively short period of time, are desirable in order to make some tangible and useful progress. Chief among them are the following:

First, enhancing more comparable disclosure in Pillar 3 is crucial. This would lead to greater market discipline, and, as a result, would enhance greater consistency across banks and jurisdictions. A cross-country monitoring process, as suggested by Tarullo (2011), also requires comparable information on RWA among different exposures. The forthcoming Basel III constitutes a good opportunity to enhance this target. As most institutions at global level are willing to adopt the new regulatory framework, specific common guidelines will allow institutions to improve disclosure of Pillar 3, making it more comparable across banks. This process could constitute part of their preparation during the phasing-in period.

Second, supervisors could contribute to making RWA more consistent through information-sharing. The cumulative experience of the last three years in dealing with IRB models will be extremely helpful. As far as validation and approval processes for these models become harmonized at cross-country level, the subsequent outcome could be a reduction in undue discrepancies in RWA.

Several approaches should be adopted in order to achieve more consistent practices among supervisors. Tarullo (2011) suggests three alternative possibilities: quantifiable comparison of standards implementation through benchmark portfolios, validation teams under the auspices of the Basel Committee, and collaboration of national supervisors in examining specific institutions. In this sense, a global solution will require information-sharing between banks and supervisors and among supervisors themselves, agreement on the main issues to be fixed in validation and approval processes of IRB models (such as those mentioned above) and finally, the definition of very specific common guidelines on these particular issues. In this way, greater consistency in supervisory practices could be achieved going forward. Mechanisms for greater interplay among supervisors could also be implemented through reinforcement of an open dialogue on this issue within the supervisory colleges, particularly in the case of global banks. These mechanisms could be implemented at both global and European level.

In addition, some regulatory measures will also provide a useful backstop for existing RWA divergences. This is the case of the leverage ratio, calculated on the basis of total assets (with some adjustments) and not of RWA. Considered in isolation, this ratio could arguably be considered as a step backward from Basel II and from recent advances in an appropriate measurement of risk. Despite these doubts, it could be useful as a complementary tool in order to deal with differences in RWA across financial institutions. In this way, it limits the behavior of some banks that could increase assets and, simultaneously, keep capital

relatively stable if they have a low RWA density, whereas others institutions in the same situation could add capital in a significant amount due to their high RWA density. As a result, the inclusion of the leverage ratio into Pillar 1 will allow for safeguarding the level playing field for all institutions. Finally, although under this definition, the leverage ratio will be helpful, it does not constitute an excuse for lack of advances in the above-mentioned proposals in order to achieve further consistency of RWA.

5 Conclusions

Consistency of RWA becomes a priority in a world of tougher capital requirements, and most likely, increasing competition for capital. However, feasible targets should be considered in achieving this goal. Lack of empirical comprehensive analysis of the main drivers of RWA makes this task more difficult. In this article, we have provided empirical evidence of the behavior and main determinants of RWA.

The persistent downward trend in RWA during the last decade and the long-lasting discrepancies across banks in RWA density are most likely not linked to a single factor, but to a combination of elements. In particular, the stability, even the reduction, shown by RWA density during the ongoing financial crisis has been a significant puzzle because of previous analyses forecasting greater pro-cyclicality due to the implementation of Basel II and, therefore, of IRB models.

Risk profile could change over time, as banks deviate activity outside loans and, as a result, loans reduce their share in total assets. Deleveraging during the crisis has been very significant for a group of institutions. In a cross-sectional approach, evidence points to very different loan activity across banks in different countries, correlated to some extent to RWA density. In our view, the existence of different risk profiles is a justifiable reason for discrepancies in RWA. Risk management is another reasonable determinant of RWA differences. While we accept that discrepancies should exist, how large these discrepancies have to be is the main question. At the current stage, discrepancies in RWA seem to be large enough to be fully justifiable.

In this sense, IRB models have been considered a factor that intensifies differences in RWA across banks. As shown in this article, most of these differences existed prior to the implementation of IRB models. Conversely, an important contribution of these models, apart from a more accurate risk measurement, is a better understanding of the nature of risk for both supervisors and banks. During their brief existence, IRB models have also allowed global banks were allowed of some divergences on validation and approval processes by supervisors in different jurisdictions. That is why a contribution to greater consistency of RWA could be the review of some of these practices and, taking advantage of the experience acquired during the last three years, to design common specific guidelines on questions such as the definition of downturn and cyclical adjustment. This will help to quickly advance in greater consistency in RWA well before the new regulatory framework comes into force. A precise quantification and analysis of all determinants of RWA will take time and will entail more information gathering than that publicly available. In this way, harmonization of Pillar 3 disclosure is a pre-condition for a successful ensuing analysis of RWA.

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