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History lesson II: Estimating the dilution from a COVID -19 recession for equity investors

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Equities have displayed remarkable resilience so far in this crisis. The first quarter fall in equity prices was steep with the S&P 500 down 20%, a record for the first quarter. But, considering the magnitude of the crisis, some have argued that equities should have fallen by more.

The market's behaviour was not that irrational, though. Prompt action from various central banks and governments reduced the risk of another financial crisis following on from the economic crisis that we likely face. So, investors only had to account for the loss in earnings, and that has little impact on equity prices in the long term. We demonstrated this in our March report[1]. One assumption we made in that report was that companies in aggregate are conservatively financed, having resources to tide through these difficult times. Of course, there will also be bankruptcies and shareholders will probably be asked for additional funding. However, a significant rebuilding of capital bases, such as banks needed after the great financial crisis, should not be necessary. Then, banks had to raise USD 650bn of additional capital, significantly diluting their existing shareholders thereby reducing their potential returns[2]. Is this likely to occur again? **This paper explores this dilution risk for equities and analyses its implication for equity investors**.

In particular, we develop two scenarios. The first assumes the current crisis is of a similar magnitude to the great financial crisis, affecting listed companies' revenue and margins in a way similar to that experienced in 2008/09. **The good news is that equities, in aggregate, do not need much additional capital under this scenario.** Dividends and capital expenditure (capex) will likely be cut but equities can weather such a storm. Our second scenario assumes that the crisis this time will be much worse than that experienced in 2008, in line with the worst-case estimates for global GDP. Operating margins fall by three standard-deviations under this scenario while revenue falls by about twice as much as that experienced during the 2008 crisis. This scenario is a stress-test for equities, modelling a once-in-a-century type event. Unsurprisingly, equities suffer more under this scenario. Dividends would likely halve from the 2019 level and may take years to recover. Still, **the dilution risk is not as significant except in Japan (at both banks and non-financial companies) and for European banks**. Figure 1 shows the DWS Research Institute's estimates of dividend cuts underlying our expectations of additional capital requirements under the two scenarios[3]. Such cuts and a patient rebuilding of balance sheets would enable companies to weather this storm. This would be preferable to issuing dilutive capital at distressed prices.[4]

Figure 1: DWS Research Institute's expectations of dividend cuts

	Scen. 1	Scen. 2
S&P 500	-16%	-42%
MSCI Europe	-34%	-54%
MSCI Japan	-16%	-56%

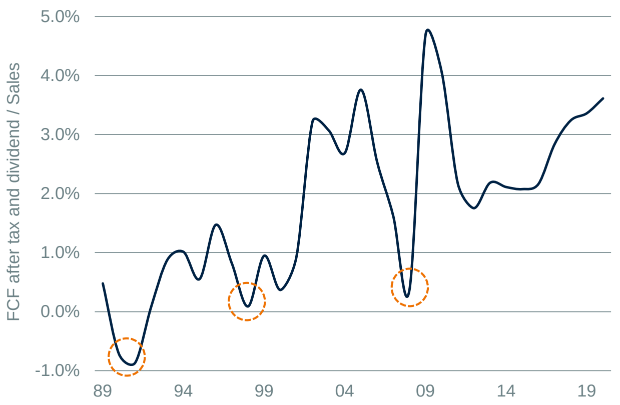
Source: DWS, CROCI. The table shows DWS Research Institute's expectations of dividend cuts under the two scenarios. These estimates are relative to the trailing twelve months dividend per shares figures for these two indices as available on 15 April 2020. For Illustrative purposes only. Due to various risks, uncertainties and assumptions made in our analysis, actual events or results or the actual performance of the markets covered may differ materially from those described.

[1] If we were to write-off 1) half and 2) all of the next two years' earnings then prices should only fall by 5% and 9% respectively.
[2] An investor may buy a stock at $10 expecting a return of 10%. However, the company may need an additional $1 to deliver the same earnings as before because of the economic crisis. At a practical level, the return is not 10%, but 9.1%, i.e. 1/(10+1).
[3] DWS Research Institute: The Impact of COVID19 on Long Term Capital Market Assumptions, April 2020
[4] Forecasts are based on assumptions, estimates, views and hypothetical models or analyses, which might prove inaccurate or incorrect.

The 'sponge' and the 'brick': measuring listed equities ability to absorb economic shocks

To analyse the impact of an economic crisis on listed companies' balance sheets we divide them into two groups: the 'sponges' and the 'bricks'. This distinction is necessary as companies react to such shocks differently, with the operations of some more affected than others. The 'sponges' are defensive companies, able to absorb economic shocks without any additional capital. By comparison, 'bricks' cannot easily absorb shocks, they break, and may need to tap their shareholders for additional capital (to repair their balance sheets). The demand for such capital generally depends upon the intensity of the shock, the nature of their operations and how prepared such companies were going into the crisis[5].

Figure 2: Free Cash Flow to Sales



Source: DWS, CROCI. The chart shows after tax free cash flow to sales of companies for which CROCI has comparable data going back to 1989. Data as available on 9 April 2020. For illustrative purposes only.

The general view is that most listed stocks are made up of 'bricks'. However, the bulk of the market is actually made up of 'sponges'. A good way to assess the quality of listed stocks is to look at Figure 2 showing the free cash flow (after dividends)-to-sales ratio of a group of 282 stocks for which CROCI has comparable data going back to 1989. These are some of the largest companies with established business models and a combined market capitalisation of USD 15.2 trillion[6]. All the companies in this group have witnessed at least three recessions, including the TMT bubble and the great financial crisis. Notably, the free cash flow (FCF) of this group improved significantly from the trough of one recession to another. This is really remarkable considering the severity of the 2008 financial crisis. At that time, profit margins fell but only modestly compared to the fall in their revenue.

Operational leverage has fallen over the past 30 years

The reality is that, on average, equity investors have a high quality exposure to the world economy through their investments in large listed companies. These companies have become much more adept in responding to economic crises.

Their flexibility is evident from Figure 3. Look at the US, for example. In the first two periods (1989 to 1991 and 2000 to 2001), revenue grew but EBITDA margins fell by 296 bps and 187 bps respectively. During the great financial crisis (between 2007 and 2009), however, revenue fell by a massive 7.4% but EBITDA margins fell by only 76bps. This shows that companies have reduced their operational gearing (as measured by the ratio of change in profits to the change in revenue). Gearing has fallen by most in the US but a fall is evident in Europe and Japan as well.

The rising free-cash-flow to sales explain the resilience of equities

The rising free-cash-flow-to-sales ratio demonstrates that most of the equity market is made up of "sponges" not "bricks". The free cash flow fell during crises but bounced back fairly quickly afterwards. In fact, in 2009, less than one year into the great financial crisis, the FCF-to-sales ratio was the highest in over 30 years.

Prudence drove management behaviour at that time. Capex and dividends were cut. Additional capital was raised (0.4% of the average market cap in the year) but was paid back through buy backs the following year (0.8% of average market cap) and dividends were back to the pre-crisis trend within 5 years. Through such measures, the group of 282 companies that we discussed earlier did not see much increase in their net debt levels from 2007 to 2009.

Figure 3: Lower operational leverage

USA	∆ Revenue	∆ EBITDA Mgn
1989-1991	11.0%	-296 bps
2000-2001	4.3%	-187 bps
2007-2009	-7.4%	-76 bps

Source: DWS, CROCI. The table shows fall in aggregate revenue and EBITDA Margins of U.S. companies in CROCI's database with comparable data back to 1989. Data as available on 15 April 2020.

Newer companies have lower operational gearing

The previous table looked at companies with long-established business models and comparable data going back at least to 1989. Over the past few years, we have witnessed the growing importance of companies more reliant on intangible assets (Intellectual Capital) to generate their revenue and profits. Their capital intensity is lower with greater flexibility to pass on even the conventional fixed costs (leasing vs. owning business premises and equipment, using freelancers vs. employees) down to their suppliers. Such companies are even better positioned to weather the

[5] Forecasts are based on assumptions, estimates, views and hypothetical models or analyses, which might prove inaccurate or incorrect.

[6] Data as available on 9 April 2020. For reference, this group represents 48% of the market capitalisation of the MSCI World ex Financials index.

economic storm than the 'old economy' companies with long-established business models.

Figure 4: Operational characteristics of companies with and without Intellectual Capital assets

2019	IC	Ex. IC
EBITDA Margin	20.3%	16.8%
R&D / Sales	6.5%	0.0%
Capex to Sales	7.7%	9.5%
FCF / Sales (post tax)	9.9%	4.8%
Dividend to Sales	5.4%	3.4%
Net Financial Liab. / M. Cap	19.1%	53.7%

Source: DWS, CROCI. The table shows selected operational characteristics of non-financial companies with and without Intellectual Capital assets that are covered by CROCI. Aggregate 2019 data as available on 15 April 2020.

Banks are perhaps the best examples of 'bricks'

However, not every company is a 'sponge'. Banks are possibly the best examples of 'bricks', i.e. companies that get badly hit by crises. The reason is simple. Banks do not have capex or working capital that they can liquidate. There is great rigidity in their operations with costs changing slowly. Banks are also highly levered (measured as total assets over equity), as this is necessary to generate an attractive return for their investors (ROE = leverage * spread), whilst maintaining a reasonable spread between loans and deposits. But with high leverage comes high risk and their entire equity can be wiped out in a downturn. Investors are then asked to provide additional capital to rebuild their equity. This is precisely what happened between 2007 and 2013 when investors were asked to foot a bill of about USD 650bn[7].

'Bricks' amongst non-financial stocks

Industries and companies with high fixed cost structure, high debt levels, and low cash returns are the "bricks" amongst non-financial stocks. However, at an aggregate level, such companies now represent a smaller part of listed equities.

Small caps and specialised benchmarks also present risks

The analysis that has been presented so far needs a caveat. We have primarily looked at large-cap stocks and diversified benchmarks. Looking at the constituents of the Russell 1000 and the Russell 3000 for example, we note that in 2019, 14% of the Russell 1000 stocks were lossmaking, while the ratio for the Russell 3000 was 30%. Small caps, therefore, may behave differently to what our analysis shows.

Figure 5: Performance, profitability and leverage of various sectors in the S&P 500

	Gross YTD TR	Cash Return	Net Fin. Liability/ M Cap	S&P 500 Wt
Energy	-46.1%	0.4%	70.9%	2.8%
Financials	-30.9%	4.3%	na	10.9%
Industrials	-26.1%	5.5%	48.7%	8.1%
Materials	-23.5%	4.5%	34.5%	2.5%
C. Discretionary	-16.7%	4.7%	28.6%	9.9%
Comm. Services	-14.9%	8.7%	22.5%	10.8%
Utilities[8]	-14.7%	3.7%	102.9%	3.4%
Health Care	-11.2%	18.7%	17.5%	15.3%
C. Staples	-9.7%	12.2%	22.0%	7.9%
IT	-9.4%	21.3%	5.2%	25.5%

Source: DWS, CROCI, Factset. Profitability and leverage are for the companies in CROCI's coverage. Such companies represent over 80% by weight of the S&P 500 index. Data at the close of business on 7 April 2020. Past performance is not a reliable indicator of future returns.

[7] Forecasts are based on assumptions, estimates, views and hypothetical models or analyses, which might prove inaccurate or incorrect.

[8] Utilities is an exception to the rule of low cash return / high leverage performing poorly in a downturn as they tend to be regulated businesses.

Estimating the pain from COVID-19 induced economic recession

To assess the risks to investors from the ongoing economic contraction we look at two scenarios. The first assumes the ongoing crisis would be of a similar magnitude to the great financial crisis, affecting listed companies' revenue and margins in a way similar to that experienced during that crisis.

The second assumes an even worse scenario, a three standard-deviation fall in margins of CROCI's coverage of companies that we have aggregated regionally. As for revenue, we have assumed a three standard-deviation fall in aggregate regional revenues to remove the distortions from different business combinations. The latter perhaps is not as extreme as the approach taken for margins. Still, the projected fall in revenue is about twice as bad as that experienced during the great financial crisis. So this can be seen as the worst-case scenario for equities.

The results of these two scenarios are in Figure 6. The net profit of companies in CROCI's coverage more than halves under the first scenario. Europe and Japan are much more affected than the US. Interestingly, even with this fall, there is no meaningful increase in net debt. In fact, the US and Japan actually manage to reduce their net debt. Only Europe sees an increase and that too by less than 1% from the 2019 level.

Scenario 2 is more extreme, with net profits collapsing across the three regions. In the US, net profits for non-financials fall by 82% from the 2019 levels with Europe and Japan experiencing even bigger falls (95% and 122% respectively). This can be seen as a once-in-a-century type situation, consistent with what would be expected of a three standard-deviation analysis. Even in this extreme situation, there is hardly any change in net debt for the US despite assuming USD 274 billion in dividends (down 42% from the 2019 level). Japan looks more stretched in this analysis, though.

Figure 6: Potential impact of an economic recession on profit & loss and balance sheet of non-financial companies this year

	USA			Europe			Japan		
	2019	Scen. 1	Scen. 2	2019	Scen. 1	Scen. 2	2019	Scen. 1	Scen. 2
Revenue Growth (y-o-y)	1.6%	-11.4%	-19.9%	2.9%	-13.2%	-20.3%	-3.9%	-13.4%	-24.0%
EBITDA Margin	20.7%	20.2%	16.2%	17.5%	16.2%	13.7%	13.2%	11.5%	7.3%
Net Profit Margin	10.9%	6.4%	2.5%	7.1%	3.0%	0.5%	5.8%	2.5%	-1.7%
Net profit growth (y-o-y)	-1.2%	-47.7%	-81.5%	-0.4%	-63.0%	-94.6%	-14.0%	-62.6%	-122.1%
Capex growth (y-o-y)	13.2%	-13.8%	-13.8%	16.6%	-4.6%	-4.6%	6.4%	-23.7%	-23.7%
Increase in Net Debt (y-o-y)	22.6%	-4.2%	-5.4%	26.7%	0.4%	6.2%	8.2%	-5.9%	42.7%
Net Financial Liabilities to M.Cap	24.6%	26.3%	26.0%	46.3%	54.1%	56.3%	44.5%	43.7%	59.5%

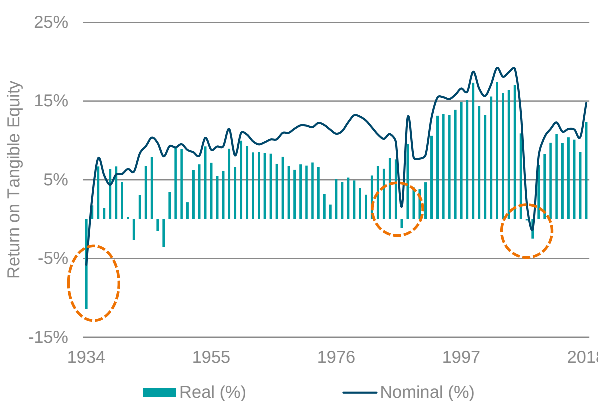
Source: DWS, CROCI. The table shows the impact of an economic recession similar to the great financial crisis (Scenario 1) and a 3-standard deviation event (Scenario 2) on key profit & loss and balance sheet figures of non-financial companies in CROCI's coverage. Aggregate data as available on 2 April 2020. For Illustrative purposes only. Due to various risks, uncertainties and assumptions made in our analysis, actual events or results or the actual performance of the markets covered may differ materially from those described.

Banks' ROE may fall to -16% under severe stress

The same cannot be said for the financial part of the market. Investors should expect a dividend cut to offset losses that banks are likely to incur as a result of the crisis. To assess the impact of the ongoing crisis on banks' capital we have again developed two scenarios, the first modelling the impact of an economic crisis of a similar magnitude to the great financial crisis and the second modelling an even more extreme scenario, in line with the once-in-a-hundred year event that we modelled for non-financials.

Both these scenarios are based on long-term data on U.S. commercial banks from the Federal Deposit and Insurance Corporation (FDIC).

Figure 7: US Banks' Return on Tangible Equity (ROE)



Source: U.S. Federal Deposit and Insurance Corporation, DWS and CROCI. Data as available on 9 April 2020.

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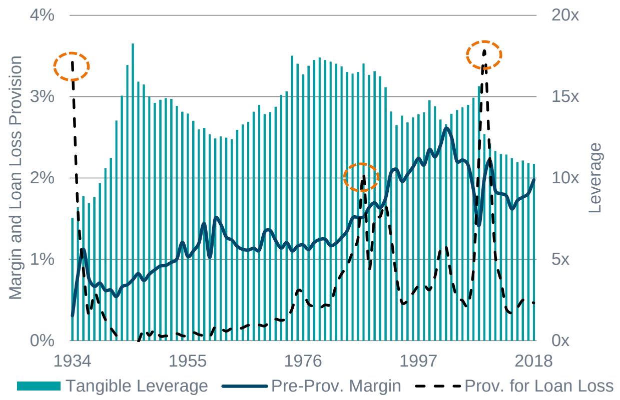
Figure 8: Drivers of the Return on Tangible Equity



Source: U.S. Federal Deposit and Insurance Corporation, DWS and CROCI. The chart shows evolution of the three main drivers of banks' profitability namely Tangible Leverage (Tangible Assets / Total Equity), Pre-Provision Margin (Pre-Provision Profit / Tangible Assets) and Provision of Loan Losses (as % of Gross Loans). Data as available on 9 April 2020.

Banks' profitability falls significantly under both these scenarios but in aggregate banks look much better positioned than they were in 2008. Under the first scenario, the Return-on-Tangible-Equity (ROE) falls from +14.8% in 2018 to -0.8% for this year. This is from 1.45% return on tangible assets before loan loss provisions (down 53 bps from the 2018 level) and a loan loss provision of 2.7%. For reference, the banks earned a 1.42% return on tangible assets in 2008. The 2.7% loan loss provision is similar to the average between 2008 and 2010[9].

Figure 9: U.S. Banks' profitability under a severely adverse scenario (a three standard deviation event)

	2018	Scen. 1	Scen. 2
Leverage (Tangible Assets / Tangible Equity)	11x	11x	11x
Earnings before provisions (% of Tangible Assets)	1.98%	1.45%	1.45%
Provisions for loan losses (% of Gross Loans)	0.46%	2.70%	5.70%
Nominal Return on Tangible Equity (ROE)	14.8%	-0.8%	-16.1%

Source: U.S. Federal Deposit and Insurance Corporation (FDIC) data for commercial banks, DWS and CROCI. Data as available on 2 April 2020. For Illustrative purposes only. Due to various risks, uncertainties and assumptions made in our analysis, actual events or results or the actual performance of the markets covered may differ materially from those described.

For Scenario 2 we assume the loan loss provision increases to 5.7% from 0.46% in 2018. This is similar to the level modelled by the Federal Reserve (Fed) in their severely adverse scenario for 2019 stress tests. There is one difference, though. Our analysis assumes that the losses would be front-loaded, occurring in the first year instead of the nine quarters that is used by the Fed. The return on tangible assets is assumed to remain at the 1.45% level that we used for Scenario 1. Under these assumptions, the US banks' ROE falls to -16.1%. The loss under this scenario would be about USD 240 bn.

European and Japanese Banks' lower profitability means higher impact

European and Japanese banks are even more exposed, though, because of their lower profitability. This is evident from Figure 10 showing the operational characteristics of the banks that CROCI covers. These are only large-cap banks (unlike the data from the FDIC that includes all U.S. commercial banks) but it's clear that, not only are the European and Japanese banks more financially geared, they also have lower margins. Their loan loss provisions are also below their US counterparts suggesting they would be more affected by the crisis.

Figure 10: European and Japanese banks face bigger challenges

2019 data	US	Europe	Japan
Leverage (Tangible Assets / Tangible Equity)[10]	13.3	21.2	20.7
Earnings before provisions (% of Tangible Assets)	1.87%	0.75%	0.33%
Provisions for loan losses (% of Gross Loans)	0.71%	0.49%	0.18%
Nominal Return on Tangible Equity (ROE)	16.0%	9.4%	5.9%
CET1 Ratio	11.2%	13.5%	13.5%
Loans / Deposit	69.1%	92.7%	58.6%
Dividend Yield	2.8%	2.9%	4.5%
Dividend payout	30.1%	33.0%	45.5%
Price-to-Earnings	18.5x	17.1x	17.7x

Source: DWS, CROCI. The table shows selected operational and valuation characteristics of banks under CROCI's coverage. Data as on 15 April 2020.

Banks may need to cut dividends to shore up their reserves

The good news from this analysis is that banks in general are better positioned than they were in 2008. Even then, investors should expect banks to cut their dividends to offset the losses they are likely to incur as a result of the crisis. The alternative would be additional capital issuances diluting existing shareholders just as they did during the 2008

[9] Forecasts are based on assumptions, estimates, views and hypothetical models or analyses, which might prove inaccurate or incorrect.

[10] The leverage ratio of US banks is not fully comparable to European banks because of the difference in the treatment of derivative assets and liabilities between US GAAP and IFRS.

financial crisis. On this, we note that the European Central Bank (ECB) has already mandated its supervisee banks to freeze dividend payments and share buybacks at least until October 2020. The Bank of England (BOE) has similarly asked the UK banks to not pay any dividends including the unpaid 2019 dividends or conduct any share buybacks until the end of 2020. So far, the Fed has not issued any such orders but several US banks have already voluntarily suspended their buyback programs although they continue to pay dividends[11].

Conclusion

Large diversified benchmarks provide investors with exposure to high quality companies. Our analysis suggests that **listed non-financial companies would not require significant additional capital to sustain even a worst-case scenario, across the major Developed Markets**. Japan is the only exception. A combination of low profitability and high operational gearing (compared to other Developed Markets) is likely to substantially increase debt levels in a stressed scenario requiring companies to raise additional equity capital.

In the case of banks, **the loan losses are likely to accrue over a period longer than the year** that we have modelled in our scenario. **Along with government loan guarantees this would lessen the impact on banks**. **The risk of additional capital issuances like those after the 2008 financial crisis under Scenario 1 is low, therefore**. **Still, the cost of rebuilding the economy after the crisis is likely to be significant and banks are likely to be asked to remain prudent with their dividend policies and share buybacks for some time to come**. Such rebuilding after the great financial crisis meant dilutive rights issuances and prudent dividend policies for 5 years. A repeat of 2008/09 may just mean cutting dividends and then restoring them over a 5 year period.

The risk of dilutive rights issues increases under Scenario 2, but even then we do not anticipate a significant dilution. In practical terms, dividends may not return to 2019 levels under this scenario in the next 10 years.

[11] Forecasts are based on assumptions, estimates, views and hypothetical models or analyses, which might prove inaccurate or incorrect.

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