

Pressures on Bank Capital

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2. Floors and the revised credit risk SA
3. Impact analysis on one country's banks
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Regulatory responses to the crisis

- The crisis required action to bolster bank capital and plug gaps in the regulatory framework that had been neglected under Basel II.
- The most important tasks after 2007 were:
 1. New market risk rules to constrain bank trading books which by 2007 contained many potentially illiquid credit sensitive instruments
 2. New liquidity regulations including LCR and NSFR type rules (Basel II focussed much too much on capital neglecting the stability of bank funding)
 3. Boosting overall levels of genuinely loss-absorbing bank capital to make the system more stable
 4. New rules on securitisation
- 1 led in July 2009 to BCBS 158 (“Basel 2.5”)
- 2 and 3 led to the Basel III regulations: BCBS 189 (June 2011) on capital, BCBS 238 (January 2013) on the LCR and BCBS 295 (October 2014) on the NSFR
- 4 was addressed after long delays by BCBS 303 (December 2014)

Evaluation

- With the exception of the securitisation rules which have some real weaknesses, these were highly sensible responses to problems and omissions in Basel II that contributed to the crisis.

Current developments

- But what is going on now is much more questionable
- The Basel III capital adjustments were effected by
 - changing the definition of capital (in reasonable ways) and
 - adjusting the trigger ratios that banks apply to their Risk Weighted Assets (RWAs)
- The latest measures proposed by Basel involve
 1. Instituting elaborate Standardised Approaches (SA) the capital banks must hold against different risk types (notably credit, market and operational)
 2. Imposing capital floors whereby advanced banks using internal models to calculate capital must hold capital no less than some fraction of the SA capital

Comments

- Basel III involved transparent increases in capital levels that had relatively little differential impact on banks' various activities (except for uncontroversial increases in capital for illiquid and credit related exposures in the trading book)
- The combination of new, supposedly risk sensitive SAs plus capital floors creates major capital hikes for some risks while little affecting others
- The effects depend on calibrations of look-up tables and risk weighting for which no clear justification has been provided
- For some banks, the new rules will double capital, for others the effects may be much less but overall capital levels will substantially rise

The assault on internal models

- The driving force behind this development is the negative view that some regulators take of banks' internal models
- This view is justified by comparative studies showing that banks' models imply different risk weights for particular example exposures
- It is then suggested that banks have too much scope to game the system

Comments

- Variation across risk weight implied by bank models is not very surprising to anyone who has hands-on experience of evaluating risk in financial portfolios
- There are inevitably differences in data available for calibration exercises and in choices made in formulating models
- The correct response should be to encourage more industry benchmarking exercises (in the results of which bank risk managers are always highly interested) and in regulatory analysis and benchmarking through effective supervision
- The idea that regulators can devise appropriate risk weight calibrations for banks in all jurisdictions by populating a few look up tables is simple hubris

Broader implications for Basel level decision making

- One may argue that the approach of risk sensitive SAs and capital floors actually throws into doubt the good sense of the Basel project in general
- The Basel II use of internal models permitted risk sensitivity to be applied in a way that was appropriate to the risks of banking assets in different countries
- It is easy to show the inappropriateness of risk weights for particular exposures in particular markets or countries based on SA calibrations
- This was not so much of a problem when the larger banks could use their internal models and hence only small banks (that required high capital buffer anyway) were affected
- But if capital floors mean that SA risk weights are the binding constraint on all banks then one may well ask: Why should a jurisdiction apply Basel rules that are based on inappropriate calibrations with no clear justification?
- The currently proposed credit risk SA lookup table in BCBS 307, for example, implies high capital charges for Dutch mortgages despite their generally very low delinquency rates
- If the Dutch determined their own rules rather than being subject to European decision-making, they would not be sensible to adopt what is proposed
- On securitisation, we have recently seen Europe in effect reject Basel securitisation rules inappropriate for its own market

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Illustration: Credit Risk SA (1/2)

Capital floors

- BCBS 306 suggests RW floors for IRB banks based on some percentage (80%?) of SA risk weights
- Unclear whether the floors would be at the risk class level or bank wide
- The new floors would “sort out” the current situation in which “Basel I floors” inherited from the Basel II transition period are applied differently in different jurisdictions
- But, the Basel I floors DO NOT BIND for most banks so replacing them with one that does is likely to imply a significant capital hike

| | Revenue ≤ €5m | Revenue ≤ €50m | Revenue ≤ €1bn | Revenue > 1bn |
|---------------------|---------------|----------------|----------------|---------------|
| Leverage: 1x-3x | 100% | 90% | 80% | 60% |
| Leverage: 3x-5x | 110% | 100% | 90% | 70% |
| Leverage: >5x | 130% | 120% | 110% | 90% |
| Negative Equity (*) | 300% | 300% | 300% | 300% |

Current and Revised Credit Risk SAs

- The current credit risk SA yields capital for exposures in each asset class based on $8\% \times \text{EAD} \times \text{Asset-class-specific-risk-weight}$
- If an exposure is rated (corporate/bank/sovereign), a rating-specific risk weight is employed.
- In the revised SA, set out in BCBS 307, rating-based risk weights are retained for sovereigns but for other exposures, ratings are dropped and risk weights depend on financial ratios

For example, corporate risk weights depend on (i) Revenue and (ii) Leverage (assets/equity)

Illustration: Credit Risk SA (2/2)

Bank risk weights depend on (i) CET1 ratios (ii) Net non-performing assets

| | 12% > | 9.5% > | 7% > | 5.5% > | | |
|----------------------|------------|------------|------------|------------|------------|------------|
| | CET1 ratio | CET1 ratio | CET1 ratio | CET1 ratio | CET1 ratio | CET1 ratio |
| | ≥ 12% | ≥ 9.5% | ≥ 7% | ≥ 5.5% | ≥ 4.5% | < 4.5% |
| NNPA ratio ≤ 1% | 30% | 40% | 60% | 80% | 100% | 300% |
| 1% < NNPA ratio ≤ 3% | 45% | 60% | 80% | 100% | 120% | 300% |
| NNPA ratio > 3% | 60% | 60% | 100% | 120% | 140% | 300% |

Residential mortgage risk weights depend on Loan-to-Value and Interest Coverage Ratios

| | 40% ≤ LTV | 60% ≤ LTV | 80% ≤ LTV | 90% ≤ LTV | | |
|-----------|-----------|-----------|-----------|-----------|--------|------------|
| | LTV < 40% | < 60% | < 80% | < 90% | < 100% | 100% ≤ LTV |
| DSC ≤ 35% | 25% | 30% | 40% | 50% | 60% | 80% |
| DSC > 35% | 30% | 40% | 50% | 70% | 80% | 100% |

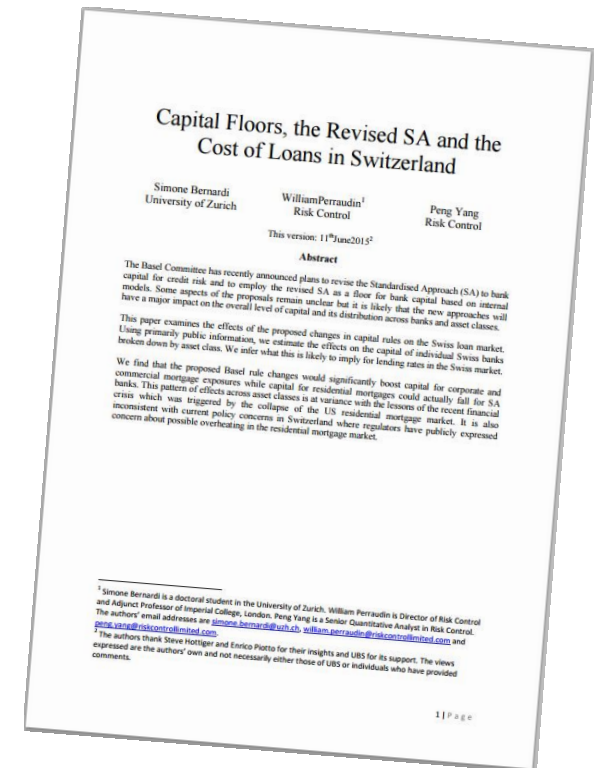
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Overview

- To analyse the impact of BCBS 306 and 307 on the Swiss loan market
- We study the effects on 37 individual banks, breaking results down by different loan categories.
- We then re-aggregate the findings which we report for Large banks, Cantonal banks and Other banks

A two-step process

1. First, we calculate the impact on the capital that banks will have to hold against loans in different categories.
2. Second, we estimate the effect on the spreads that banks would charge for making loans in these categories.
 - This involves estimating banks' cost of funding given their regulatory capital requirements



Results

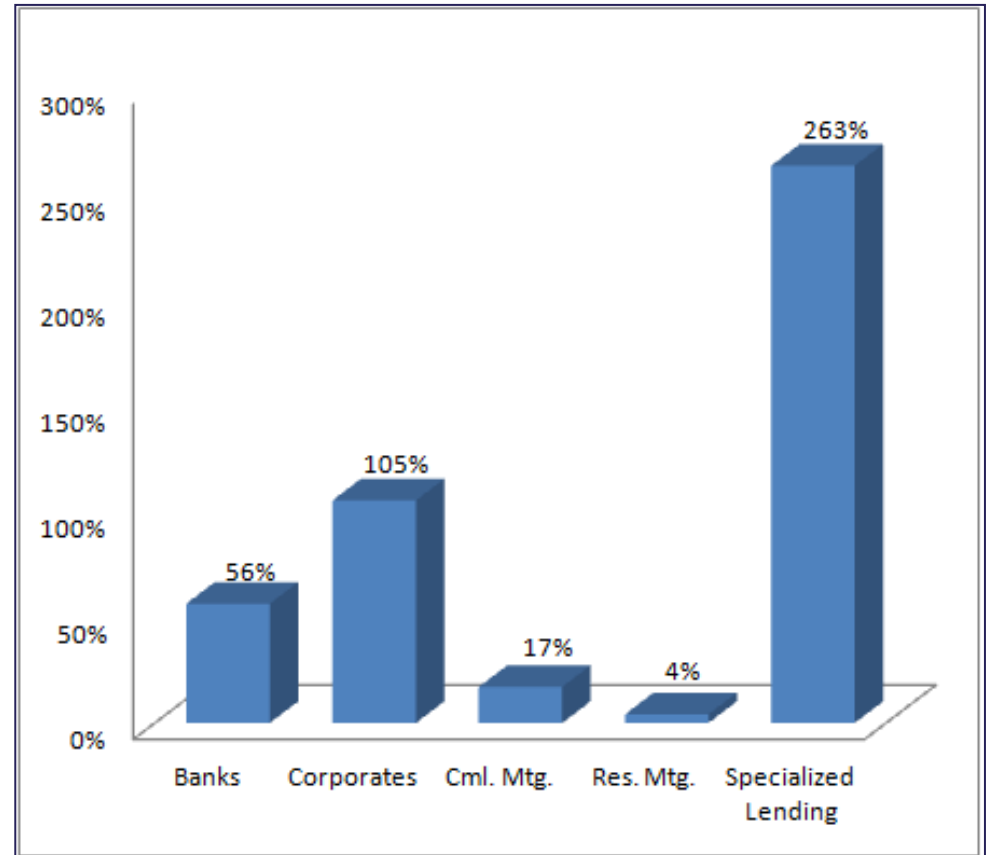
- Our analysis reveals dramatic results.
- We believe some effects of the proposed regulations are unintentional. For instance:
 - Capital for corporate loans within Switzerland would be substantially boosted
 - Whereas capital for residential mortgages would fall for SA banks (but increase for IRBA banks)
- IRBA banks would be required to hold substantially greater capital
- Capital for SA banks would in many cases fall

Immediate implications

- Changes to capital levels matter for the rest of the economy to the extent that they affect the lending rates that banks charge.
- To reveal the implications for lending rates, we have looked at how bank loan spreads (over and above Treasury yields) would be affected.

What are the effects?

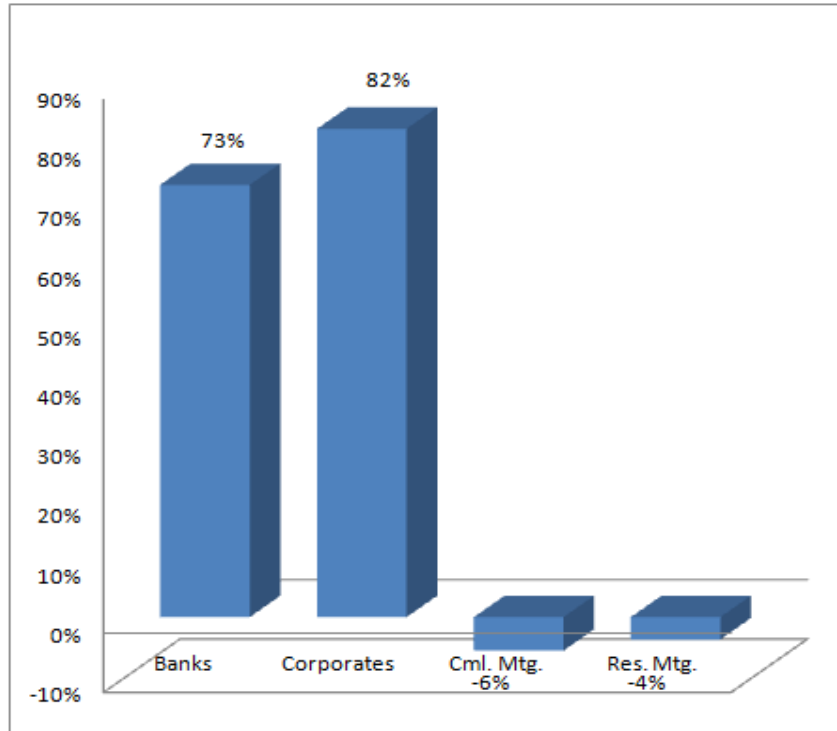
- We focus on four key loan categories:
 1. exposures to banks,
 2. corporate loans,
 3. commercial mortgages , and
 4. residential mortgages.
- Corporate and commercial mortgage capital increase substantially
- Capital for residential mortgages hardly changes
 - this partly reflects offsetting rises and falls in increases in IRBA and SA bank capital for residential mortgages.



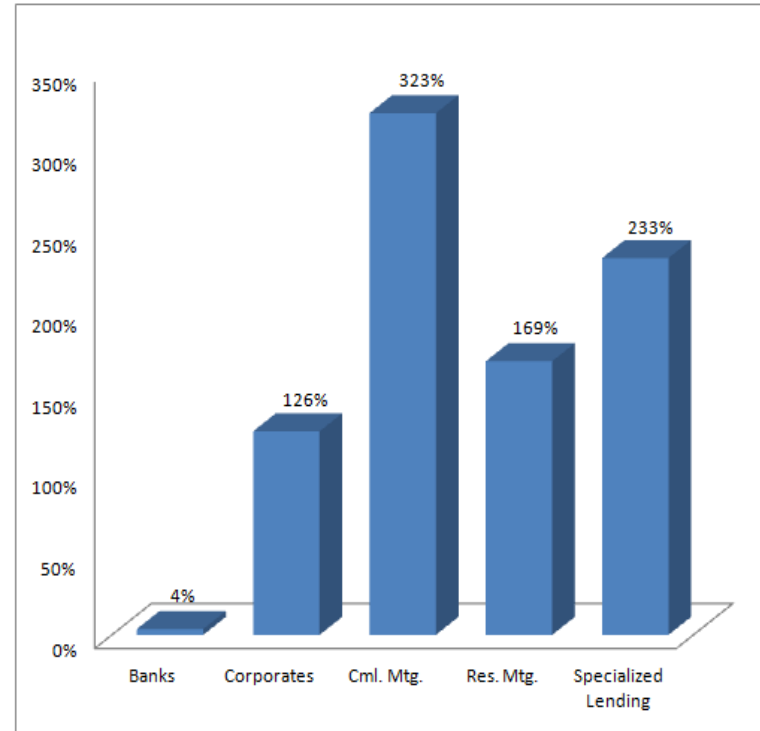
Note: The figure shows the percentage change in capital that Swiss banks will have to hold under the new regulations against their loans to Swiss borrowers.

RW breakdown by IRBA/SA banks

Weighted average SA bank RW changes



IRB bank RW changes (80% asset class floor)



Changes in bank lending spreads

- The table shows weighted average estimates of changes in bank lending spreads that would result from the adoption of the new bank capital rules.
- Estimates are presented for two assumptions about the relevant definition of equity capital: Common Equity Tier 1 (CET1) or Total Capital
- The increase in the cost of lending due to the spread change is CHF 1.3 billion or CHF 2.1 billion per annum (depending on which of the capital definitions is employed).

| | Banks | Corp. | CML. Mtg. | Res. Mtg. | Specialised Lending | Wtd. Avg. |
|-------------------------------|--------------|--------------|----------------------|----------------------|--------------------------------|----------------------|
| CET1 Capital Target | | | | | | |
| Wtd. Avg. of IRB Banks | 3 | 60 | 57 | 9 | 70 | 30 |
| Wtd. Avg. of IRB and SA Banks | 7 | 45 | 14 | 2 | 70 | 11 |
| Total Capital Target | | | | | | |
| Wtd. Avg. of IRB Banks | 6 | 103 | 90 | 15 | 121 | 51 |
| Wtd. Avg. of IRB and SA Banks | 11 | 73 | 22 | 3 | 121 | 19 |

Note: The table shows weighted average estimates of changes in bank lending spreads.

Spread impact for IRBA banks

Spread impact in basis points (asset class level floor for IRB banks)

| | | Spread Impact 1 (Constant Equity Return) | | | | | Spread Impact 2 (Reduced Equity Return) | | | | | | |
|----------------------------|-------------------------------|--|-------|------|------|----------|---|-------|-------|------|------|---------|------|
| | | Speciali | | | | Speciali | | | | | | | |
| | | Cml. | Res. | zed | Wtd. | CML. | Res. | zed | Wtd. | | | | |
| | | Banks | Corp. | Mtg. | Mtg. | Lending | Avg. | Banks | Corp. | Mtg. | Mtg. | Lending | Avg. |
| | | 60% floor | | | | | | | | | | | |
| CET 1 capital target | Wtd. Avg. of IRB Banks | 3 | 39 | 38 | 4 | 49 | 19 | 3 | 37 | 36 | 3 | 46 | 18 |
| | Wtd. Avg. of IRB and SA Banks | 8 | 38 | 8 | 0 | 49 | 8 | 7 | 36 | 7 | 0 | 46 | 8 |
| | 70% floor | | | | | | | | | | | | |
| | Wtd. Avg. of IRB Banks | 4 | 52 | 49 | 6 | 62 | 25 | 3 | 49 | 47 | 5 | 59 | 23 |
| | Wtd. Avg. of IRB and SA Banks | 8 | 43 | 12 | 1 | 62 | 10 | 7 | 41 | 11 | 0 | 59 | 9 |
| | 80% floor | | | | | | | | | | | | |
| | Wtd. Avg. of IRB Banks | 5 | 65 | 60 | 11 | 75 | 33 | 3 | 60 | 57 | 9 | 70 | 30 |
| | Wtd. Avg. of IRB and SA Banks | 8 | 47 | 15 | 2 | 75 | 13 | 7 | 45 | 14 | 2 | 70 | 11 |
| | | 60% floor | | | | | | | | | | | |
| Total capital target | Wtd. Avg. of IRB Banks | 6 | 67 | 60 | 6 | 84 | 32 | 4 | 63 | 57 | 5 | 80 | 29 |
| | Wtd. Avg. of IRB and SA Banks | 12 | 60 | 14 | 0 | 84 | 13 | 11 | 57 | 12 | 0 | 80 | 12 |
| | 70% floor | | | | | | | | | | | | |
| | Wtd. Avg. of IRB Banks | 6 | 90 | 79 | 10 | 107 | 43 | 4 | 84 | 74 | 8 | 101 | 39 |
| | Wtd. Avg. of IRB and SA Banks | 12 | 68 | 19 | 2 | 107 | 17 | 11 | 65 | 18 | 1 | 101 | 15 |
| | 80% floor | | | | | | | | | | | | |
| | Wtd. Avg. of IRB Banks | 8 | 111 | 96 | 18 | 128 | 55 | 6 | 103 | 90 | 15 | 121 | 51 |
| | Wtd. Avg. of IRB and SA Banks | 12 | 76 | 24 | 4 | 128 | 21 | 11 | 73 | 22 | 3 | 121 | 19 |

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Our findings are

- Bank capital charges for Bank, Corporate, Commercial Mortgage, Residential Mortgage borrowers and Specialised Lending will increase by 18%, 160%, 215%, 35% and 259% respectively.
- Total IRB bank capital will rise by 108%.
- Total SA bank capital against Residential Mortgages will fall from CHF 22 billion to CHF 21 billion.
- Substantially higher capital is likely to lead to increases in lending spreads in Swiss loan markets.
- We estimate that Corporate Loan spreads would rise by between 45 and 76 basis points assuming a full pass-through to borrowers and an 80% asset class level floor.
- If one assumes that IRB banks set prices in corporate lending, then the impact will be between 60 and 111 basis points.

Broader implications

- Here we have focussed on the revised credit risk SA and its interactions with capital floors. Similar arguments apply to the FRTB
- The shocks to bank capital from these measures are substantial enough to be labelled Basel IV
- They stem from a misguided attempt to link capital for IRB banks to a set of conservative, supposedly risk sensitive SA rules
- Some may argue that raising bank capital does not matter as standard academic arguments suggest increasing capital cuts the costs banks face in raising equity
- But this argument turns on whether banks behave like simple portfolios long in loans and short in deposits
- Controlling bank managers is challenging for outsiders creating free-cash-flow-related agency costs and making external equity costly
- There are real effects in imposing inappropriate capital levels on different bank exposures

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What one needs to know

- To calculate the revised SA capital for a given bank and given asset class (e.g., corporate exposures), one needs the total exposure and the breakdown of that exposure by the risk indicator ranges specified in BCBS 307
- Such breakdowns are hard to assess from outside a bank but we have
 1. Data on the credit quality of their exposures (from Pillar 3 disclosures)
 2. Loan breakdowns by risk indicators and credit quality for the Swiss market (from UBS)

Steps in the capital forecasting

- a) For IRB banks, we infer default probabilities (PDs) from risk weights using the standard Basel formula assuming values of loss given default (LGD) and maturity (MT).
- b) For SA banks, we infer ratings from RW according to the look-up tables in the current SA approach.
- c) From the inferred ratings, we map the corresponding PD based on a default probability master scale table provided by UBS (see Table 8).
- d) We devise two rating buckets: AAA to A- and BBB+ to default.
- e) For each asset class that depends on two capital indicators, we estimate three joint distributions: one unconditional distribution and two conditional distributions for the above two rating buckets.
- f) For each asset class, we associate to each of the exposure categories (broken down by credit quality) a distribution of the two capital indicators conditional on their credit quality.
- g) Given the look-up table in the revised SA paper, the indicator distribution and the loan exposure at default, we calculate the risk weighted assets and capital requirement for the loan book.

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How we analyse spread impact

Banks finance a given loan using a combination of deposit and equity funding.

- The latter is considerably more expensive to a bank, dollar for dollar.
- The volume amount of equity funding that a bank requires for a loan is determined by the regulatory capital a bank is required to hold.

$$\begin{aligned} \Delta spread &= capital_{new} \\ &\quad \times return\ on\ equity_{new} \\ &\quad - capital_{old} \\ &\quad \times return\ on\ equity_{old} \end{aligned}$$

Here the “capital level” is measured per Swiss franc of exposure. To estimate the return on equity, we use the Capital Asset Pricing Model (CAPM).

$$\begin{aligned} \Delta spread_{i,j} &= \begin{cases} (K_{i,j}^{RSA} \times \beta_j^{SA} - K_{i,j}^{SA} \times \beta_j^{SA}) \times \gamma, & \text{constant cost of equity} \\ (K_{i,j}^{RSA} \times \beta_j^{RSA} - K_{i,j}^{SA} \times \beta_j^{SA}) \times \gamma, & \text{varying cost of equity} \end{cases} \end{aligned}$$

We estimate the beta using a regression: $\beta_{Equity} = \alpha_0 + \alpha_1 \times \frac{Assets}{Equity}$

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