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The Banking System in the Time of Covid-19: A Reverse Analysis on Loss Absorption Capacity, Lending to the Economy and Market Valuation

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Views expressed in this paper are those of the authors and do not necessarily reflect the official views of their home institutions. The authors speak in their personal capacity.

FIRST DIMENSION

Loss Absorption Capacity, Growth of Lending & Bank Fragility

While banks are fragile by nature, their ability to absorb losses has significantly increased in recent years. This is particularly evident when compared to what they looked like before the 2008-2009 financial crisis.

SECOND DIMENSION

The Difficult Balance Between Financial Stability, Bank Regulation and Bank Market Value

The banking sector seems to be facing a sort of trilemma (at least for the moment), i.e. the impossibility of simultaneously having: (1) A high level of capitalization and consequently stronger financial stability. (2) Protection of public funds. (3) Profitability capable of satisfying the cost of capital that allows banks to stay competitive.

ANALYSIS DATA SETS

The sample of banks used in the analyzes includes the major financial institutions from six Countries: Germany, France, Italy, Spain, UK and USA. For European Countries, the sample includes the so-called "Significant" banks. In 2019, for France, Italy and Spain, the sample represents almost all of each Country's banking assets; for Germany about 50%, and for the UK about 60%. The sample of US banks includes all the largest banks which represent almost the entire consolidated total assets of the US Banking system as a whole. For further details, see the Annex.

FIRST DIMENSION

Loss Absorption Capacity, Growth of Lending & Bank Fragility

A RELATIVE DEFINITION OF LOSS ABSORPTION CAPACITY

Break-Even RoA (BERoA) = Level of ROA that triggers the breaching of regulatory capital constraints.

Loss Absorption Capacity in 2007

(Data in millions)

Country	Total Assets ⁽¹⁾ Q4 2007	CET1 Ratio Q4 2007	RWA Density Q4 2007	Surplus (Deficit) AT1	Surplus (Deficit) T2	Minimum CET1 Ratio ⁽²⁾	Max Capacity to Absorb Losses	BERoA	BERoRWA	BERoE
GERMANY	2,677,025 EUR	7.29%	21.98%	-1.40%	-0.62%	4.02%	19,201 EUR	-0.72%	-3.26%	-35.85%
FRANCE	4,180,439 EUR	6.11%	28.99%	-0.75%	-1.77%	4.77%	16,268 EUR	-0.39%	-1.34%	-14.49%
ITALY	2,139,279 EUR	6.14%	62.78%	-1.41%	-1.09%	4.50%	21,904 EUR	-1.02%	-1.63%	-14.35%
SPAIN	1,541,066 EUR	6.07%	56.78%	-0.56%	1.03%	2.61%	30,249 EUR	-1.96%	-3.46%	-34.14%
UK	5,322,019 GBP	6.08%	33.57%	0.01%	-0.01%	2.91%	56,640 GBP	-1.06%	-3.17%	-35.27%
USA	8,391,703 USD	5.46%	53.56%	0.09%	0.16%	2.38%	138,111 USD	-1.65%	-3.07%	-27.90%

AVERAGE

6.19%

3.53%

-1.13%

(1) The total assets of the US banks have been adjusted to take into account the derivatives netting allowed in US-GAAP. This adjustment ensures a fair comparison with the European banks that adopt IFRS accounting standards.
 (2) Minimum CET1 Ratio: represents the binding total capital demand in terms of CET1 capital. It has been calculated as 2% + Deficit (AT1) + Deficit (T2).

- Loss Absorption Capacity (BERoA), on average, was more than double in 2019 compared to 2007 (x6 for France).
- Minimum levels of common equity requirement were almost double, on average (with low variability) in 2019 compared to 2007.
- In relation to the MDA trigger, the average Loss Absorption Capacity (BERoA) in 2019 is at the same level as in 2007, but with the minimum level of capital almost tripled.
- The CET1 Relief P2R rule introduced by the ECB, following the Covid-19 pandemic, has reduced CET1 ratio requirements by 0.32%, potentially freeing up about 19 bn in capital.

Loss Absorption Capacity in 2019

(Data in millions)

Country	Total Assets ⁽¹⁾ Q4 2019	CET1 Ratio Q4 2019	RWA Density Q4 2019	P2R ⁽²⁾ Q4 2019	Surplus (Deficit) AT1	Surplus (Deficit) T2	Minimum CET1 Ratio ⁽³⁾	Max Capacity to Absorb Losses	BERoA	BERoRWA	BERoE	MDA Trigger ⁽⁴⁾ (CET1 Ratio Requirement)	Max Capacity to Absorb Losses	BERoA	BERoRWA	BERoE
GERMANY	3,638,672 EUR	14.63%	29.60%	2.10%	-0.58%	0.09%	6.78%	84,595 EUR	-2.32%	-7.85%	-53.59%	10.53%	44,236 EUR	-1.22%	-4.11%	-28.02%
FRANCE	8,523,044 EUR	15.08%	29.54%	1.59%	-0.83%	0.24%	6.45%	217,418 EUR	-2.55%	-8.63%	-46.67%	9.94%	129,544 EUR	-1.52%	-5.14%	-27.81%
ITALY	2,573,232 EUR	13.96%	41.89%	1.87%	-0.82%	-0.05%	6.64%	79,002 EUR	-3.07%	-7.33%	-45.41%	9.66%	46,432 EUR	-1.80%	-4.31%	-26.69%
SPAIN	3,451,009 EUR	12.21%	42.17%	1.60%	-0.44%	-0.42%	6.26%	86,687 EUR	-2.51%	-5.96%	-37.61%	9.41%	40,748 EUR	-1.18%	-2.80%	-17.68%
UK	5,287,488 GBP	14.45%	28.61%	3.80%	0.79%	1.34%	6.63%	118,358 GBP	-2.24%	-7.82%	-40.83%	10.84%	54,647 GBP	-1.03%	-3.61%	-18.85%
USA	14,755,292 USD	11.84%	52.50%	2.00%	0.15%	0.58%	6.53%	411,028 USD	-2.79%	-5.31%	-34.66%	10.54%	100,107 USD	-0.68%	-1.29%	-8.44%

AVERAGE

13.70%

6.55%

-2.58%

10.15%

-1.24%

(1) The total assets of the US banks are adjusted to take into account the derivatives netting allowed in US-GAAP. This adjustment ensures a fair comparison with the European banks that adopt IFRS accounting standards.
 (2) P2R (Q4 2019): Represent the Pillar 2 (P2R) capital add-on to be held in excess of Pillar 1 (P1R). For US banks, P2R is set equal to 2% which represents the implied CET1 capital ratios add-on required for classification as "well capitalized".
 (3) Minimum CET1 Ratio: represents the binding total capital demand in terms of CET1 capital. It is calculated as 4.5% + Pillar 2 (P2R) + Deficit (AT1) + Deficit (T2).
 (4) MDA Trigger (CET1 Ratio Requirement): represents the CET1 ratio threshold which, if breached, would lead to automatic restrictions on capital distributions and certain discretionary incentive compensation payments. It is calculated as 4.5% + Pillar 2 (P2R) + Deficit (AT1) + Deficit (T2) + CBR. Following the decision of most Macro-prudential Authorities, the CBR now includes the CCyB set at zero (see ESRB - Countercyclical capital buffer).

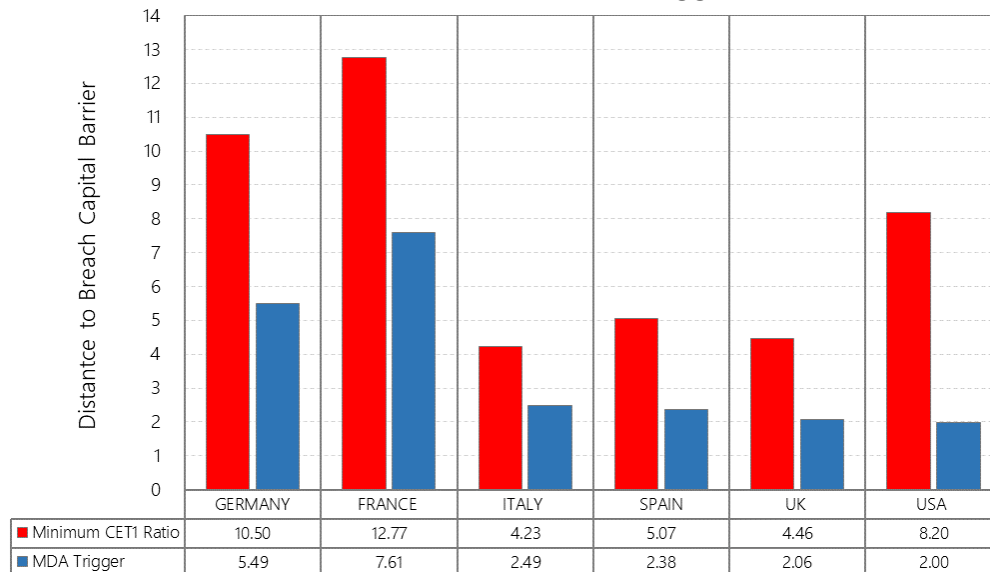
- Using the logic of a structural valuation model of corporate debt introduced by Black & Scholes (1973) and Merton (1974) we can construct a measure of the distance, in terms of standard deviations, between the current/expected profitability conditions in terms of ROA and the estimated BERoA levels that identify the breach of capital barriers imposed by the regulation.
- This may allow us to provide a normalization of the BERoA levels in order to have an idea of how far above the threshold value a Country's banking system is.
- The Distance to Breach Capital Barrier (DBCBC) is scaled by the historical yearly volatility (1996-2019) of the ROA for each Country. Volatility is estimated on the basis of the World Bank "Global Financial Development Database". In the following estimates, the current ROA is assumed to be zero for all countries, in order to make the comparison between Countries neutral.

$$DBCBC = \frac{\text{Current (Expected) ROA} - \text{BERoA}}{\text{ROA Volatility}}$$

- As can be seen, despite the use of a rough proxy as a measure of volatility, the reconstruction particularly penalizes those banking systems that have suffered heavy losses in recent years. The analysis also highlights the substantial difference between 2007 (pre-financial crisis) and 2019 (pre-Covid-19).

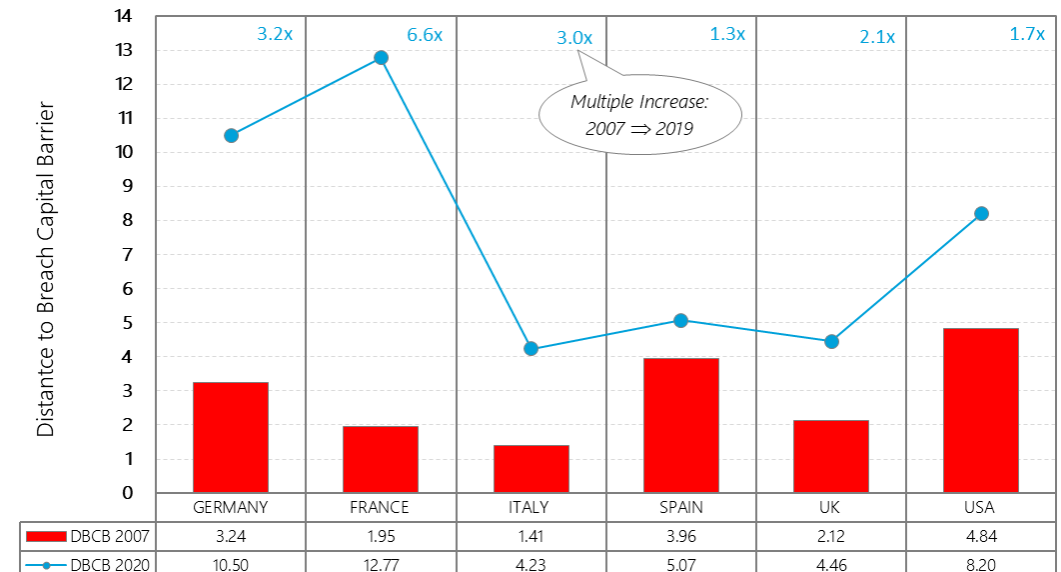
Distance to Breach Capital Barrier: 2020

CET1 Minimum & MDA Trigger

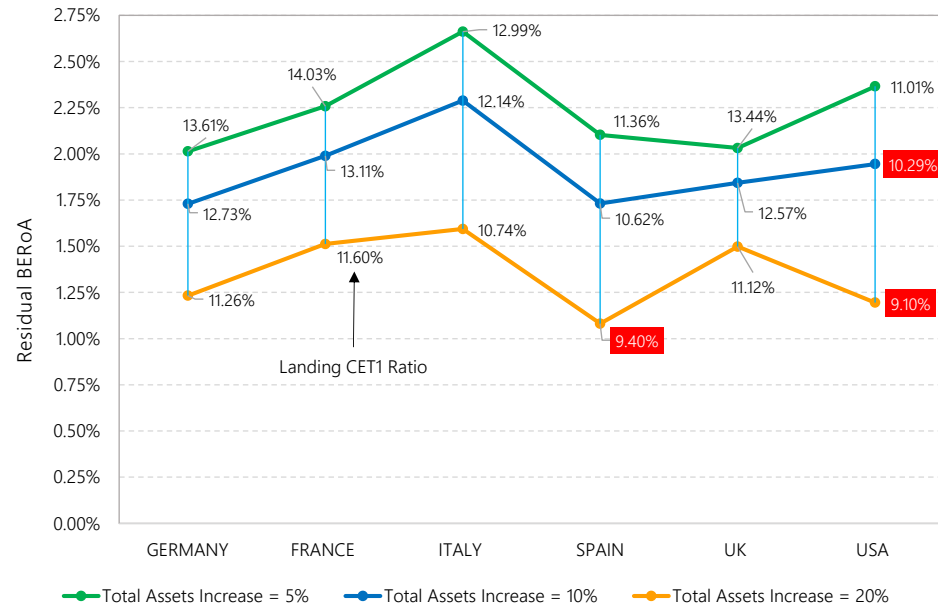


Distant to Breach Capital Barrier: 2007 vs. 2020

CET1 Minimum

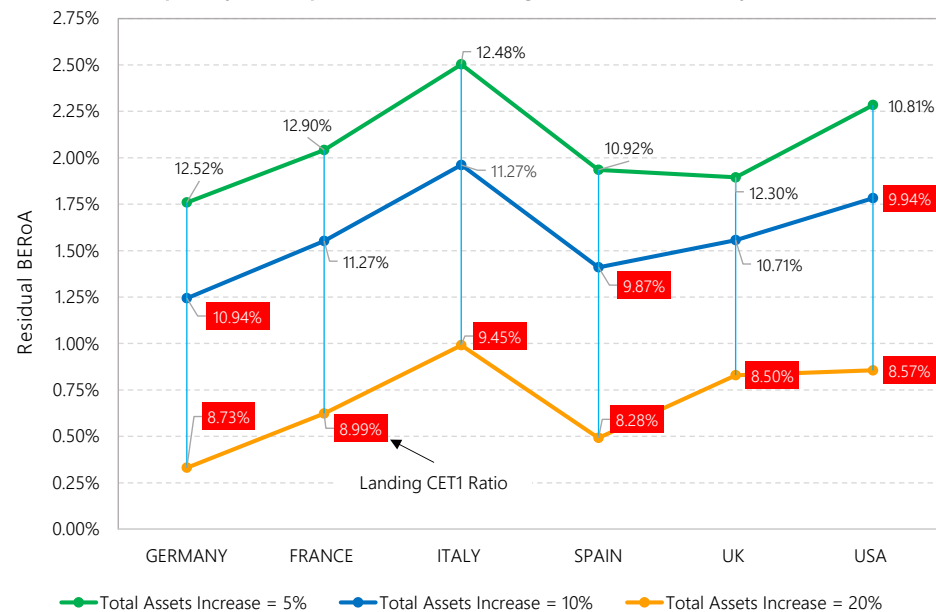


Capacity to expand assets: Marginal RWA Density = $RWADensity_{2019} \times (1+50\%)$ (*)

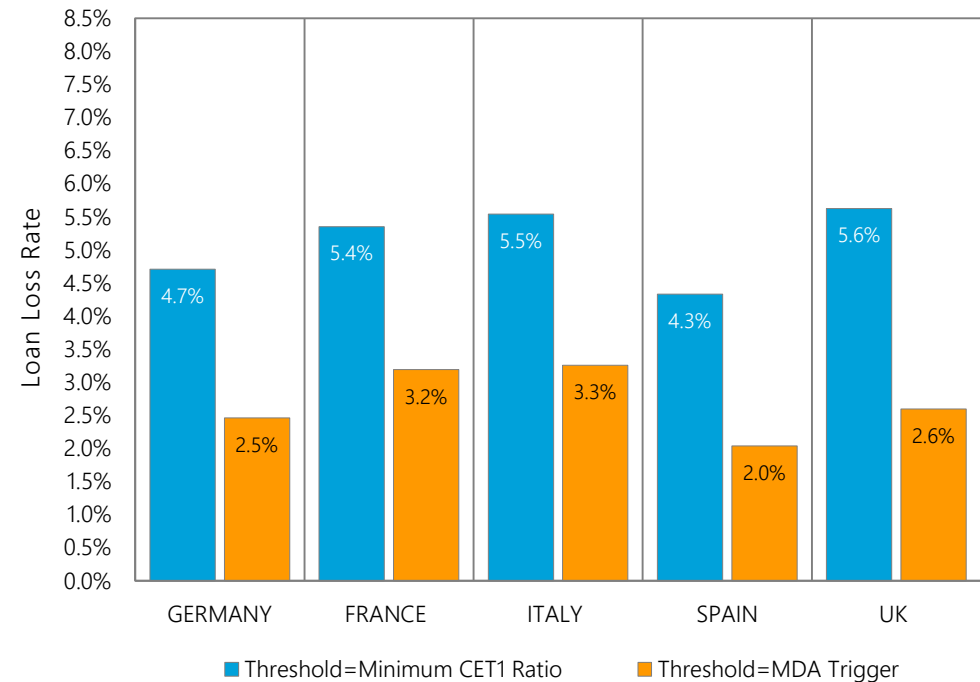


- The riskiness of new lending is a crucial factor in determining maximum lending capacity.
- Assuming a scenario in which the new assets are marginally weighted with a risk weight factor of 50% more than the ones in 2019, growth rates of assets of 20% would allow, in theory, the maintenance of a residual loss space (capital buffer), BEROA, between 1% and 1.5% relative to the minimum CET1 threshold; low levels of BEROA could only be sustainable in the short term.
- In an even more conservative scenario (marginal weighting of 100%), growth rate above 10% would not be sustainable.
- The maximum implicit loan loss rate (Provisions for Loan Losses/Total Loans) for the two reference threshold levels are between 2% and 3% for Minimum CET1, and between 4% and 5% for the MDA Trigger.

Capacity to expand assets: Marginal RWA Density = 100% (*)



Implied Max Loan Loss Rate



(*) In red, we highlight when the Landing CET1 Ratio breaches the MDA trigger.

SECOND DIMENSION

The Difficult Balance Between Financial Stability, Bank Regulation and Bank Market Value

A SIMPLE VALUATION FORMULA

Under the assumptions that a bank is in a *steady state* condition and growth at a constant level g , the implied equity value in terms of a multiple of the EBV ($m=P/EBV$) can be estimated as:

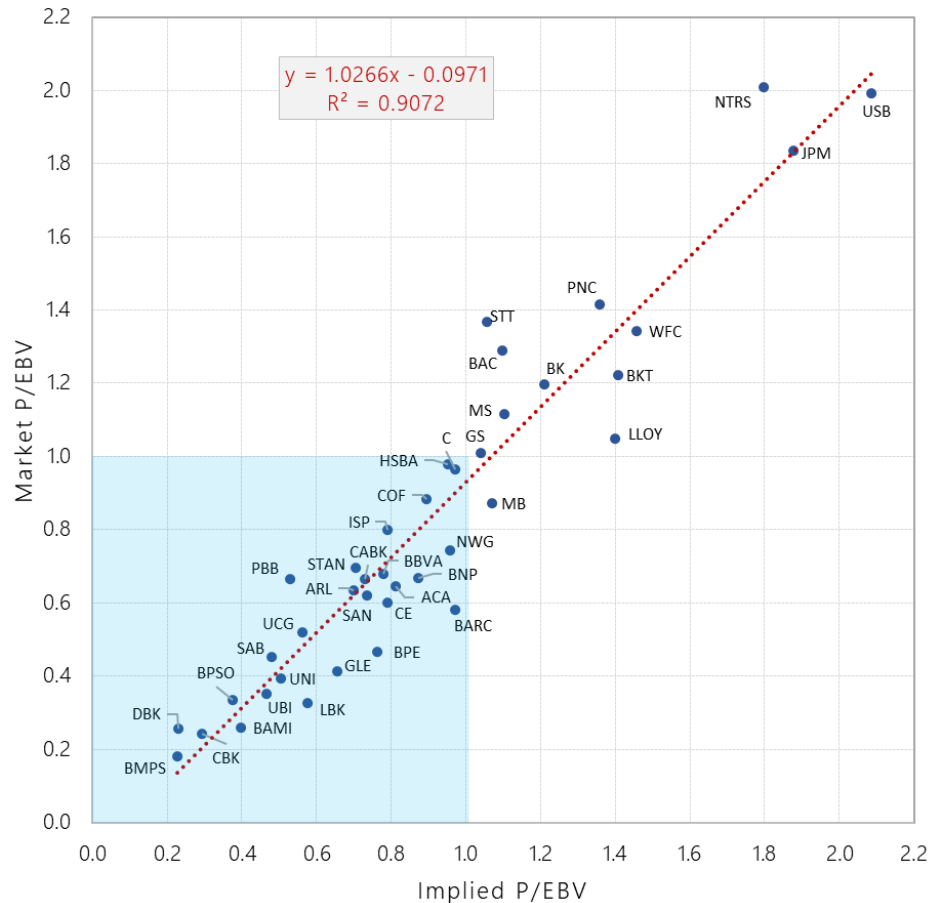
$$m = \frac{ROE - g}{COE - g}$$

where ROE is the return on equity and COE is the cost of equity.

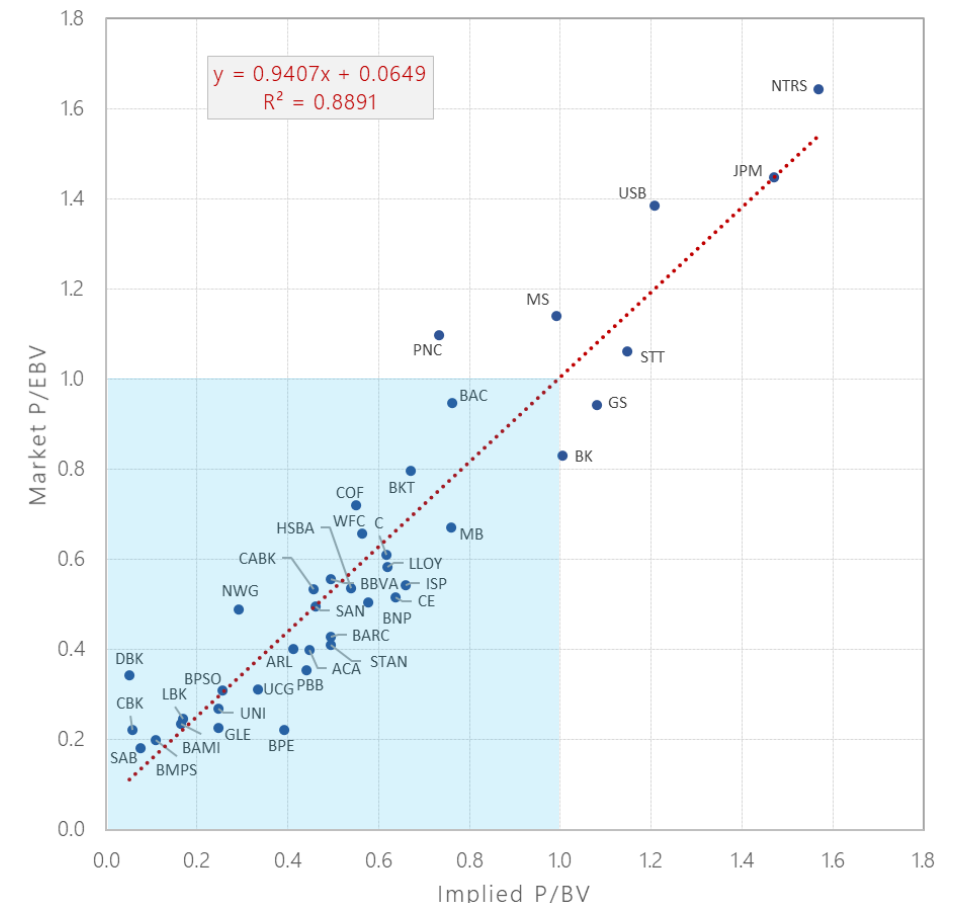
THE VALUE MAP ANALYSIS

The value map is reconstructed assuming: **ROE**: 2-year consensus median (at each estimate date). **COE**: determined on the basis of CAPM. Risk-free rates and market risk premiums for each Country provided by Fernandez *et al.* (2020). Betas were estimated using last-3-years weekly data (for both the bank price shares and the corresponding stock market country index). The growth rate of total assets, g , is set at 3% as a proxy of long term growth.

Pre-Covid 19 Value Map: Dec-2019

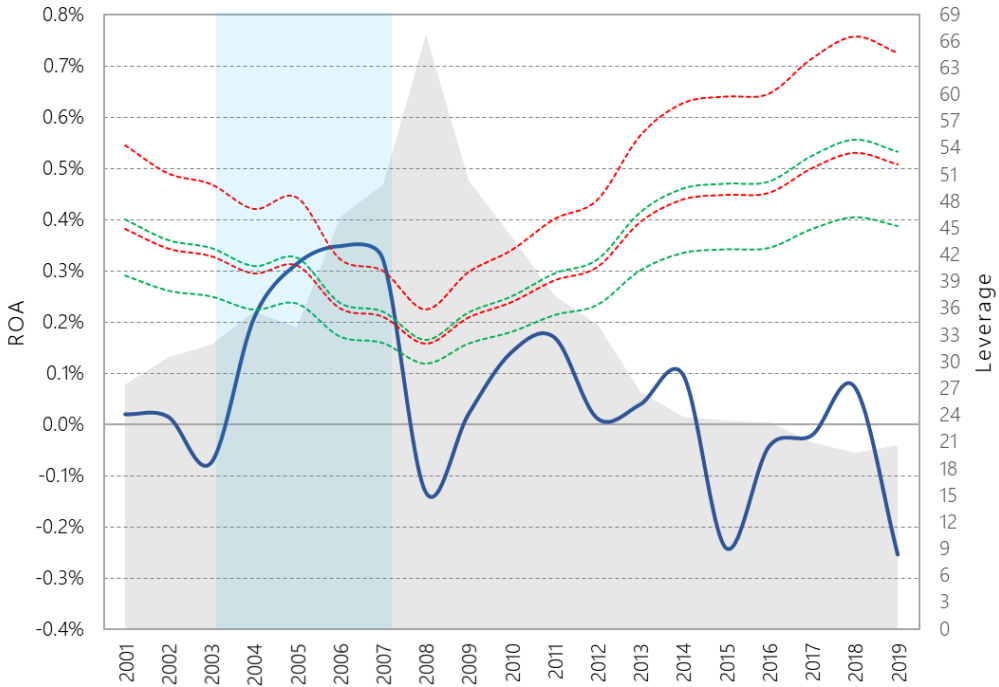


Post-Covid 19 Value Map: Nov-15-2020



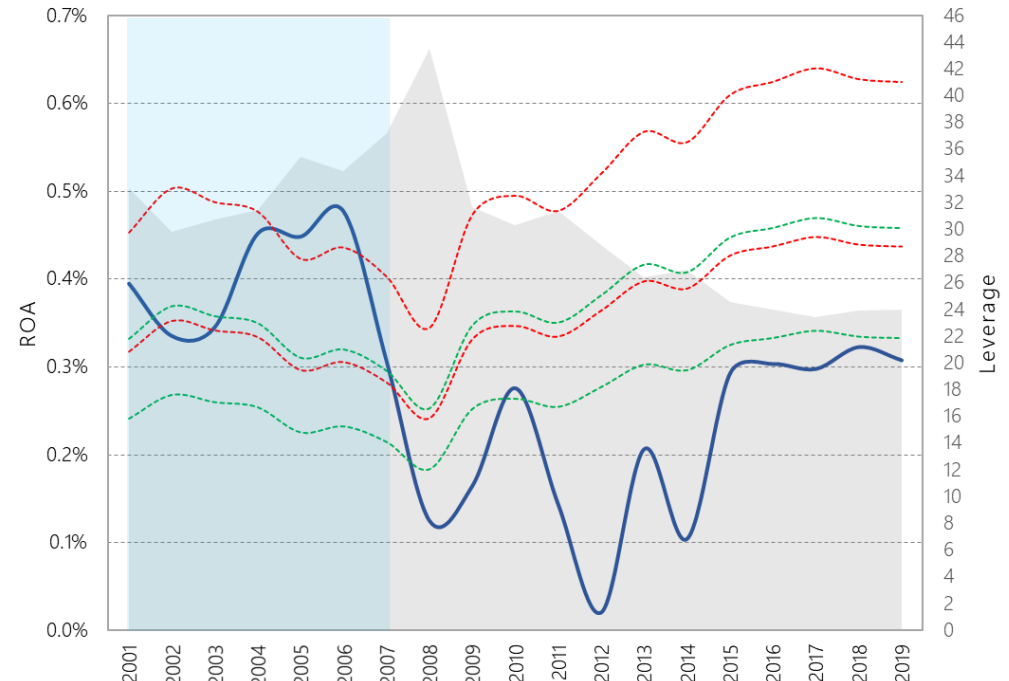
- The 2-year consensus median ROE declined from 7.8% in Dec. 2019 to 5% in Nov. 2020.
- The average cost of equity for the entire sample it is about 9.5% in both periods.

Germany: Implied ROA vs. Historical ROA & Leverage



For Germany and France, the significant reduction in leverage levels led to an equally significant increase in the levels of ROA required to keep certain levels of market-to-book ratio.

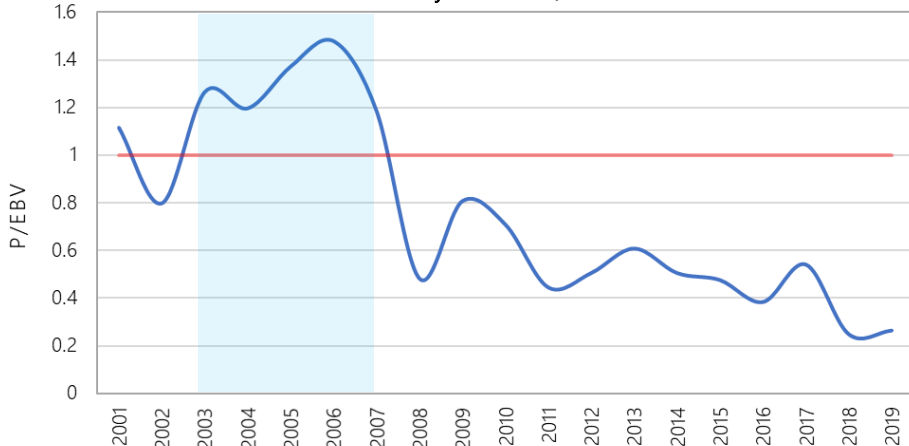
France: Implied ROA vs. Historical ROA & Leverage



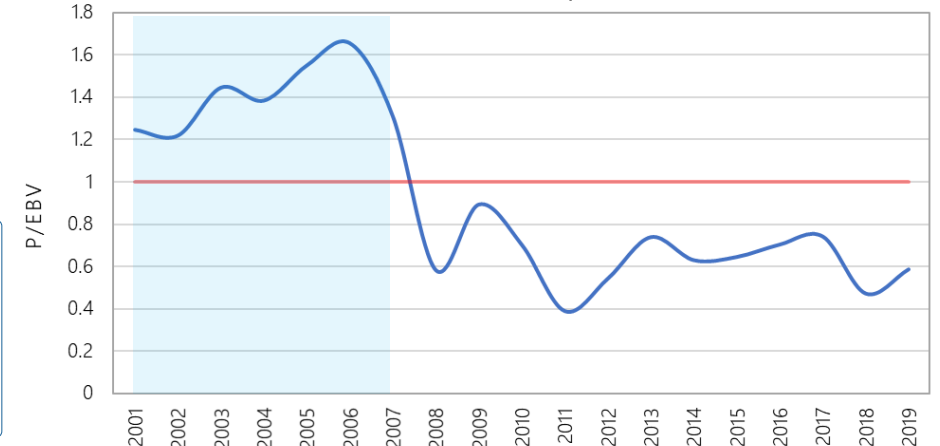
Leverage (TA/EBV)
 Historical ROA
 ImpliedROA(COE=8%, P/EBV=1)
 ImpliedROA(COE=11%, P/EBV=1)
 ImpliedROA(COE=8%, P/EBV=1.5)
 ImpliedROA(COE=11%, P/EBV=1.5)

Leverage (TA/EBV)
 Historical ROA
 ImpliedROA(COE=8%, P/EBV=1)
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 ImpliedROA(COE=8%, P/EBV=1.5)
 ImpliedROA(COE=11%, P/EBV=1.5)

Germany: Historical P/EBV

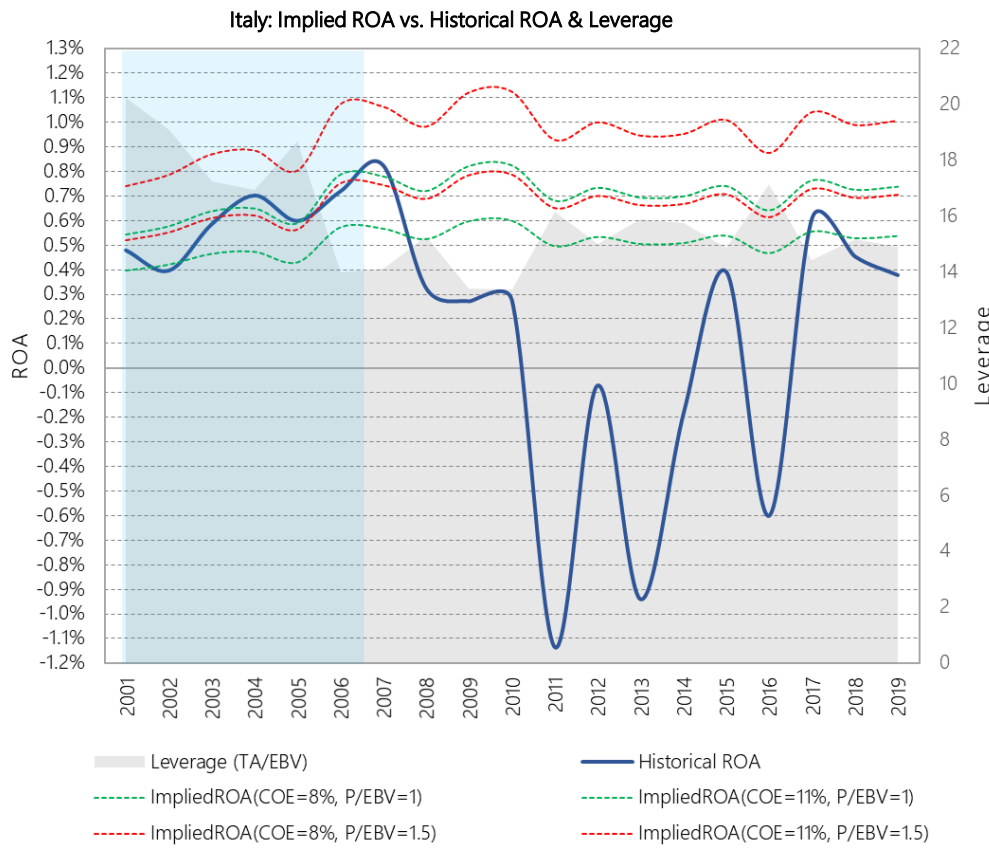


France: Historical P/EBV

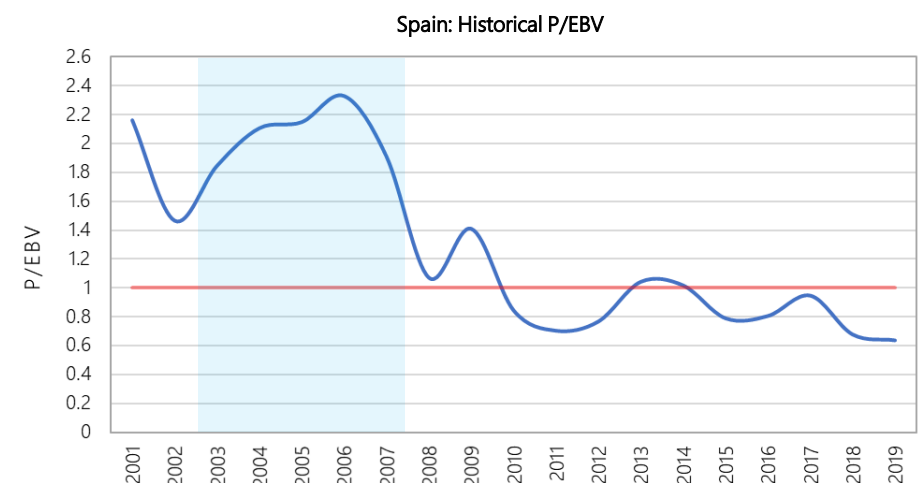
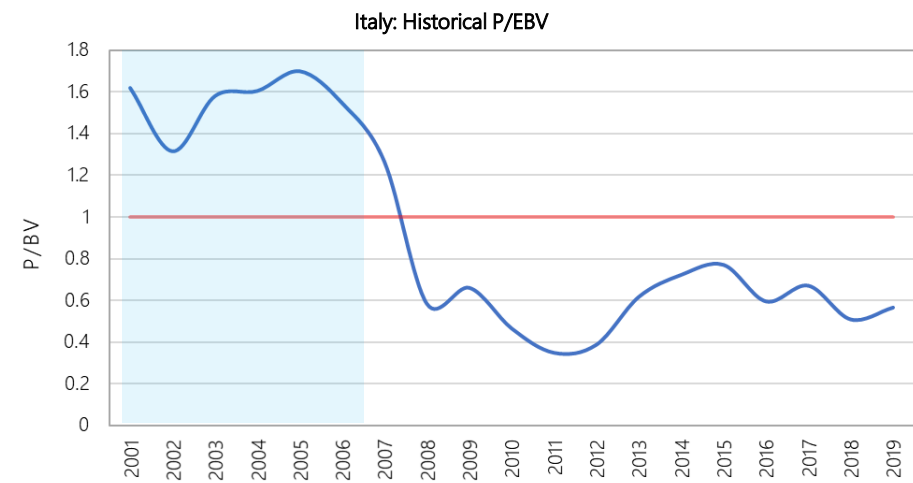
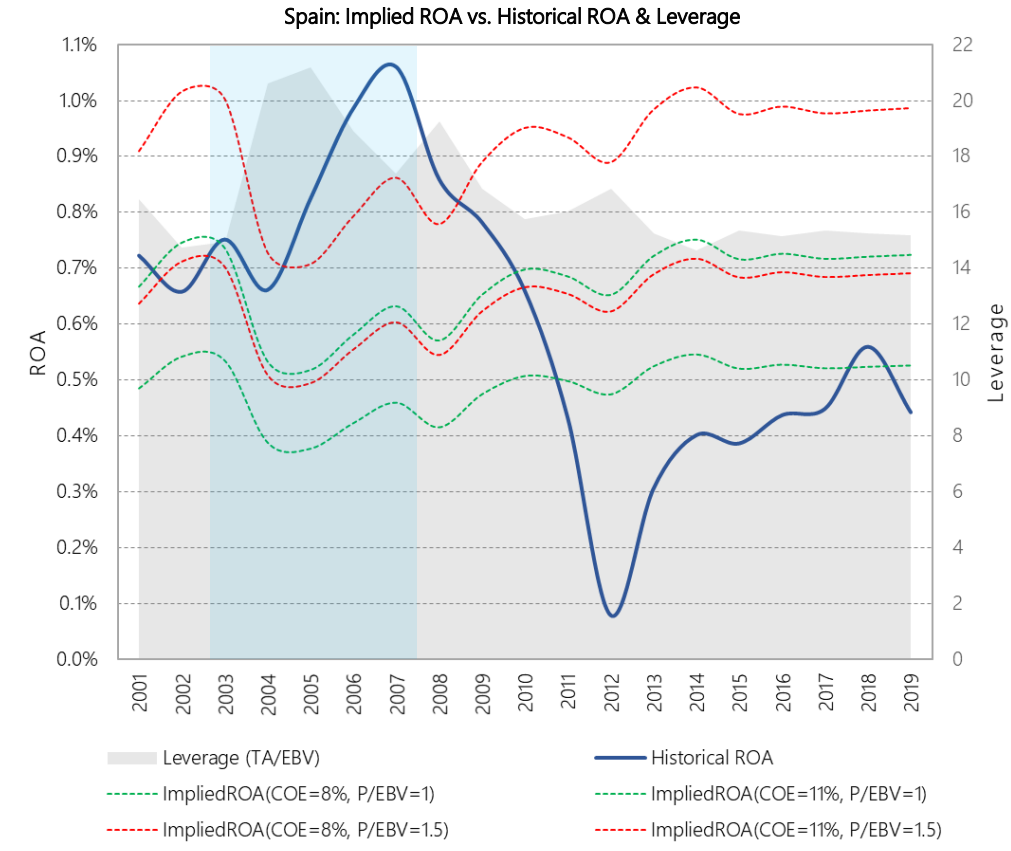


The dashed lines (green and red) that define the implicit ROAs are calculated based on the following equation:

$$ImpliedROA = \frac{m \cdot COE + (1 - m) \cdot g}{(TA/EBV)}$$



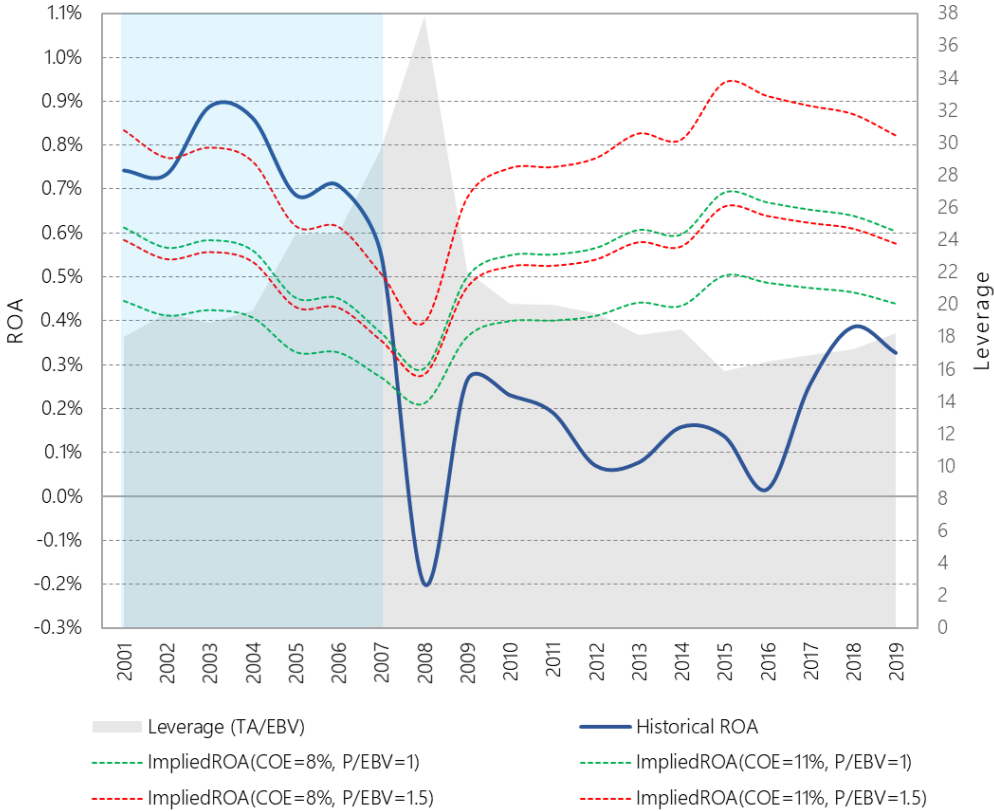
For Italy and Spain, the adjustment of leverage levels was more contained than in France and Germany; the increase in ROA levels required to keep certain levels of market-to-book ratio was smaller.



The dashed lines (green and red) that define the implicit ROAs are calculated based on the following equation:

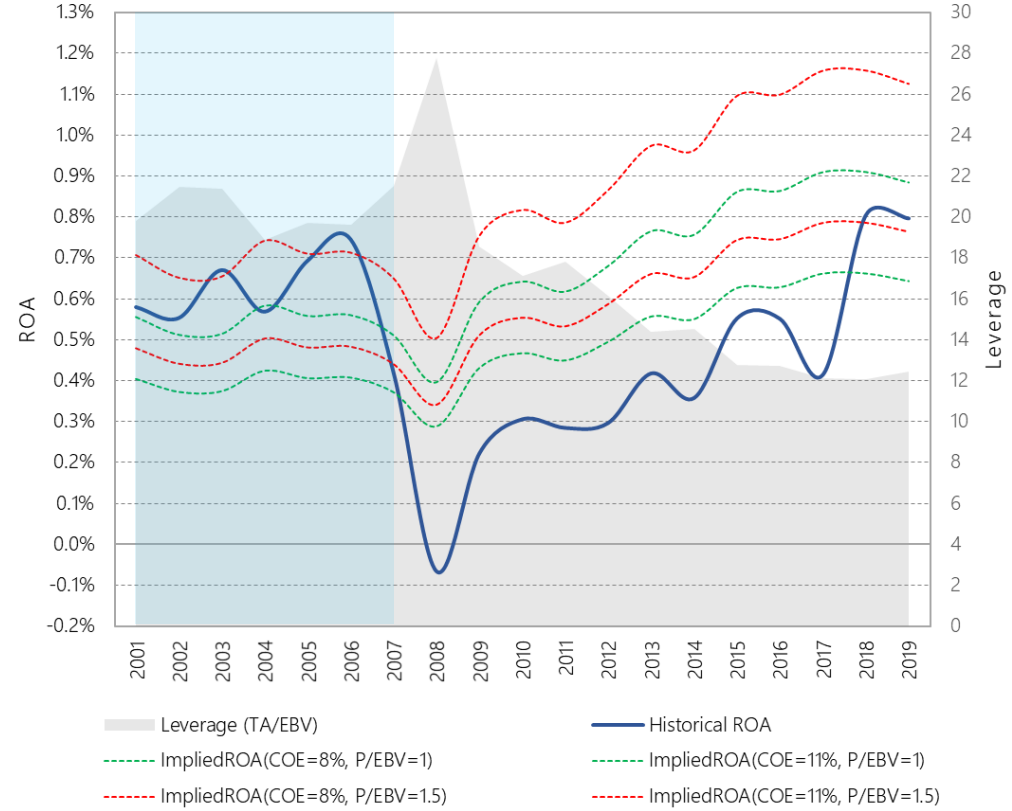
$$ImpliedROA = \frac{m \cdot COE + (1 - m) \cdot g}{(TA/EBV)}$$

UK: Implied ROA vs. Historical ROA & Leverage

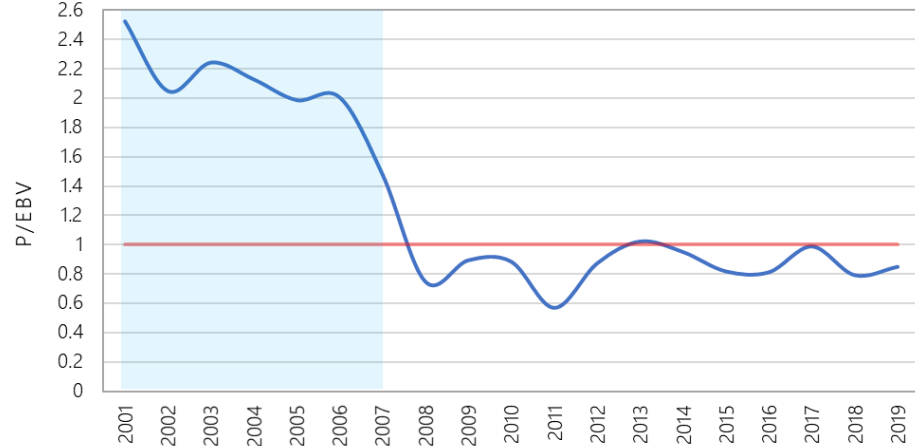


For the USA, the adjustment in leverage levels was quite significant and resulted in a significant increase in the ROA required to keep certain levels of market-to-book ratio. For the UK, the adjustment is only significant if we take the years just before the great financial crisis as a reference.

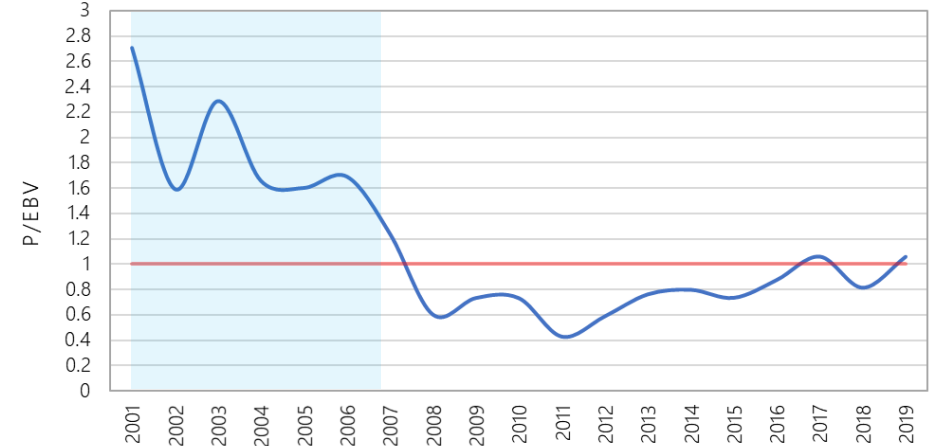
USA: Implied ROA vs. Historical ROA & Leverage



UK: Historical P/EBV



USA: Historical P/EBV

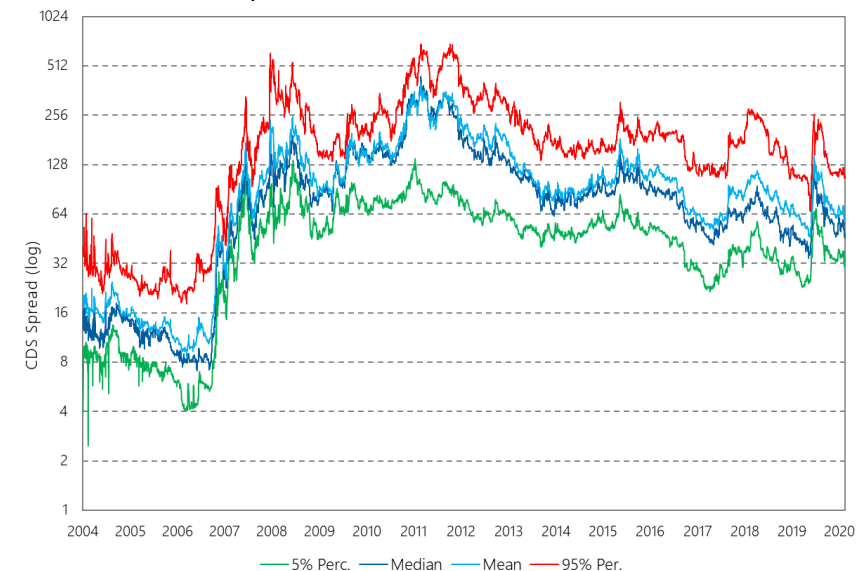


The dashed lines (green and red) that define the implicit ROAs are calculated based on the following equation:

$$ImpliedROA = \frac{m \cdot COE + (1 - m) \cdot g}{(TA/EBV)}$$

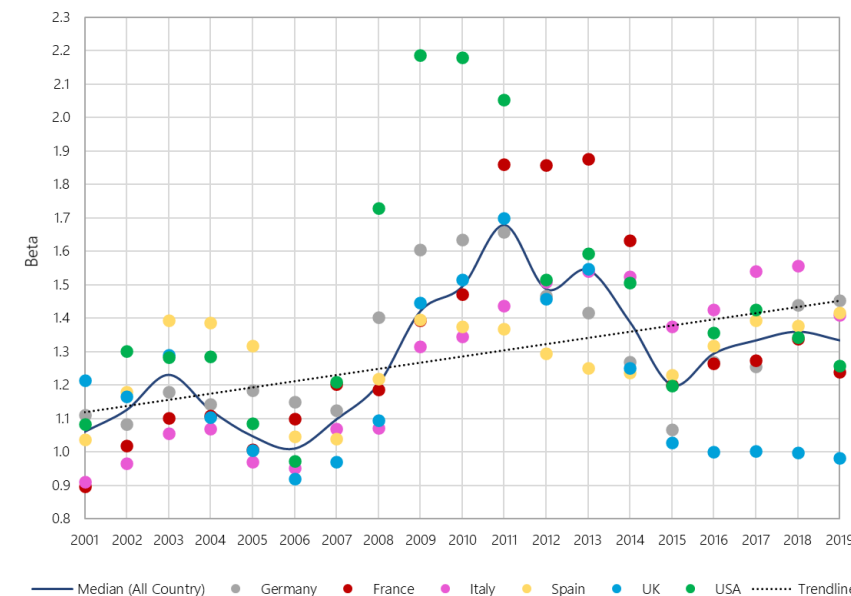
- Banks are widely valued at a discount in respect to their book value; this is particularly true in Europe. This condition is now exacerbated by the pandemic crisis.
- Despite improvements in profitability in recent years, banks still do not seem to be attractive enough to investors; this is particularly true in Europe.
- Higher capital requirements have made the banking system safer, but at the same time, they have also increased the levels of ROA required to keep the capitalization level stable and achieve certain market valuations. (see the following slide).
- In past years, several authors (see Admati *et al.*, 2010) have suggested that higher levels of capitalization would have led to lower levels of profitability, but that a lowering of risk might have counterbalanced it. Actually, bank profitability has declined compared to pre-financial crisis, while investor risk perception seems to have increased.
- Five-year bank credit spread proxied by CDS increased significantly compared to the years before the financial crisis; the maximum values of that time have become the minimum values of today. “New bail-in rules for bank failure resolution target long-term debt losses. Creditors... now demand higher compensation for absorbing potential futures default losses.” Duffie (2017).
- Even a simple analysis using market beta data seems to confirm the perception that banks are considered more risky; in recent years (excluding the period of the financial crisis), betas tend to be higher than before 2008-09.

Five Year CDS Spread (All Banks in Our Sample with CDS Price Available)



Data source: Bloomberg

Market Beta for Banking Stocks: Historical Evolution by Country



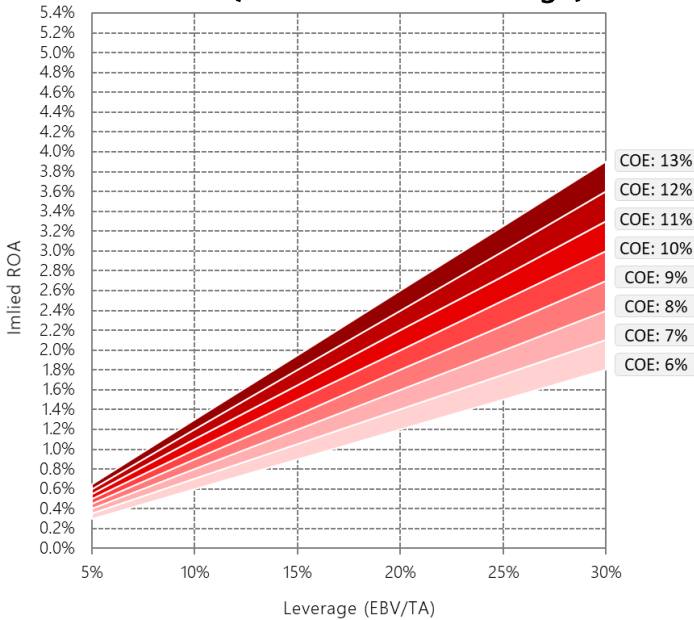
Data source: Bloomberg

The analysis includes a total of 40 banks (for a list by country, see the Annex). The betas for each Country are obtained as a weighted average (as a function of market capitalization) of the betas of the individual banks in the country. The market index used for the estimate is the country's reference stock index.

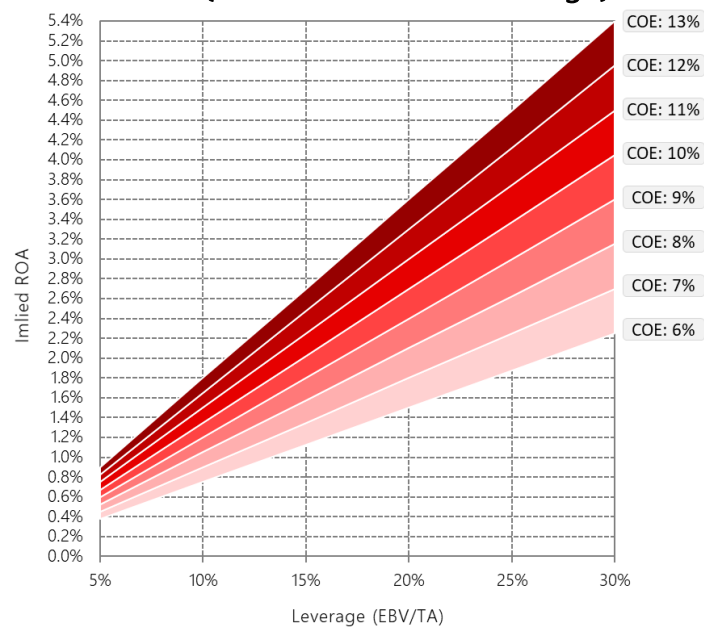
The Implied Relationships Between ROA, COE & Leverage

- The market value of a bank implies specific conditions to be satisfied in terms of profitability (ROA), risk (COE) and Leverage.
- If we increase equity requirements to keep certain market valuations, ROA must increase and/or COE must decrease. The two graphs below highlight these relationships; the analysis on the right also considers the potential effects on ROA of the increase/reduction of the cost of funding.
- The historical analysis of profitability at Country level shows that ROA levels above 1% tend to be difficult to obtain.

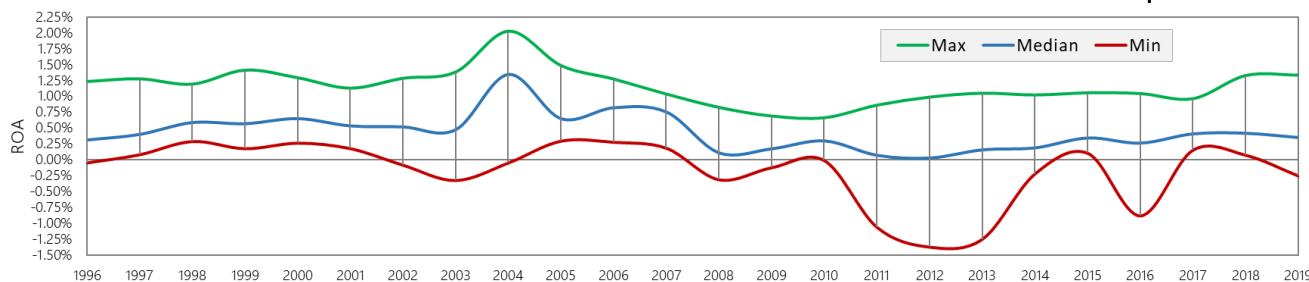
P/EBV=1: {ROA, COE and Leverage}



P/EBV= {1.5: ROA, COE and Leverage}



Historical Distribution of the Banks ROA for the Countries in the Sample

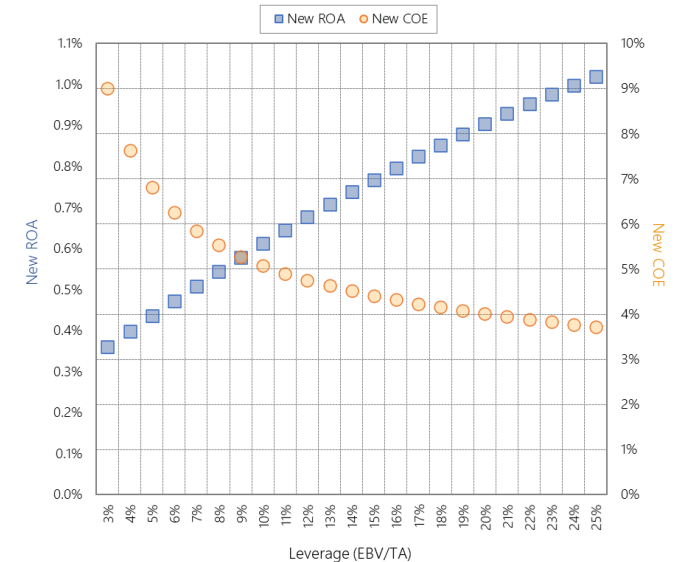


Data Source: World Bank Global Financial Development Database

A SIMPLE CHECK

- Gambacorta and Shin (2018) examine the impact of leverage on the average cost of debt funding, and they "...find that a 1 percentage point increase in the equity-to-total-assets ratio (EBV/TA) is associated with a reduction of approximately 4 basis points in the overall cost of debt funding (deposits, bonds, interbank borrowing, etc.)."
- On the basis of this hypothesis and assuming an initial COE of 9% and a $g=3%$, we calculate the implicit equilibrium relations in terms of ROA and COE, to keep a constant evaluation in terms of P/EBV=1, starting from an initial leverage condition EBV/TA=3%, assuming a progressive leverage increase (EBV/TA) in steps of 100 bps.
- The objective is to calculate, for each new level of leverage, the **New ROA** considering the effects linked to the reduction in the cost of funding (4-bps every 100-bps increase leverage), and given the New ROA, the level of **New COE** necessary to maintain P/EBV=1.
- If the COE does not adjust, the only way to keep the value unchanged is for the ROA to increase further, which would likely imply an increase in lending interest rates.

P/EBV=1: {ROA=f(Cost of Funding), COE and Leverage}



THE CURRENT SCENARIO

- The banking system has become much stronger in the past decade. Banks entered the Covid-19 crisis in better shape than they had been in during the previous crisis.
- In the aftermath of the global financial crisis, the approach to banking crisis management changed drastically. Banks had to acquire substantial amounts of **additional capital and liquidity** as well as step up their **risk governance**, while **regulation and supervision became more intrusive** in almost all business aspects, with a significant increase in compliance costs. **Investors must contribute to bank resolution and restructuring.**
- There is still a heated debate on **benefits and costs of much higher bank-capital requirement**; but no one seriously doubts that an increase in capital requirements and more generally reducing the exposure of taxpayers to systemic crises was necessary.

WHAT SCENARIO FOR THE FUTURE?

- The **capacity of banks to support certain asset growth rates and have certain market valuations** (which are two sides of the same coin) basically depends on **ROA, leverage and COE**. If we raise the capital requirements, the ROA level must also be increased to keep the same asset growth and leave the market value unchanged.
- However, **in the current market context there are still many sources of friction** that make the choice of the “optimal” capitalization level difficult and complex, because it is difficult to quantify the social costs and benefits of further raising capital requirements and/or trying to remove or at least reduce certain frictions. The **banking business is much more complex to evaluate than other sectors** also because of the high level of **informational asymmetry but at the same time needs to be kept healthy and stable.**
- The real market situation in recent years shows that those market mechanisms that should act as compensation do not seem to work; indeed, at the moment, they seem to go in the opposite direction. In the future it is possible that things may evolve in a different way, but as long as this scenario persists, **banks should increase the levels of profitability (often higher than those pre-financial crisis) necessary both to support the growth of lending and to be attractive to investors.**
- As we have seen, **regulation is not neutral in respect to the conditions** that: a) **make banks attractive to private investors**; b) **allow banks to support the real economy.** To this end, regulation should somehow foster the environment in which banks compete also to prevent “shadow banking” phenomena which are much more difficult to oversee.

THANK YOU FOR YOUR ATTENTION!

LIST OF BANKS USED IN THE ANALYSES

Following are the bank samples for each country used in our analyses. The first list includes the banks used in the FIRST DIMENSION section, in all the analyses referring to the year 2019, and the sample of listed banks, highlighted with an asterisk ("*"), used in the SECOND DIMENSION section.

- **GERMANY:** Aareal Bank AG*; ByernLB; Commerzbank AG*; Deka Group; ApoBank; Deutsche Bank AG*; Deutsche Pfandbriefbank AG*; DZ Bank AG; Hamburg Commercial Bank; LLBW; Helaba; Münchener Hypothekbank eG; NordLB; State Street Europe Holdings Germany; UBS Europe SE; Volkswagen Bank. The consolidated total assets of our sample represent about half of the consolidated total assets of the entire German banking system. Unlike the other countries considered in our analysis, Germany has a large number of less-significant banks.
- **FRANCE:** BNP Paribas Group*; BPCE Group; Crédit Mutuel Group; Crédit Agricole Group*; HSBC France; La Banque Postale; RCI Banque SA; SFIL SA; Bpifrance S.A. (Banque Publique d'Investissement); SoGen Group*. The consolidated total assets of our sample represent almost the entire consolidated total assets of the French Banking system as a whole.
- **ITALY:** MPS Group*; BPS Group*; Banco BPM Group*; BPER Group*; CCB Group; Credem Group*; Iccrea Group; ISP Group*; MB Group*; UCG Group*; UBI Banca Group*. The consolidated total assets of our sample represent almost the entire consolidated total assets of the Italian Banking system as a whole.
- **SPAIN:** Abanca Holding Financiero SA; BBVA*; BCC; Banco de Sabadell SA*; Santander Group*; Bankinter SA*; BFA Tenedora de Acciones SA; CaixaBank SA*; Ibercaja Banco SA; Kutxabank; Liberbank*; Unicaja Banco SA*. The consolidated total assets of our sample represent almost the entire consolidated total assets of the Spanish Banking system as a whole.
- **UK:** HSBC Group*; Lloyds Banking Group PLC*; Barclays PLC*; Natwest Group plc (former RBS Group)*; Standard Chartered PLC*. The consolidated total assets of our sample represent about 60% of the entire consolidated total assets of the Britannic Banking system as a whole.
- **USA:** Bank of America Corp*; Bank of NY Mellon Corp*; Capital One Financial Corp*; Citigroup INC*; Goldman Sachs Group INC*; JPMorgan Chase & Co*; Morgan Stanley*; Northern Trust Corp*; PNC Financial Services Group; State Street Corp*; U.S. Bancorp*; Wells Fargo & Co*. The consolidated total assets of our sample represent almost the entire consolidated total assets of the US Banking system as a whole.

The sample of banks used in the analysis referring to the year 2007 in the FIRST DIMENSION section includes the following banks in each country:

- **GERMANY:** Aareal Bank AG; Commerzbank AG; Deutsche Bank AG. The consolidated total assets of our sample represent about 27% of the entire consolidated total assets of the German Banking system as a whole.
- **FRANCE:** BNP Paribas Group; Crédit Agricole Group; SoGen Group. The consolidated total assets of our sample represent about 67% of the entire consolidated total assets of the French Banking system as a whole.
- **ITALY:** MPS Group; Banco Popolare; BPER Group; Credem Group; ISP Group; MB Group; UCG Group; UBI Banca Group. The consolidated total assets of our sample represent about 80% of the entire consolidated total assets of the Italian Banking system as a whole.
- **SPAIN:** BBVA; Banco de Sabadell SA; Santander Group; Bankinter SA. The consolidated total assets of our sample represent about 42% of the entire consolidated total assets of the Spanish Banking system as a whole.
- **UK:** HSBC Group; Lloyds Banking Group PLC; Barclays PLC; Natwest Group plc (former RBS Group); Standard Chartered PLC. The consolidated total assets of our sample represent about 59% of the entire consolidated total assets of the Britannic Banking system as a whole.
- **USA:** Bank of America Corp; Bank of NY Mellon Corp; Citigroup INC; JPMorgan Chase & Co; Northern Trust Corp; PNC Financial Services Group; U.S. Bancorp; Wells Fargo & Co. The consolidated total assets of our sample represent about 77% of the entire consolidated total assets of the Britannic Banking system as a whole.

DATA SOURCE

In order to run our calculations, we used the following data sets: banks' official 2019 consolidated annual reports; banks' official press releases; Bloomberg L.P. (in particular for 2007 data); banks' official capital Pillar 3 report; banks' official capital requirements (including P2R requirements). For both 2019 and 2007, the total amount of assets for the entire banking system in each country can be found through this query on the ECB web site (for German, British and Spanish banking systems only, 2008 data were used, as 2007 ones were not available in the ECB database). For the US, the 2019 data is drawn from BIS Statistics, and 2007 data from the Federal Reserve Bank of St. Louis. It is worth noting that the consolidated accounting data provided in the banks' official financial statements and the consolidated data provided by ECB, BIS or other authorities cannot be perfectly matched, as the source may be different (e.g. official regulatory reporting). Market data and consensus estimates used in the analysis were taken from Bloomberg.

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