

Marketing Material



CROCI Outlook 2022

Homeward bound to Ithaca?

Authors: [Francesco Curto](#), [Colin McKenzie](#), [Jay Joshi](#), [Mital Parekh](#)

As we start 2022, hopes rest on the global economy moving back to 'normal'. But what will normal look like? This must also have been the question that Odysseus (the hero that has accompanied the past five CROCI Outlooks) asked himself as he approached home after twenty years away. He was to find that home was not quite the hospitable place for which he had been hoping. There was eventually a happy ending, but first there were serious challenges to overcome.

As we progress through 2022, investors should also expect a few challenges, in our opinion. The first challenge is an expensive equity market, based on CROCI's valuation framework. Strong price performance over the past few years has been driven by a collapse in equity risk premia, which in turn has resulted in high valuation. Central banks and policymakers had a clear strategy: to provide ample liquidity in support of the real economy. But some of that liquidity found its way into speculative assets, including some parts of the equity market. The moment that central banks started to talk about the path to normalization, a correction took place in the most speculative parts of the market. Will it move and affect the broader market? Possibly.

There are two 'paths' to normalization, (i) lower stock prices, and (ii) higher growth with stable prices. The latter must be the preferred approach for most investors—it is consistent with a 'managed' transition or a phased approach to normalization. But a hawkish approach by central banks in response to high growth and inflation may lead to a disorderly price adjustment. This could be made worse if, for example, investors were to fear that an excessive rate hike might have an impact on economic recovery.

The second challenge surrounds what 'normal' will look like, given that human activities are threatening the resilience of the Earth system. The Holocene epoch, the recent benign period for humanity, has been running for the past 11,700 years (since the end of the last glacial period), but has been at risk for some time thanks to the loss of genetic diversity and carbon emissions¹.

Science suggests that a 50% cut in existing carbon emission by 2030 is a good starting point for reducing that risk². But what path will that follow and what will that mean for economic growth, inflation, profitability and expected returns? Our in-depth research suggests that we may face a supply-demand imbalance, leading to higher carbon prices. Materials, Energy and Utilities will have no choice but to pass the higher input prices onto the production/consumer chain. Not a normal market for assessing inflation expectations, in our opinion.

Our Postcard from the 1980s suggests that companies with strong competitive advantage are best sheltered in such a context. At the market level, Healthcare, Energy, Utilities and Materials are the most attractively priced sectors based on medium term valuation, and Emerging Markets are the cheapest region.

¹ Planetary boundaries: Guiding human development on a changing planet, Science, 347, 2015

² Climate Change 2021: The Physical Science Basis, IPCC, August 2021 <https://www.ipcc.ch/report/ar6/wg1/>

Important Information

This paper is intended for Professional Investors only, who understand the strategies and views introduced in this paper and can form an independent view of them. CROCI represents one of many possible ways to analyse and value stocks. Potential investors must form their own view of the CROCI methodology and evaluate whether CROCI and investments associated with CROCI are appropriate for them.

Please see Glossary A for a brief introduction to CROCI and for definitions of key terms used throughout this piece and for risk considerations. Please see Glossary B for the definition of Real Value.

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Past performance is not an indicator of future performance and any forecast or projection may not be realised. Any current or past company metrics may not be indicative of future metrics. Any investment in equities can go down as well as up and investor capital may be at risk up to a total loss.

Simulated returns have many inherent limitations. No representation is made that actual returns will be similar to those shown. There are frequently significant material differences between simulated and actual returns. Simulated returns are developed with the benefit of hindsight and often do not take into account actual financial, economic, transaction or market risk. Simulated returns are therefore not necessarily a reliable guide to actual returns.

In the data and charts presented throughout this document, “E” refers to financial years that are not yet reported. Forecasts of accounting data for these years are based on market’s consensus estimates as reported by Bloomberg Finance L.P. CROCI metrics for the forecast years are calculated by applying the CROCI model to these consensus estimates. The CROCI team does not make any forecasts or projections of accounting data. Data for historical years are derived from company reports and other publicly available sources.

Forward looking statements or projections are subject to risks and uncertainties that may cause actual results to differ materially.

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08 February 2022

Summary View

Homecoming, but not plain sailing

We expect the driving theme of 2022 to be the changing dynamics of the discount rate. Moves in the discount rate have been the primary driver of equity prices throughout the pandemic. Between December 2019 and March 2020, the equity risk premium rose from 4.9% to 5.2%, prompting the initial decline in equities as investors pondered the potential negative impact of the new virus. Since March 2020, the discount rate has fallen from 5.2% to 4.4%. This was responsible for almost two-thirds of the 98% rally since the March 2020 lows (for a detailed explanation, see the report we wrote back in March 2020³).

There is a strong behavioural factor in the discount rate—it rises as investor concerns increase and falls as investors become more optimistic. Understanding the discount rate is by no means purely an academic exercise, however. It not only affects asset prices, but also affects economic activity: the discount rate is the hurdle rate for return on capital when entrepreneurs are looking to create value with new capital projects.

Central banks are currently trying to curb economic activity, to tame what Keynes called the “animal spirit”. In effect, they are trying to push up the discount rate—not a good omen for equity returns in the short term. Some of the most speculative asset classes have already seen a correction in prices. **Our estimates suggest that if the discount rate were to rise to 4.9%, equities would fall by 25%. But a normalisation in the discount rate does not necessarily require a sharp adjustment in prices.** Higher-than-expected real growth and subdued returns for a few years are also a possibility, but it is rarely advisable to try and ‘fight the Fed’.

Inflation is the primary concern of central banks. On the one hand, some inflation is desirable, given the high stock of debt; on the other, it affects middle- and low-income families the most, according to a Fed study⁴. **Ample liquidity and other measures have achieved their aim of supporting the global economy, but they have also produced unintended results.** According to Oxfam⁵, the **10 richest men in the world have seen their wealth double** to \$1.5tn (£1.01tn) since the start of the global pandemic thanks to a surge in share and property prices, while at the same time **over 160 million more people have been forced into poverty.** **If normalisation means a better inflation outlook and financial relief for the worst off, then central banks will not hesitate in their tightening.**

Our fear is that inflation may remain high in the medium term. The old normal was based on an economic model that did not care much about how goods were manufactured (use of child labour in the supply chain is still rarely monitored, for example), nor did it care about economic activity’s impact on biodiversity, climate, and the Earth system. The new normal will need to be different, but it will come with a cost. We estimate that **the full costs of transitioning to a more sustainable energy path will have an unsustainable impact on the profitability of Energy, Materials and Utilities (section 1.2).** Inevitably, **these primary sectors will need to pass the higher costs of doing business down the value chain.** However, it is also worth looking at other factors and we note that capex in the Energy sector is down by nearly 45% over the past nine years. The remaining economic life of assets in the Energy sector is only 10 years, something which many investors underestimate in our experience. If the global economy does not transition fast to alternative sources, the world could face an oil shock or, worse still, a revolt against any path to Net Zero. On balance, our analysis suggests that energy prices will continue to rise in the foreseeable future. **In a nutshell, investors must not underestimate the continued risk of inflation.** The “Postcard from the 1980s” section suggests that when inflation arises, investors are best served by businesses with a strong competitive advantage. This would normally suggest companies with high levels of Intellectual Capital. But we note that Software and Services is one of the most expensive sectors in the market.

Focusing on valuation, 2021 was a rare vintage for distressed value, which we measure through the P/B factor. However, that factor’s performance tends to be short lived and then typically gives way to Quality Value, currently at a 60% discount to the broader market. Materials and Energy feature amongst the cheapest five sectors, after a significant upgrade to cash flows. Semiconductors is another new entry into the cheapest sectors globally. Pharmaceuticals and Consumer Durables continue to be in pole position. On median valuation, Japan is now cheapest region overall with U.S. in second place and Europe bringing up the rear. In conclusion, a homecoming may well be in sight, but it will not be plain sailing.

Francesco Curto

London, February 2022

³ ‘History Lessons – why do markets sell-off and then rebound’, March 2020. <https://www.dws.com/AssetDownload/Index?assetGuid=18b5ba16-2231-4f72-8798-ae4c2c5e60d3&consumer=E-Library>.

⁴ <https://www.jec.senate.gov/public/index.cfm/republicans/2021/11/how-inflation-is-weakening-the-recovery-and-harming-low-income-americans-the-most>.

⁵ <https://www.oxfam.org/en/press-releases/ten-richest-men-double-their-fortunes-pandemic-while-incomes-99-percent-humanity>

Contributors

Virginie Galas

Head of CROCI Research

Dirk Schlueter

Head of CROCI Investment Strategies

Krithika Ekambaram

CROCI Investment Strategy & Valuation Group

Gyanendra Jaiswal

CROCI Investment Strategy & Valuation Group

Janamejay Kumar

CROCI Investment Strategy & Valuation Group

Tathagat Kumar

CROCI Investment Strategy & Valuation Group

Bharat Shah

CROCI Investment Strategy & Valuation Group

Figure 1: Global Equities P&L and Valuation

	2013	2014	2015	2016	2017	2018	2019	2020	2021E	2022E	2023E	
Economic P / E (x)	23.0	25.9	29.2	29.8	29.0	27.2	30.8	42.6	33.6	31.8	29.4	A E
Accounting P / E (x)	15.1	16.8	18.9	18.6	18.2	17.2	18.9	24.4	21.1	20.2	19.0	
Yield (%)	2.8	2.7	2.6	2.6	2.6	2.6	2.4	2.1	1.9	1.8	1.9	
P / BV (x)	2.2	2.6	2.7	2.5	2.6	2.8	2.8	3.0	3.7	3.4	3.1	
EV / Sales (%)	128.4	143.0	164.1	166.4	176.3	177.2	188.9	220.4	242.9	234.9	221.2	
EV / Adj. EBDIT (x)	8.0	8.8	9.7	9.6	9.9	9.9	10.3	12.1	11.9	11.4	10.6	
EV / Free Cash Flow (x)	27.5	28.7	29.7	26.4	27.6	27.1	27.9	27.8	27.8	24.6	22.2	
EV / Capital Employed (x)	1.5	1.7	1.7	1.7	1.8	1.9	1.8	1.9	2.4	2.4	2.3	
Avg. Market Cap. (bn)	23,806	26,537	26,902	26,635	30,772	33,564	34,576	38,199	51,106	52,410	52,333	
Enterprise Value (bn)	28,390	31,297	31,818	31,955	36,697	40,023	42,553	46,447	59,037	59,192	57,658	
Key Ratios	2013	2014	2015	2016	2017	2018	2019	2020	2021E	2022E	2023E	
Revenue Growth	0.9	-1.1	-11.4	-1.0	8.4	8.5	-0.3	-6.4	15.3	3.7	3.4	B
Revenue Growth (Median)	3.6	3.8	1.5	1.5	6.3	5.0	2.1	-2.9	10.2	4.7	4.1	
Adj. Net Profit Pre-Min. Growth	10.1	-0.5	-10.3	1.1	18.5	15.2	-6.3	-14.4	54.1	6.8	6.1	
Adj. EBDIT Mgn	16.1	16.3	16.9	17.3	17.8	17.8	18.4	18.3	20.4	20.7	20.9	C
Adj. EBIT Mgn	11.1	11.0	11.1	11.3	12.0	12.2	11.8	11.0	13.9	14.2	14.4	
Adj. Net Prof. Pre-Min. Mgn	7.4	7.5	7.6	7.7	8.5	9.0	8.4	7.7	10.3	10.6	10.9	
Tax Rate	34%	33%	35%	31%	30%	27%	28%	32%	24%	24%	23%	
Depreciation / Sales	5.4	5.8	6.9	6.6	6.1	5.9	7.1	8.3	6.7	6.5	6.5	D
Capex / Sales	8.0	8.2	8.7	8.2	7.9	7.9	8.8	9.1	8.5	8.4	8.2	
Free Cash-Flow / Sales (Post-Tax)	4.7	5.0	5.5	6.3	6.4	6.5	6.8	7.9	8.7	9.6	10.0	
Dividends / Sales	3.0	3.4	4.1	3.9	3.9	4.3	4.3	4.1	4.1	3.6	3.6	
Interest Cover (x)	11.0	11.0	10.3	9.7	10.6	11.1	8.9	7.3	10.4	11.6	12.8	
Net Debt (-) Cash (+) / Equity	-36.9	-40.2	-44.4	-45.5	-44.2	-47.7	-58.5	-58.0	-49.8	-36.3	-24.2	
Return on Stated Equity	13.1	13.4	12.2	12.5	13.5	14.4	13.1	9.7	17.0	16.8	16.1	
Return on Cap. Employed (Post-Tax)	9.4	9.3	8.5	8.5	9.2	9.9	9.0	7.5	10.7	11.1	11.5	
P&L (USD bn)	2013	2014	2015	2016	2017	2018	2019	2020	2021E	2022E	2023E	
Turnover	22,117	21,881	19,388	19,199	20,817	22,592	22,525	21,073	24,300	25,198	26,065	B
Adjusted EBDIT	3,561	3,562	3,268	3,331	3,702	4,027	4,136	3,851	4,968	5,211	5,460	
Depreciation	1,193	1,269	1,341	1,261	1,279	1,324	1,590	1,748	1,624	1,645	1,702	
Pre-Tax Profit	1,941	1,910	1,504	1,669	1,988	2,206	1,978	1,409	2,869	3,144	3,360	
Income Tax	654	631	523	523	602	605	555	450	700	740	780	
Adj. Net Profit Pre-Min.	1,647	1,639	1,470	1,487	1,762	2,030	1,902	1,628	2,508	2,678	2,843	
Cash Flow (USD bn)	2013	2014	2015	2016	2017	2018	2019	2020	2021E	2022E	2023E	
EBIT before stock options	2,424	2,355	1,972	2,122	2,490	2,779	2,612	2,185	3,475	3,729	3,934	
Depreciation	1,193	1,269	1,341	1,261	1,279	1,324	1,590	1,748	1,624	1,645	1,702	
NWC and Provisions	-114	-78	26	-29	-270	-251	-133	78	-158	-27	-28	
...Operating Cash Flow	3,503	3,546	3,338	3,355	3,499	3,852	4,068	4,010	4,941	5,346	5,608	
Proceeds from Share Issues	-328	-209	-271	-90	-108	-370	-309	-153	-266	-1	0	
Dividends Paid	-667	-739	-791	-749	-816	-976	-961	-854	-993	-913	-941	
Capex	-1,774	-1,788	-1,686	-1,569	-1,652	-1,776	-1,991	-1,920	-2,073	-2,113	-2,139	
Net Other Investments	-100	-343	-396	-584	-481	-548	-1,554	-474	-254	1	1	
Change in Net Debt (-) Cash (+)	-123	-116	-342	-291	-468	-533	-1,565	-207	622	1,345	1,522	
Balance Sheet (USD bn)	2013	2014	2015	2016	2017	2018	2019	2020	2021E	2022E	2023E	
Net Working Capital	684	587	440	362	451	482	449	141	182	159	146	
Net Financial Debt (-) Cash (+)	-4,262	-4,378	-4,719	-5,047	-5,515	-6,050	-7,618	-7,830	-7,208	-5,863	-4,333	
Gross Tangible Fixed Assets	20,734	20,103	20,106	20,780	22,565	22,845	25,495	26,882	27,212	28,243	29,146	
Net Tangible Fixed Assets	10,115	9,845	9,706	9,951	10,712	10,813	12,230	12,647	12,810	13,267	13,628	
Other LT Assets	1,394	1,411	1,465	1,515	1,696	1,780	1,872	2,060	2,122	2,167	2,200	
Stated Shareholder's Equity	10,927	10,358	10,065	10,478	11,778	11,964	12,285	12,694	13,681	15,348	17,120	
Minorities	610	531	566	618	713	716	743	799	786	794	789	

Source: Company reports, Bloomberg Finance L.P., DWS and CROCI. The table shows aggregate data of companies in CROCI's global coverage. Data in USD as on 17 December 2021. "E" after a year indicates that the numbers are based on consensus forecasts. Forecasts are based on assumptions, estimates, views and or analyses, which might prove inaccurate or incorrect."

- A** Elevated valuations. Accounting P/E understates the real economic valuation

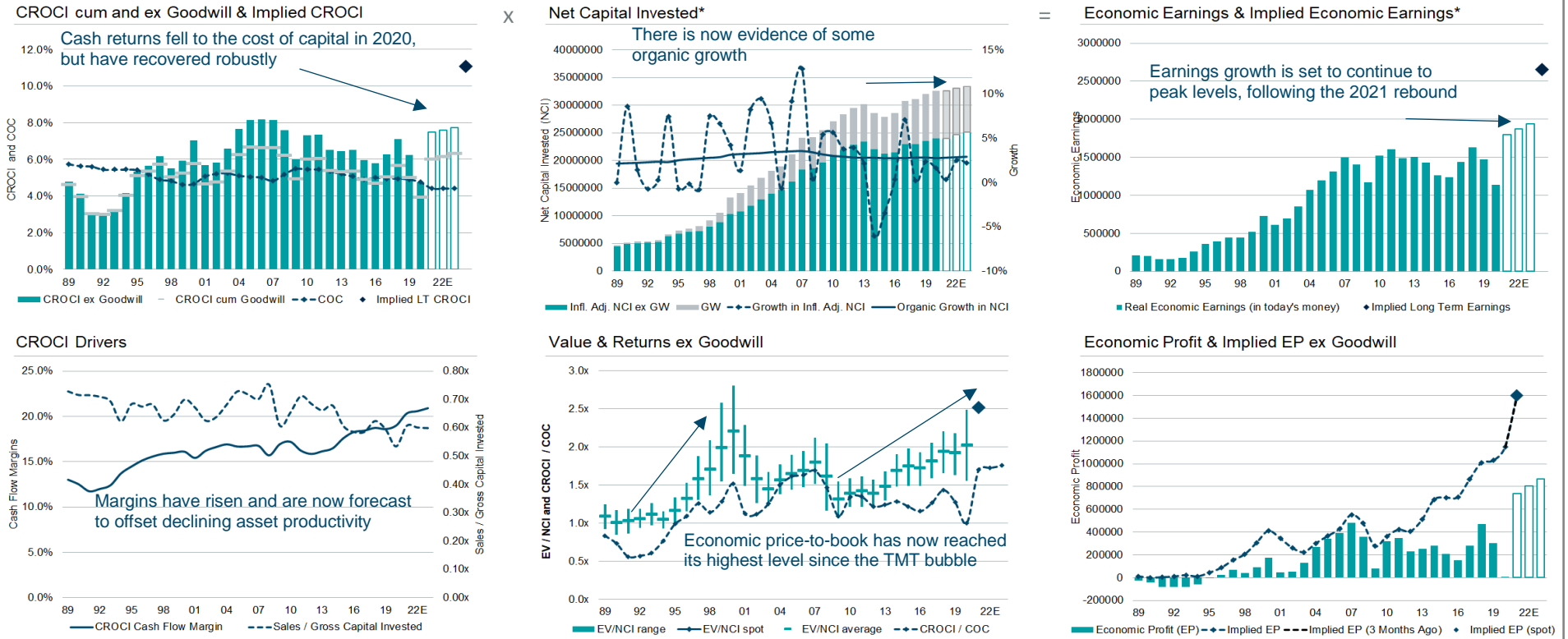
- B** Global revenues have fully recovered to pre-pandemic levels

- C** Margins are at peak levels. Improving margins have managed to give some support to earnings

- D** Free cash flow are forecast to reach peak levels in 2022E

- E** Dividend yield may have fallen but still compares favorably to the yields offered by other asset classes

Figure 2: Global Equities CROCI



	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021E	2022E	2023E
Enterprise Value (USD bn)	14034	16452	18398	21047	25893	24158	21201	23975	26188	27196	30258	33154	33712	33900	38826	42245	43816	47729	60394	60455	58994
Market Cap (USD bn)	10576	12957	14861	17348	21545	18551	15506	18418	20125	20719	23806	26537	26902	26635	30772	33564	34576	38199	51099	52231	52163
EV/NCI Ex. GW	1.44x	1.56x	1.65x	1.69x	1.80x	1.62x	1.31x	1.38x	1.42x	1.39x	1.48x	1.69x	1.74x	1.72x	1.81x	1.93x	1.92x	2.02x	2.52x	2.41x	2.26x
Economic PE	21.9x	20.4x	20.3x	20.7x	22.0x	21.3x	21.9x	19.0x	19.3x	21.3x	23.0x	25.9x	29.2x	29.8x	29.0x	27.2x	30.8x	42.5x	33.6x	31.7x	29.3x
Accounting PE	16.5x	15.1x	15.0x	15.3x	16.3x	15.3x	15.3x	12.9x	12.7x	13.4x	15.1x	16.8x	18.9x	18.6x	18.2x	17.2x	18.9x	24.4x	21.1x	20.2x	18.9x
Cost of Capital	5.24%	5.10%	5.05%	5.00%	4.82%	5.18%	5.48%	5.45%	5.45%	5.35%	5.20%	5.07%	4.90%	5.00%	4.95%	4.95%	4.90%	4.75%	4.40%	4.40%	4.40%
CROCI Ex. GW	6.6%	7.6%	8.1%	8.2%	8.2%	7.6%	6.0%	7.3%	7.3%	6.5%	6.4%	6.5%	6.0%	5.8%	6.3%	7.1%	6.2%	4.8%	7.5%	7.6%	7.7%
Implied CROCI	7.6%	8.0%	8.3%	8.4%	8.7%	8.4%	7.2%	7.5%	7.7%	7.4%	7.7%	8.6%	8.5%	8.6%	9.0%	9.6%	9.4%	9.6%	11.1%	10.6%	9.9%
Implied Economic Earnings/ Economic Earnings	115%	104%	102%	104%	106%	110%	120%	103%	105%	114%	120%	131%	143%	149%	143%	135%	151%	202%	148%	139%	129%

Source: Company reports, Bloomberg Finance L.P., DWS and CROCI. The table shows aggregate data of companies in CROCI's global coverage. Data in USD as on 17 December 2021. Forecasts are based on assumptions, estimates, views and or analyses, which might prove inaccurate or incorrect. "E" after a year indicates that the numbers are based on consensus forecasts. *Displayed in today's money.

Past performance may not be a reliable indicator of future results. Market and index performance data is sourced from Bloomberg Finance L.P. Company data is from the CROCI database. Unless stated this data is as of December 2021.

Section 1:

A Bottom-Up View of Global Equities

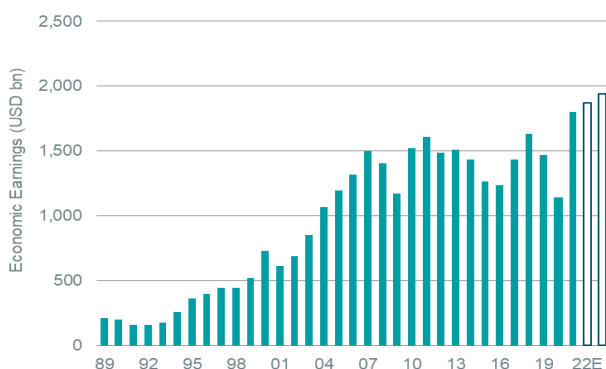
1.1 The top-down versus the bottom-up

2021 - the year of rebound

2021 was an eventful year in markets, characterized by higher-than-expected earnings rebound fueled by the post-lockdown reopening of economies and by reflation. The economic earnings of our coverage universe in aggregate saw a sharp rebound of more than 50% in real terms last year, following a 27% fall in 2020.

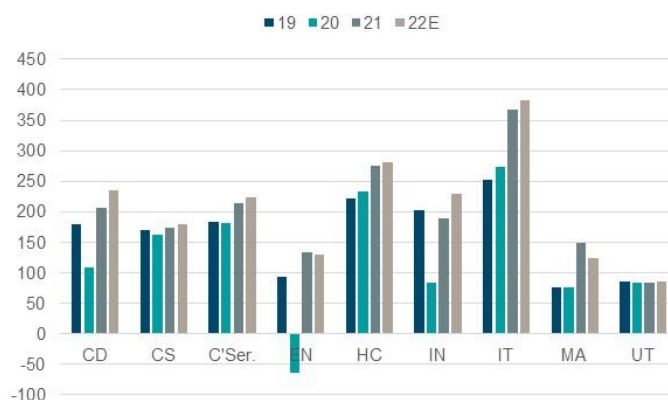
At the start of 2021, the shape of the post pandemic recovery (U-shaped, V-shaped, W-shaped, etc.) was the main focus for investors. Consensus expected 2021 earnings to fall short of pre-pandemic levels. By the end of the year, attention was squarely on the inflation narrative—and the debate whether it was transitory or not—following a great year for commodities in general and crude oil in particular. This was reflected by the Energy and Materials sectors, who achieved the greatest growth in 2021 economic earnings relative to 2019 levels. Of the other sectors, though, only Industrials and Utilities failed to finish 2021 with higher economic earnings than before the crisis.

Figure 3: Real Economic Earnings (USD bn)



Source: DWS, CROCI. The chart shows the aggregate inflation-adjusted Economic Earnings of companies in CROCI's global coverage. Data as available on 17th December 2021.

Figure 4: Real economic earnings by Sectors (USD bn)

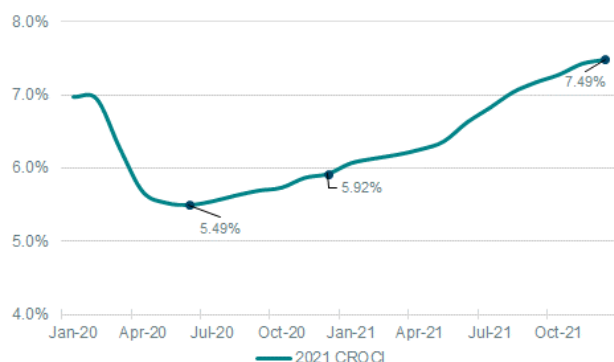


Source: DWS, CROCI. The chart shows aggregate inflation-adjusted Economic Earnings of CROCI's global coverage by sectors in USD bn. Data as available on 17th December 2021.

Figure 5 shows how investor sentiment regarding 2021 economic earnings expectations has changed since the peak of the COVID-19 crisis. Early on, 2021 CROCI experienced a 150 basis points cut to c.5.5%. Subsequent vaccination drives improved sentiment at the end of 2020 but, even so, CROCI forecasts remained substantially below pre-pandemic levels. Over the course of 2021, the reopening of economies, economic stimulus, rising commodity prices and digital transformation prompted material upward earnings revisions until cash returns ended up 50bps above original estimates.

In hindsight, consensus estimates for 2021 demand turned out to be far too conservative. Across almost all major regions, there was a double-digit rise in median 2021 revenues, almost five percentage points higher than market expectations a year earlier. This also translated into broad optimism for this year's growth rate, with expectations for global median revenue growth of around five per cent. Economists' projections for the global economy indicate similar trends. The IMF, for example, currently projects in its January Economic Outlook that the global economy will grow by 5.9 percent in 2021 and 4.4 percent in 2022. For context, the IMF measures the average annual growth between 2013 and 2019 at 3.4%. In December 2021, the OECD also projected global growth to expand by 4.5% in 2022, after a rebound of 5.6% in 2021.

Figure 5: 2021 CROCI Estimate



Source: DWS, CROCI. The chart shows the 2021 CROCI return for Global coverage. Data as available on 17th December 2021.

Figure 6: Median Revenues Growth by Region

	2019	2020	2021E	2022E	Δ in 2021 since Outlook
US	2.1%	-2.0%	12.2%	5.3%	7.2%
Europe	3.4%	-6.6%	7.4%	4.9%	1.4%
Japan	-1.8%	-4.3%	11.2%	3.5%	6.2%
GEMs	3.6%	3.0%	10.0%	5.1%	4.1%
Global	2.1%	-2.7%	10.3%	4.8%	4.8%

Source: DWS, CROCI. The table shows median revenue growth forecasts of CROCI's coverage. Data as available on 17th December 2021.

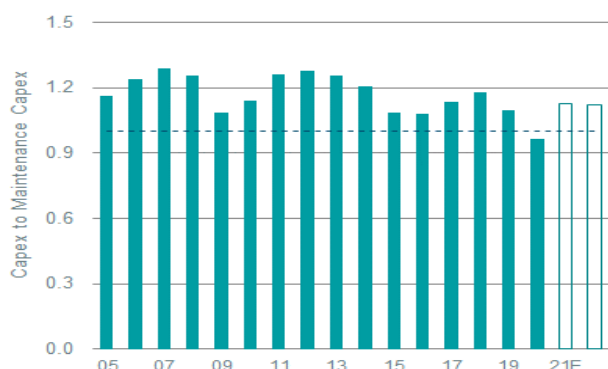
Capital expenditure inching towards expansion

This recovery in revenues has also translated into growth in capex expectations. In 2021, capex was higher than maintenance capex in aggregate, reversing the situation in 2020 and implying some degree of organic expansion. Last year's excess of capex over maintenance capex was in fact greater than in 2019 and this is expected to persist in 2022.

Two sectors particularly stand out. Information Technology has seen the highest inflation-adjusted capex over the past three years, and this will probably not come as a surprise.

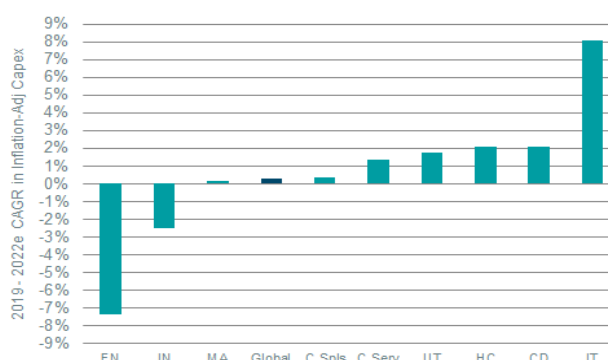
Energy, on the other hand, has seen the sharpest decline in inflation-adjusted capex. The sector has certainly seen a lot of volatility over the past two years. Energy prices collapsed sharply in 2020 on the back of demand compression, only to become one of the top performers in 2021. We have covered the key underlying economic drivers of the Energy sector in detail in Section 2.1.

Figure 7: Global capex to inflation-adjusted depreciation



Source: DWS, CROCI. The chart shows the ratio of capex to inflation-adjusted depreciation. The latter is a proxy for maintenance capex that would be necessary to maintain production capacity. Aggregate data of companies in CROCI's global coverage. Data as available on 17th December 2021.

Figure 8: Sectoral inflation-adj. Capex (2019-22E CAGR)



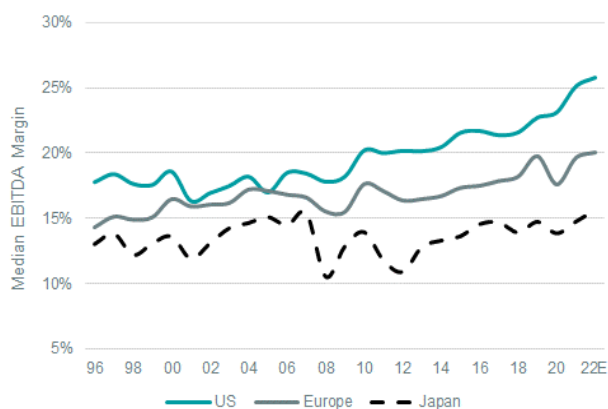
Source: DWS, CROCI. The chart shows three-year CAGR in aggregated inflation-adjusted capex of companies in CROCI's global coverage. Data as available on 17th December 2021.

Margins continue to hold steady

Consensus expects a slight plateauing of the margin expansion story in 2022. The degree to which the inflationary trends of 2021 are structural is likely to determine whether EBITDA margins have already peaked.

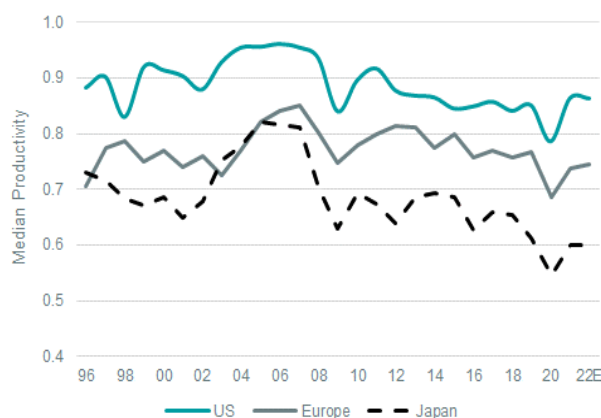
The impact of inflation on asset productivity (sales to gross capital) is equally important to monitor. Current expectations are for productivity to improve only marginally, up from its lowest level last year since 1995. Section 2.2 looks at the interplay of margins and productivity against the backdrop of high inflation seen in the 1980s.

Figure 9: EBITDA margins for global equities



Source: DWS, CROCI. The chart shows median EBITDA margin by region from 1996 to 2022E. Data as available on 17th December 2021.

Figure 10: Sales to Gross Capital Invested for global equities



Source: DWS, CROCI. The chart shows the median productivity (sales to GCI) by region from 1996 to 2022E. Data as available on 17th December 2021.

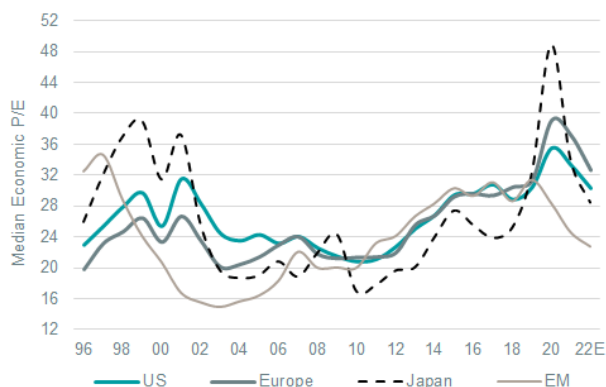
Valuations have moderated but remain at multi years high

Global economic earnings expectations also improved significantly over the course of 2021, resulting in a small moderation in valuation despite the strong price performance in global developed markets. Current valuations are more attractive than they were at the time of last year's Outlook. Global equities traded on a median 2021E Economic PE of 35.3x this time last year, for example, whilst global equities now trade on a median 30.2x Economic PE based in 2022e data, with the US at 30.3x, Europe at 32.7x and Japan on 28.4x.

Emerging Markets continue to appear cheaper than Developed Markets. They trade on an Economic PE of 22.7x, four PE points less expensive than a year ago. Excluding 2020, though, developed market spot valuations are still at multi-year highs.

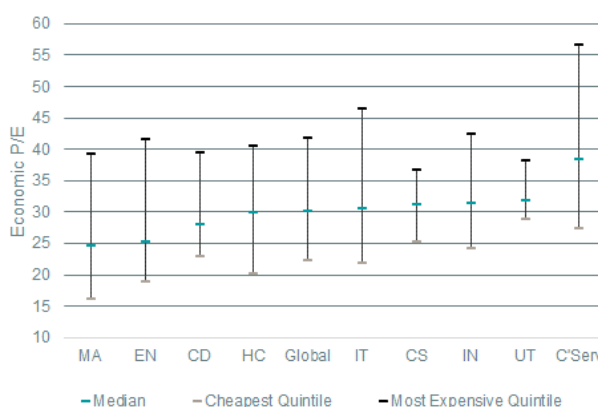
From a GICS perspective, Materials and Energy are the cheapest sectors on 2022E economic PE, almost 20% and 15% respectively below global median economic PE. Given that these two sectors are also amongst the highest carbon emitters, investors should be aware of their sensitivity to changes in the carbon price, which is covered in Section 1.2. By contrast, Communication Services appears the most expensive, almost a third higher than the global median economic PE.

Figure 11: Median Economic P/E by region



Source: DWS, CROCI. The chart shows the median economic PE by region from 1996 to 2022E. Data as available on 17th December 2021.

Figure 12: 2022E Economic P/E by sectors



Source: DWS, CROCI. The chart shows the economic PE by sector for 2022E. Data as available on 17th December 2021.

Cost of Capital remains at record lows

Investors have on average received a 5.4% total real inflation-adjusted return from equity investments over the long-term. The expected level has fluctuated with time depending on investors' risk appetite and is currently at 4.4%—100 bps below the long-term average.

Figure 13: Annual Global Cost of Capital since 1989



Source: DWS, CROCI. Data as available on 10th January 2022

Figure 14: Sensitivity of global equity values to the changes in cost of capital

COC	EV/NCI	EV move	MV move
5.40%	1.06	-40%	-46%
5.20%	1.16	-34%	-40%
4.90%	1.33	-25%	-29%
4.60%	1.56	-11%	-13%
4.40%	1.76	0%	0%
4.20%	2.02	15%	17%
4.00%	2.35	33%	38%

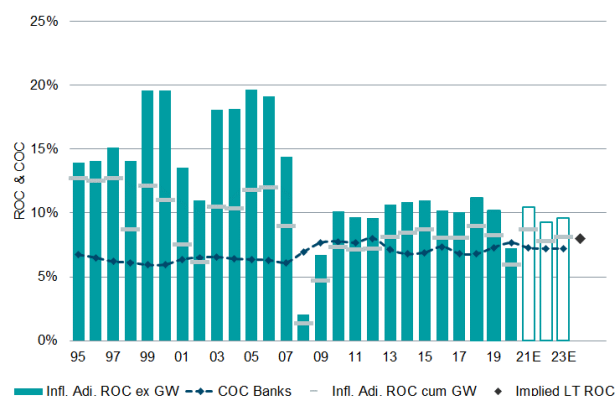
Source: DWS, CROCI. Sensitivity is calculated using agglomerated data of companies in CROCI's coverage globally. EV is Enterprise Value; MV is Market Value. Data as available on 10th January 2022

Historical analysis shows that expected return has had a strong tendency to revert towards its long-term average. This reversion could happen either through several years of subdued equity returns—or through a fall in equity prices. Today, such a fall would mean a drop in equity prices of over 45% to correct the expected return to the long-term average level.

Governments the world over have had to spend record breaking amounts to prop up COVID-stricken economies, instead of scaling back their role. That effort has pushed the debt overhang in the developed world to unprecedented levels. Incremental debt now has materially less utility than it did even a year ago.

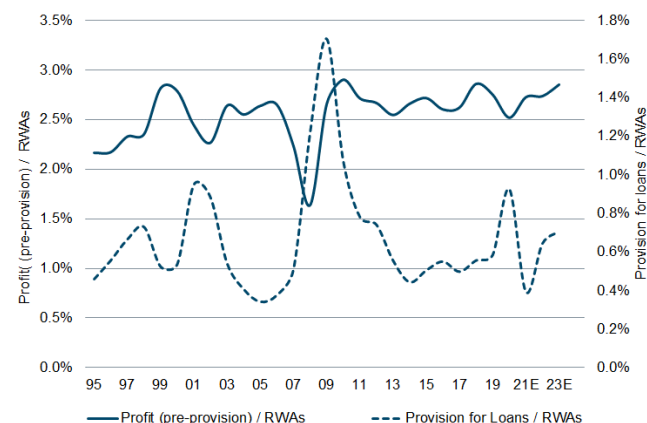
Rebound in banking profitability

Figure 15: Global Banks' Return on capital & cost of capital



Source: DWS, CROCI. The chart shows Return on Capital and Cost of Capital for Global Banks under CROCI coverage. Data as available on 10th January 2022.

Figure 16: Global Banks' return drivers



Source: DWS, CROCI. The chart shows return drivers for global Banks under CROCI coverage. Data as available on 10th January 2022.

2021 was a year of rebound for the banking sector. Consensus expectations for inflation-adjusted return on capital (RoC) are set to return to pre-pandemic levels, following a fall in 2020. Much of this rebound came from a reversal in loan-loss provisions, the main factor behind the previous year's dip, as most of the extra provisioning for anticipated loan losses was reversed. 2022 will not have the support of provision write-backs, so the future course of loan losses is likely to depend on a number of factors, particularly how borrowers respond to rising rates. Consensus estimates incorporate a rise in provisions from the low reached in 2021. However, higher estimated pre-provision profits mostly offset that impact, so that the consensus-based RoC estimates remain comparable to pre-crisis levels.

Interest rates rose sharply towards the end of 2021 and major central banks have indicated that they plan to raise base rates this year. In case of such an eventuality, banks tend to gain, especially some of the European banks that have been bearing the brunt of low rates for longer than their peers.

Banks' capital levels have proven to be resilient during the pandemic. As a result, U.S. banks have been generous with buybacks and dividends. In 2021, however, some European banks also bought back shares, departing from the historical trend. The buyback trend should continue for banks in 2022.

1.2 Carbon Price & CROCI

Brief background on carbon cost

Nearly 200 countries at last year's Glasgow U.N. climate conference agreed to curb their use of fossil fuels to address global warming. The objective is to stave off the worst impacts of rising temperatures. For businesses, the shift—and climate change itself—naturally raises the risk of lower profitability, should they be required to pay for their own emissions.

This section was conceived with a simple question—how to account for carbon cost in economic returns and valuation? Clearly this question is complicated by how intertwined with the economy the companies in question are. For example, the scope 1 emissions of company A (generator of electricity) can be counted as the scope 2 emissions of company B (end-user of electricity). As an extrapolation of this example, one can understand that carbon emission from the carbon intensive sectors such as Utilities (UT) and Energy (EN) has a ripple effect on the carbon footprint across the wider economy. This is because almost every company has UT and EN in their upstream supply chain.

Because of the deeply embedded nature of the carbon within our economy that the apparently simple question above cannot have a simple answer. However, the question is still worthy of discussion, as it can help explain: 1) whether carbon-intensive sectors have the economic firepower to pay for their carbon emissions, while also ensuring a transition to a low-carbon economy, 2) to what extent the downstream impact of carbon-intensive sectors such as UT and EN alter the economic returns/valuation of non-carbon intensive sectors. We make three simplifying assumptions:

Assumption 1: defining the boundaries of emissions. It is important to understand that three sectors—Energy, Materials and Utilities—account for more than four fifths of the carbon emissions of CROCI's coverage universe (Figure 17). This is when emissions are restricted to Scope 1. If Scope 2 is added, these three sectors continue to account for around the same proportion of carbon emissions. However, once Scope 3 is added, these three sectors account for almost 60% of carbon emissions, of which nearly half comes from Energy sector.

In this section, we restrict ourselves to Scope 1 and 2 only. Scope 3 can be thought of as capturing the end-use of the sources of carbon emitters. And the Scope 1+2 breakdown reflects that to a large extent, as the initial sources of carbon must largely be the Energy, Materials and Utilities sectors.

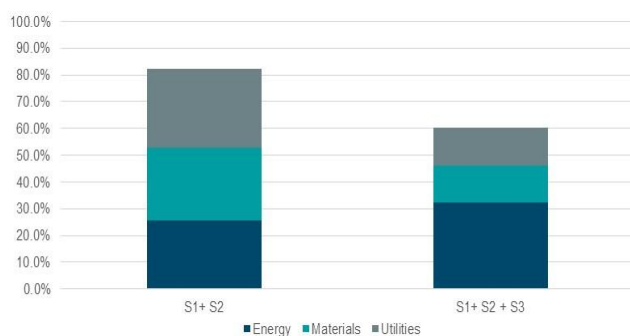
Concerns over double counting dissuade us from including Scope 3 in this study. As the scope 1 emissions of company A (generator of electricity) can be counted as the scope 2 emissions of company B (end-user of electricity), there are already concerns around double counting even restricting the emission boundaries to Scope 1 and 2. Moreover, this approach already implies that companies support the price/cost of emissions of their suppliers on top of their own direct emissions.

Assumption 2: inability to pass-on carbon cost to the customers - the ability to absorb or pass on will depend on the pricing power of the company both with its suppliers and its customers. However, for the sake of uniformity, we assume companies will not be able to pass on the cost of their scope 1 & 2 emissions to their customers. In reality, companies in certain industries must be able to pass on the impact of their carbon costs on to their customers if their business models are not to become unsustainable.

Assumption 3: global reference point for carbon cost - The EU ETS is the most liquid carbon market globally. More than 15 years since the EU ETS scheme was launched, carbon prices are now over 70 euros per tonne⁶. The EU ETS operates in all EU countries plus Iceland, Liechtenstein and Norway (EEA-EFTA states). For a more detailed perspective on the evolution of carbon markets globally, please refer to an upcoming publication from DWS Research Institute on the subject.

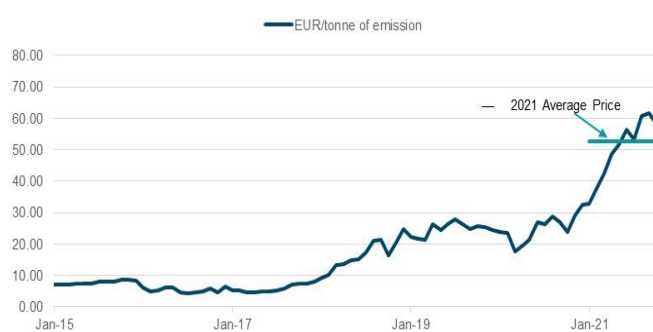
⁶ carbon dioxide, or the equivalent amount of two more powerful greenhouse gases, nitrous oxide (N₂O) and perfluorocarbons (PFCs)

Figure 17: Percentage of Global Emissions



Source: DWS ESG Engine, CROCI. Percentage of CROCI Non-Financial Coverage Universe. Data as available on 30th November 2021

Figure 18: EU ETS Price Chart

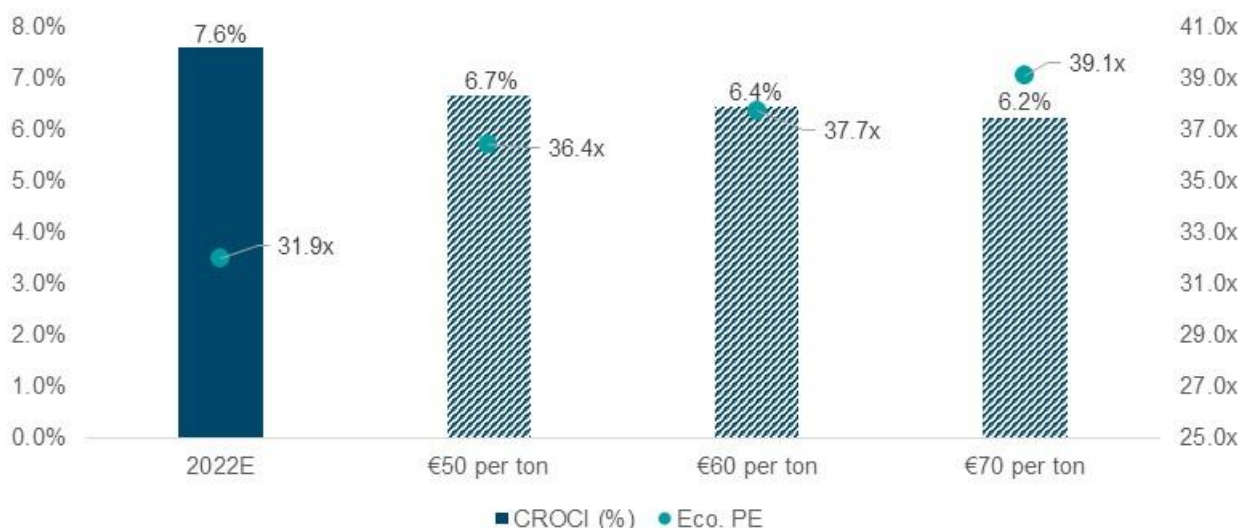


Source: DWS, Bloomberg Finance L.P., data as of 30th November 2021

Assessing the likely impact of carbon cost on economic returns and valuation

With this reference point for the carbon cost, we examine the sensitivity of economic returns and valuation to the change in the carbon price. In the following chart, we have shown this sensitivity at an aggregate level for CROCI non-financial coverage universe. Assuming a global carbon cost of Euro 50 (close to last year's average EU ETS price), the base case 2022E aggregate CROCI shrinks from 7.6% to 6.7%. The incremental impact on CROCI and Economic PE can be seen in the figure below.

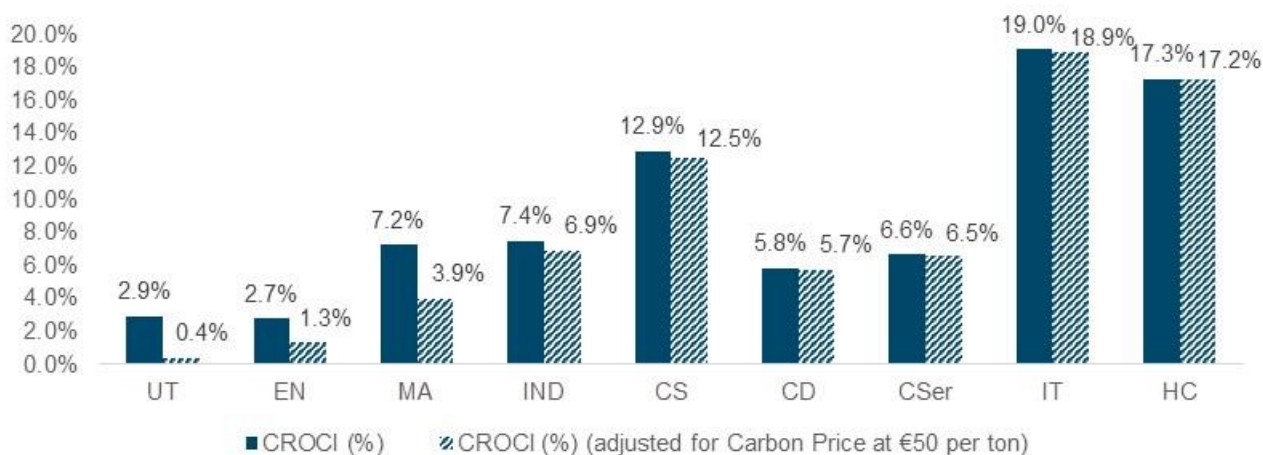
Figure 19: Sensitivity of economic returns & valuation to carbon price



Source: DWS, CROCI – Global non-financial coverage universe, data as of 24th November 2021.

We further break our analysis down by sector and region. Unsurprisingly, CROCI returns of Utilities, Energy and Materials are the most impacted due to implicit carbon cost. For the remaining sectors, the compression in CROCI is not more than 50 bps with the exception of Industrials, where it is around 60 bps.

Figure 20: Sectoral impact of EUR 50 carbon cost (base case CROCI based on 2022 estimate)



Source: DWS, CROCI, data as of 24th November 2021.

Another key takeaway from the above chart is the minimal impact seen on the non-carbon intensive sectors. This could mean either 1) that companies in the non-carbon intensive sectors such as Communication Services or IT have already moved to renewables for the purpose of their own electricity (Scope 2); or 2) that electricity usage could still be the biggest contributor to their emissions, by users consuming the IT product or service (Scope 3). The evidence suggests a combination of these possibilities. For example, a leading smartphone manufacturing company has eliminated Scope 2 emissions through renewables, but the Scope 3 emissions is the single largest driver of the overall carbon footprint of this company, driven by outsourced manufacturing (70% of total emissions), product use and end of life treatment (20%), product transportation (8%).

The depressed CROCI for Energy and Utility sectors in particular **highlights that for a globally acceptable carbon price on emissions, we need an effective transition plan, especially for the most affected sectors.** Let us take the example of Energy. There are many in the world who would like to save the planet but few of them can afford for their domestic fuel bills to rise very far. **The energy transition from fossil fuel to renewables cannot move that fast, pushing energy prices sharply higher last year. From the above figure, let us assume 2.7% as a true reflection of the sustainable CROCI for the energy sector. It may well prove too much for the sector to pay for its carbon emissions out of that, and still manage the transition from fossil fuel (which is still 81% of the global energy mix⁷) into renewables without any effective government transition plan.**

Importantly, the transition plan for sectors such as Energy and Utilities cannot be looked at in isolation, given that almost every company uses them in their upstream supply chain. So, if electricity producers convert from fossil fuels to renewable energy, the emissions savings would cascade downstream and help shrink emissions for the rest of the world. Without passing costs on to end users, however, the sectors are unlikely to have the economic firepower to absorb the carbon cost. Moreover, passing these costs on will certainly be inflationary (but this point is beyond the scope of this section). Recent developments in France⁸ and the UK⁹ suggest that the state may take on part of the burden of higher fossil fuel prices in the short or medium term, in order to avoid or at least soften the social and economic impact of the transition.

Looking at this by region, emerging markets appear to suffer the highest compression in CROCI. The highest emitting sectors have a greater representation in emerging market benchmarks than in developed. For example, looking at the MSCI EM, Utilities, Materials and Energy combined represent 20% of the ex-financial index versus 11% of the MSCI World ex-financials¹⁰.

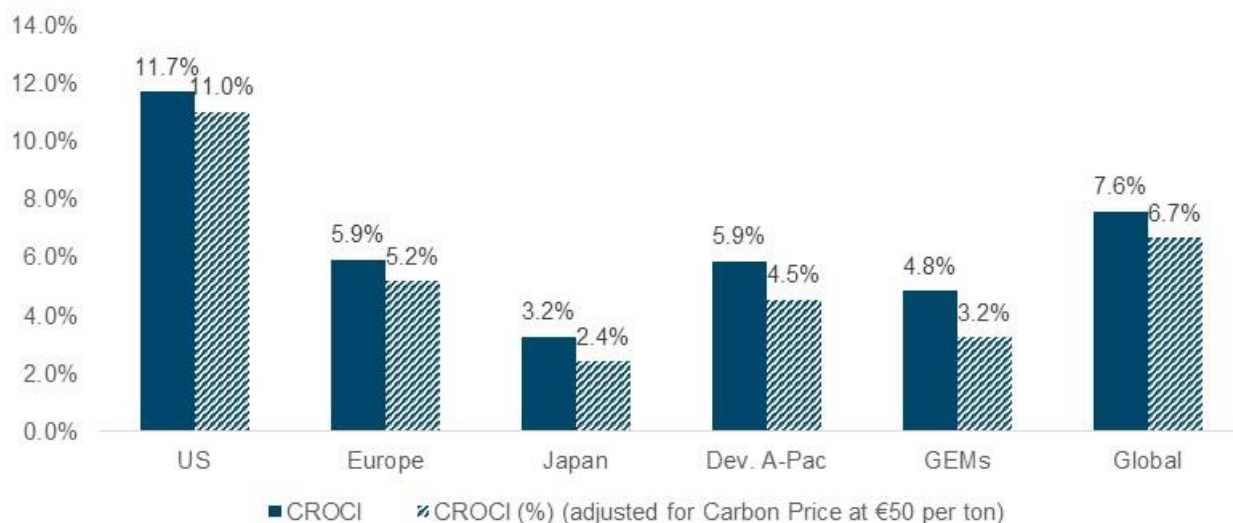
⁷ according to International Energy Agency

⁸ <https://www.reuters.com/business/energy/power-group-edfs-shares-s slump-after-edf-drops-earnings-guidance-2022-01-14/>

⁹ <https://www.ft.com/content/29a3497b-9c80-4ab1-a685-cf6225e54eb8>

¹⁰ Data as of November 30, 2021. The exercise to calculate the combined sector weights of UT, MA and EN involved sourcing the sector weights of all the sectors from MSCI factsheets for MSCI World and MSCI EM Indices. The next step was to remove the weights of the Financials sector from both the indices and re-calculate the combined sector weights of UT, MA and EN with respect to the MSCI World and MSCI EM Indices, respectively.

Figure 21: Regional impact of EUR 50 carbon cost (base case CROCI based on 2022 estimate)



Source: DWS, CROCI, data as of 24th November 2021.

Impact on the cheapest and most expensive quartile by economic value

The impact of the carbon cost on the cheapest and most expensive quartile by Economic PE¹¹ is shown in the following table. The cheapest quartile shows the disproportionate impact on CROCI in Europe. Names from the European Materials sector have a significantly higher carbon footprint than the equivalent U.S. and Japanese sectors.

To put this into perspective, high emitters such as Metals & Mining and Construction Materials account for nearly three-quarters of the European material sector's capital base within Europe's cheapest quartile. By contrast, these sub-sectors account for two-fifths and less than a tenth of the U.S. Materials sector's and the Japanese Materials sector's least expensive quartile respectively.

¹¹ FY1 Economic PE within the CROCI coverage universe

Figure 22: Cheapest and most expensive quartile by economic PE – Impact of EUR 50 carbon cost

Cheapest Quartile	CROCI	Economic PE	CROCI adjusted for carbon price	Economic PE adjusted for carbon price
Global	10.0%	16.3x	8.7%	18.7x
U.S.	17.0%	17.6x	16.1%	18.6x
Europe	11.5%	17.6x	9.0%	22.4x
Japan	6.4%	17.2x	5.9%	18.9x

Most Expensive Quartile	CROCI	Economic PE	CROCI adjusted for carbon price	Economic PE adjusted for carbon price
Global	4.7%	65.5x	3.7%	84.7x
U.S.	11.6%	55.3x	10.6%	60.8x
Europe	2.4%	76.7x	0.9%	NM
Japan	0.3%	NM	-2.8%	NM

Source: DWS, CROCI, data as of 24th November 2021. The CROCI and Economic PE based on the aggregate data of the number of companies mentioned.

Within the most expensive quartile, Japan would be the most impacted by the carbon cost. US cash returns appears to benefit from the asset-light mega-cap tech stocks. That supports overall productivity and in turn keeps cash returns high. Communication Services and IT together represent around 25% of the capital base of the most expensive quartile in the U.S. and 28% in Europe. In cash flow terms, they contribute nearly 60% in the US and 40% in Europe.

Given that tech companies are generally not emissions intensive (at least for Scope 1 & 2), our analysis suggests only a small impact on US valuations. For Europe and Japan, though, the base case CROCI is much lower than the US's. So even though absolute emissions in the most expensive quartile for Europe and Japan are around 50% and 20% lower respectively than the U.S.; low pre-carbon cost cash returns in Europe and Japan amplify the impact of the carbon cost.

Section 2:

Investment Themes

2.1 Energy sector amidst climate change

The energy sector finds itself in something of a bind. The very nature of the exploration & production (E&P) business, combined with downstream end use, makes it the largest greenhouse gas (GHG) emitter by sector. On the other hand, rising fuel demand driven by the post-pandemic re-opening of economies have allowed fuel prices to recover to a level where the addition of incremental E&P capacity has become financially viable (especially after significant capital expenditure cut and impairments seen in 2020)—even if the extent to which financial viability can be translated into sustainability remains to be seen.

In this section, we look at the historical economic returns generated by the sector, examine the risk of further impairments in the sector and provide an overview of the decarbonisation pathway adopted across two major regions – U.S. and Europe.

It is worth noting that, of the whole energy value chain, the E&P segment is the largest source of EBITDA generation and the largest consumer of capital invested. The following analysis therefore includes the companies from the U.S. and Europe that are primarily involved in E&P activities, including some large integrated operators. In all there are 21 such companies in the CROCI database, of which 17 are part of MSCI World Energy Index and represent 64 percent of the Index weight as on 30th November 2021. Unless stated otherwise, the aggregate of these 21 companies will be referred to as “The Energy Sector” for the purposes of this section.

The Economics of the Energy sector

“The textile industry illustrates in textbook style how producers of relatively undifferentiated goods in capital intensive businesses must earn inadequate returns except under conditions of tight supply or real shortage. As long as excess productive capacity exists, prices tend to reflect direct operating costs rather than capital employed.” – Warren Buffet (year 1978)¹².

This statement was made about the textile sector in the late 1970s but might equally describe the state of the energy sector today. Over the past decade ‘conditions of tight supply or real shortage’ have become infrequent thanks to changing trends in the sector. So it should not come as a surprise that the sector in aggregate has generally earned inadequate returns on capital.

Figure 23: Cash return (CROCI) for the energy sector



Source: DWS, CROCI, Aggregate data for companies in CROCI coverage that primarily involved in E&P, including integrated operators. Data as on 08th December 2021

The sector has managed to create economic value in only nine years out of the past three decades. Most of these years are clustered around the first decade of the century, when supply was not able to match the strong recovery in demand for energy. Peak profitability was between 2005 and 2007, when average returns were 9.6% and the WTI oil price was around \$65 per

¹² Berkshire Hathaway Letter to the Shareholders 1978

barrel. By contrast, between 2012 and 2014 the average oil price was nearly 50% higher at \$95 per barrel, but cash returns were nearly 50 percent lower at 4.3%.

The reason for this apparent anomaly is that new capacity additions happen when the oil price rises, making deep offshore projects profitable for example. Capital expenditure peaked between 2012 and 2014—with capex almost twice depreciation—when oil prices were also at peak levels.

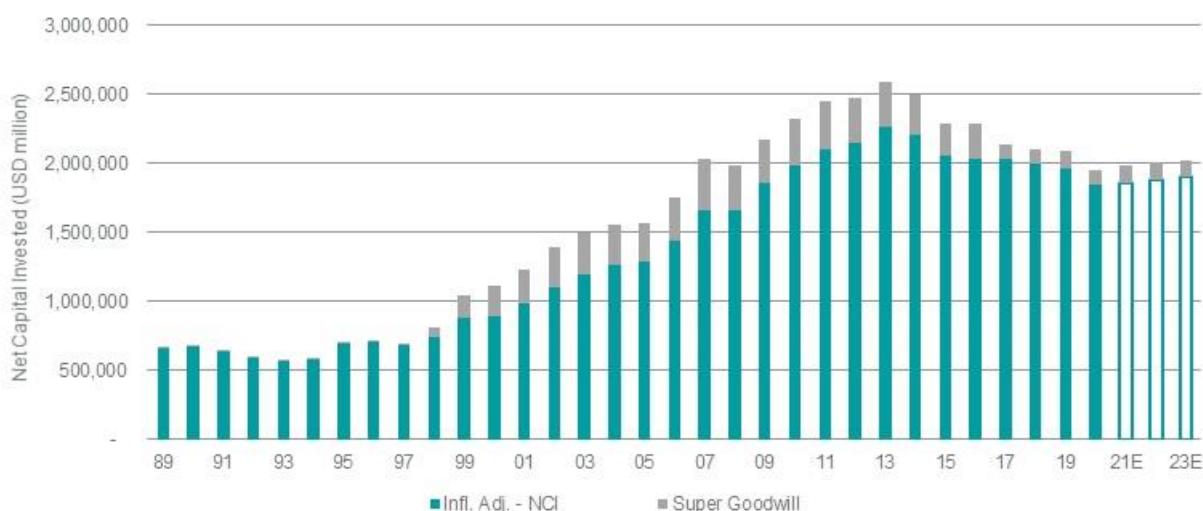
Figure 24: Capital expenditure of the Energy sector along with WTI price



Source: DWS, CROCI, Bloomberg Finance L.P. Aggregate data for companies in CROCI coverage that primarily involved in E&P, including integrated operators. Data as on 08th December 2021

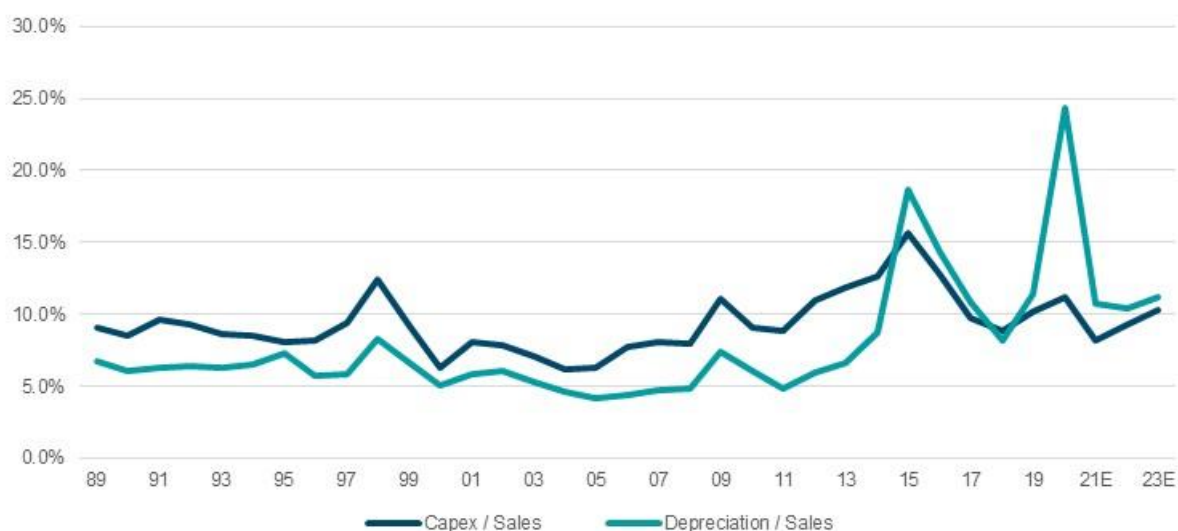
This higher capital expenditure meant that the capital base increased many times over between 1997 and 2014, the year when it peaked. Since then, the subdued oil price has meant much lower new investments and the sector has actually seen a net decline in its capital base.

Figure 25: Net Capital Invested of the Energy sector



Source: DWS, CROCI, Bloomberg Finance L.P. Aggregate data for companies in CROCI coverage that primarily involved in E&P, including integrated operators. Data as on 08th December 2021

Figure 26: Capex and depreciation as % of Sales



Source: DWS, CROCI, Aggregate data for companies in CROCI coverage that primarily involved in E&P, including integrated operators. Data as on 08th December 2021

Oil companies have conflicting considerations to weigh before making investment decisions for this year. The historical trend in global oil demand grew by more than 40 per cent during the three decades before the pandemic¹³. Set against that, the outlook for oil demand is likely to be hit hard as the world moves towards its ambitious goal of net carbon neutrality over next three decades.

The International Energy Agency (IEA) states that¹⁴, “*The world is not investing enough to meet its future energy needs, and uncertainties over policies and demand trajectories create a strong risk of a volatile period ahead for energy markets.*” It goes on to mention that current **spending by Energy companies is one of the very few areas that is reasonably aligned with the level seen in its Net Zero Emission by 2050 Scenario**. This could possibly be mitigated by the inertia of the capex cycle in the sector, however, given the length of the development period of some oil E&P projects. In other words, even though capex has been low in recent years, there is still a pipeline of already sanctioned projects that may be added to gross assets in due course, and which may have to be impaired depending on the path of future oil demand over the transition period.

Oil fields generally have a lifespan of between 15 and 30 years, according to some estimates. The most critical input to the viability of an oil field is whether the oil price will be sufficient to cover the costs of production over the life of the well. In addition, accounting standards require companies to perform an annual impairment test to determine the extent to which its assets are recoverable, with the oil price again being the key assumption.

Impairments in the sector

In 2020, the energy sector¹⁵ reported total impairments of USD 97 billion, almost five per cent of its overall capital base. This suggests that internal company estimates for future oil prices have fallen since the initial investments in those projects were made. The crucial question is, if global energy requirements move steadily away from fossil fuels and push down energy prices in the long term, then on what scale are the risks of future impairment (and associated stranded assets) for the sector.

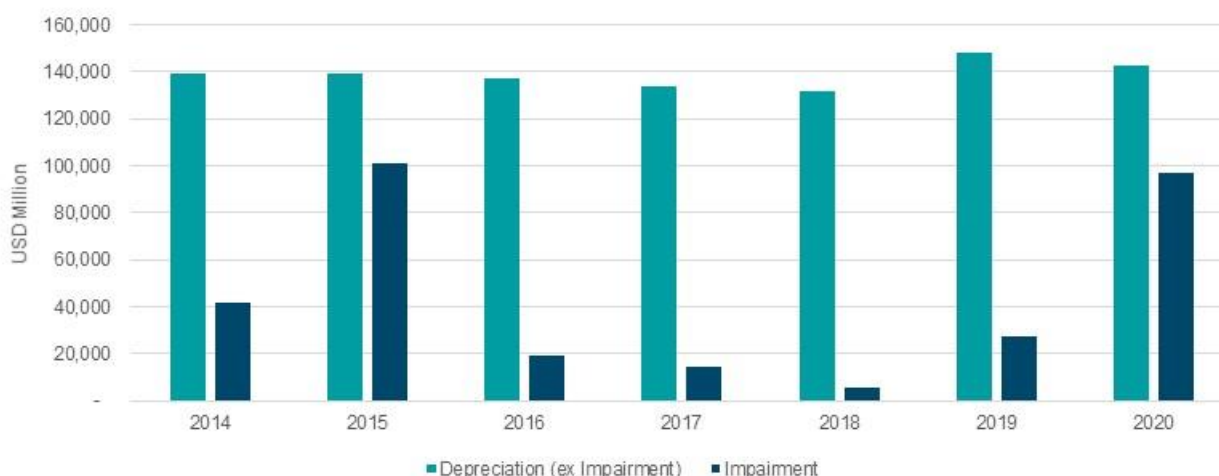
Our work suggests **it is unlikely that existing assets will be stranded, i.e., retired before the end of their initially planned economic life**. But if a fade in demand triggers a price decline for those commodities, then existing assets are at risk of yielding less in the future. Thus, the principal risk is that the fair value of E&P properties declines, possibly below their net accounting value on the balance sheet, causing further impairments.

¹³ IEA, World oil supply and demand, 1971-2020, IEA, Paris <https://www.iea.org/data-and-statistics/charts/world-oil-supply-and-demand-1971-2020>

¹⁴ IEA (2021), World Energy Outlook 2021, OECD Publishing, Paris, <https://doi.org/10.1787/14fcb638-en>

¹⁵ includes companies from U.S. and Europe, which are primarily involved in E&P activities, including some large integrated operators. In all there are 21 such companies in the CROCI database, of which 17 are part of MSCI World Energy Index and represent 64 percent of the Index weight as on 30th November 2021. Unless stated otherwise, the aggregate of these 21 companies will be referred to as “The Energy Sector” for the purpose of this section

Figure 27: Depreciation and impairment



Source: DWS, CROCI, Aggregate data for companies in CROCI coverage that primarily involved in E&P, including integrated operators. Data as on 08th December 2021

We take no view on the future direction of the oil price or interest rates. Instead, we take a range of commodity prices and discount rates to derive the plausible impairment risk in the sector, based on the CROCI framework.

Figure 28: impairment sensitivity of the energy sector

Accounting Impairment estimate in USD (% of NCI)	Discount Rate Range		
	Oil / Gas price assumption	6.0%	8.0%
\$40 / \$2.50	247bn (12.9%)	271bn (14.2%)	292bn (15.3%)
\$50 / \$3.00	93bn (4.9%)	120bn (6.3%)	144bn (7.5%)
\$60 / \$3.50	23bn (1.2%)	33bn (1.7%)	42bn (2.2%)

Source: DWS, CROCI, data as of 08th December 2021

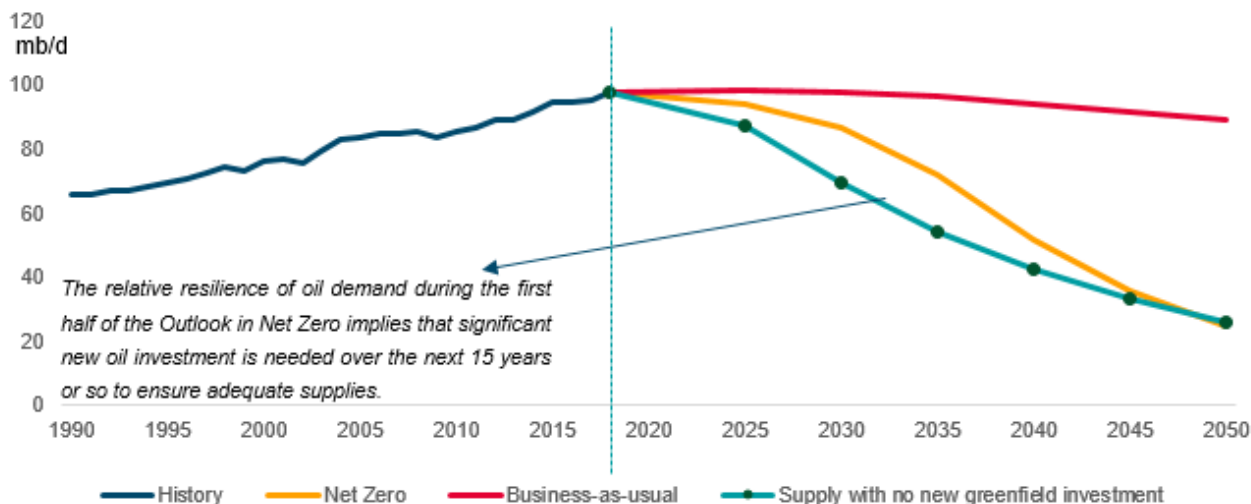
Energy companies are required to disclose projections (revenue, costs, capex, etc.) for their oil & gas exploration business. They use standard assumptions for oil & gas prices (average of first day of the month price for previous twelve months), cost curves (based on the year-end structural levels) and, generally, a default 10% discount rate. We use this information as a starting point for our sensitivity analysis on the impact on asset impairment of commodity price and discount rates.

With oil and gas prices at USD 40 per barrel and USD 2.5 per MMBTU respectively and the nominal discount rate at 10 per cent, we estimate the total impairment charge for the sector to be USD 292 billion (or roughly 15.3 percent of the current capital base). The lion's share of the impairment is likely to come from only a small number of US companies, however.

By contrast, with oil and gas prices at USD 60 per barrel and USD 3.5 per MMBTU respectively and the nominal discount rate at 6 per cent, we estimate the total impairment to be just around one per cent of the existing capital base, with most of the impairment coming from an even more limited number of companies. Doubtless, company management will see compelling opportunities for large-scale capital expenditure in their traditional energy operations as energy prices bounce back. For reference, in the following figure the blue-green line shows the scenario where no investment is undertaken in new fields beginning with the 2020 supply baseline. It assumes that continuous investment at producing and sanctioned fields takes

place including infill wells and costs related to maintaining the facility. Additionally, projects that have already been sanctioned (up to almost 7 Mb/d by 2025) are assumed to be completed in the next few years. It is clear that this would not even meet the demand based on the Net Zero pathway (yellow line).

Figure 29: Consumption and production of oil



Source: DWS, bp Energy Outlook 2020.

In the context of the capital discipline implied by the IEA ‘World Energy Outlook 2021’, it becomes apparent that periods of tight supply are likely to become frequent as transition away from fossil fuels plays out over the next decade. As a result, the oil prices are likely to find support in the near term, indicating limited scope for incremental impairment. This assumption could easily unravel if the consumption of oil or fossil fuels in general declines significantly on the back of strong policies to hasten the shift to clean energy and lead inexorably to additional impairments.

U.S. & Europe – Different pathways to decarbonization

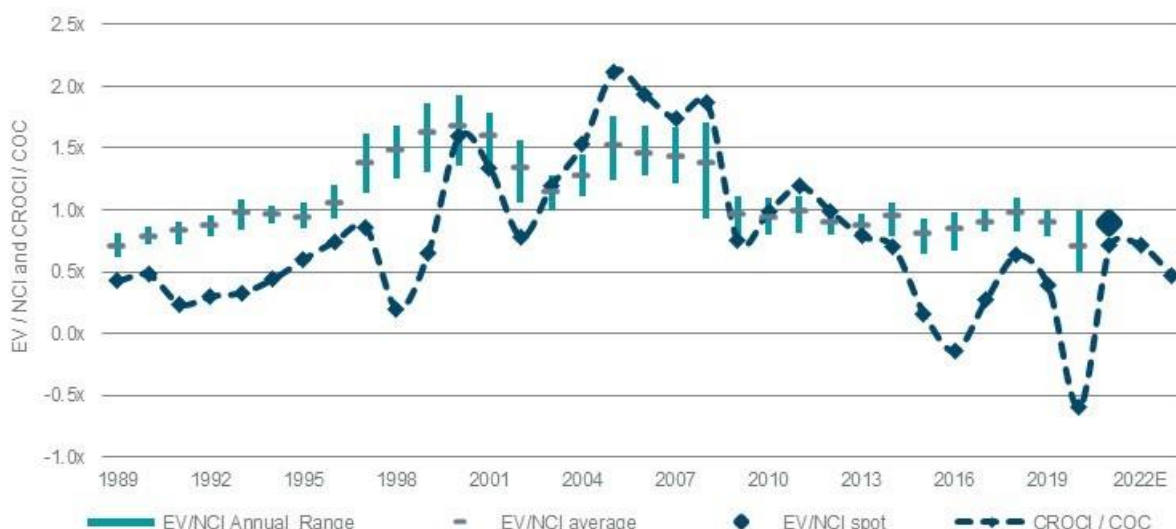
The global Energy sector has traded on an average economic price-to-book of 1.1x since 1989, and on 0.9x since 2015. On current forecasts, its 2022E economic P/BV is 0.8x. An impairment of USD 292 billion (based on the scenario above) would still leave the multiple just below 1.0x.

The CROCI economic price-to-book is in effect a Tobin’s Q, comparing the market value of a company’s assets with their replacement value. For cyclical sectors, a prolonged period of value destruction (sub-cost of capital returns) tends to follow an expansionary phase (such as in 1996 or 2013 for Energy)—and this tends to push Tobin’s Q below 1. Over the past decade, however, EV/NCI for the Energy sector has remained below 1, the only sector where this has happened.

It tends to suggest grounds for consolidation and/or an overall cut in sector capacity¹⁶. And so it has proven in the case of the energy sector, whose capital base has been in near steady decline since 2015.

¹⁶ By contrast, capacity expansion is usually associated with a Tobin’s Q of more than 1, which makes incremental investments viable.

Figure 30: Value & returns for the Energy sector



Source: DWS, CROCI, Aggregate data for companies in CROCI coverage that primarily involved in Oil & Gas Exploration, including integrated operators. Data as on 08th December 2021

At the regional level there are stark differences. The US's EV/NCI is close to 1.0x, whereas Europe trades at less than 0.7x. Neither the assets nor the emission levels are far apart. The major difference is in the capex strategy, making the US more sensitive to changes in energy prices.

Figure 31: The energy sector split across U.S. & Europe

	2022E EV/NCI	Mkt. Cap. As % of EV	2022E NCI (USD bn)	Emissions^ (S1+S2)
Aggregate	0.81	89%	1,928	499
U.S.	0.94	94%	922	248
Europe	0.68	84%	1,006	251

Source: DWS, CROCI, DWS ESG Engine. Aggregate data for companies in CROCI coverage that primarily involved in Oil & Gas Exploration, including integrated operators. Data as on 08th December 2021. ^Emissions data are in MteCO2e.

More stringent European regulations and court rulings on carbon have prompted faster investments in renewables by European majors. These investments in early-stage new energies and renewables will increase their share of unproductive capital in the near term. Meanwhile, their US counterparts have the potential to gain market share. Their ongoing investments in oil and gas should see improved returns if crude oil prices remain above \$65-a-barrel.

While it is unlikely that existing assets will be stranded, they are still at risk of yielding lower cash flows if a fade in demand triggers a decline in commodity prices—2020 was a good example of how a fall in demand can have a devastating impact on the oil price.

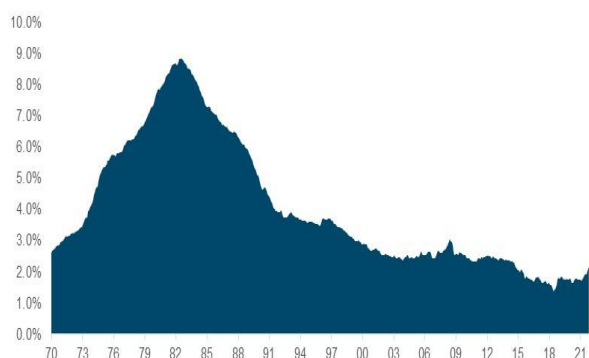
Equity shareholders would be well served to look beyond the near-term favourability in the economics (on the back of higher fuel prices), to focus on year-by-year timelines for emission reduction at an individual company level within the Energy sector. The optionality to kick the emissions can down the road seems to have passed its expiry date.

2.2 Postcard from the 1980s

U.S. consumer prices rose at an annual pace of 7.0% in December 2021, their highest annual gain in almost four decades. Commentators have blamed the surge on everything from soaring commodity prices to some \$5.3 trillion in U.S. fiscal stimulus passed since the start of the pandemic. We published a report on the impact of inflation in equities¹⁷ in the second half of last year, which sought to shed light on the reaction of equities to inflation. One very valuable case study for this is the hyper-inflationary period of the 1970s extending into the early 1980s, helping assess the impact of sustainably high inflation on the operating characteristics of equity markets.

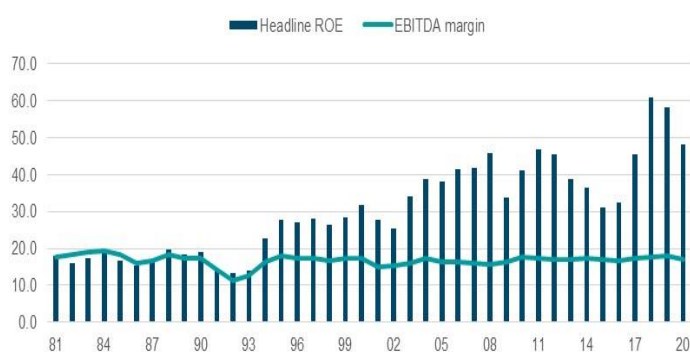
We have been able to collect data back to the start of the 1980s for twenty key U.S. companies¹⁸, which covers the last period of high inflation, 1981-7. In aggregate, CROCI cash flow margins were at their peak (over 20%) in 1981. Average margins were only about 2 percentage points lower over 1981-7, but companies in aggregate still failed to create value in most of those years. **This sort of productivity analysis potentially gives greater insight into a business resilience to inflation than just looking at margin buffers**, as it also takes into the state of a company's assets. The key takeaway is that businesses with both commoditized products and a strong correlation between sector-capex and selling price, are prime candidates for economic profit troubles during inflationary period.

Figure 32: 10Y trailing avg. U.S. CPI (1961 – LATEST)



Source: DWS, Federal Reserve Economic Data. Period on the x axis refers to the preceding decade. 1970 refers to 1961 to 1970 and so on. Data as available on 13th December 2021

Figure 33: Headline ROE and EBITDA Margin (1981-20)



Source: DWS, CROCI. Data as available on 13th December 2021. The above chart is an aggregation of 20 U.S. companies for which we have data from 1981.

Traditional investor wisdom says that stocks are a hedge against inflation, rooted in the fact that stocks are not claims against dollars, as bonds are, but represent ownership of companies with productive assets. This belief is seemingly supported by conventional accounting ratios: EBITDA margins even improved a little during the early 1980s (Figure 33), and headline ROE was resilient.

But when we look at CROCI's inflation-adjusted numbers, it becomes clear that high inflation did not automatically translate into higher real rates of return on equity. The key driver of the difference between CROCI and the margin is the asset productivity. Improvements in margin in the early 1980s were more than offset by the fall in productivity (Figure 35). Even as inflation was brought under control during the decade, years of high inflation fed into the capital employed, which only shows up fully when assets are shown at replacement value in real terms.

¹⁷ DWS Research Institute – CROCI, The impact of rising rates and inflation on equities, Curto/McKenzie, 28 July 2021

¹⁸ These collectively account for c.9.0% of the S&P 500 ex financial index, as of November 30, 2021

Figure 34: CROCI vs Cost of Capital (1981-22E)

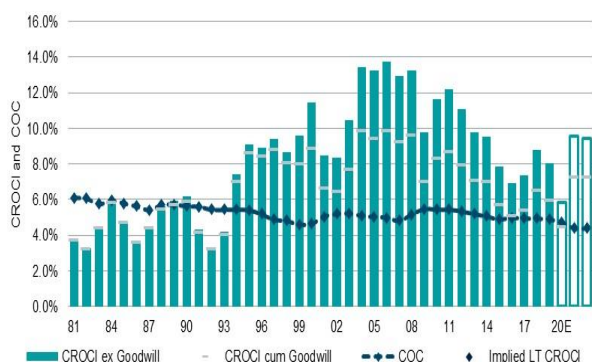
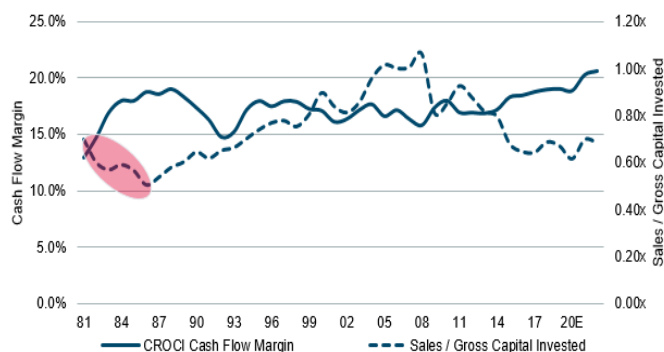


Figure 35: CROCI Drivers (1981-22E)



Source: DWS, CROCI. Data as available on 13th December 2021. The above charts are aggregations of 20 U.S. companies for which we have data from 1981.

The onset of recession¹⁹ did have an impact on sales, but the gross capital (when adjusted for inflation) still grew significantly. The upshot is that fixed assets responded to inflation (which was on the decline during the decade) with something of a lag. But this extra investment ended up generating no productivity improvement in cash returns.

Figure 36: Sales and Gross Capital Employed (USD mn) - aggregate of twenty companies

	1981	1987	Absolute growth over the period
Sales	265,126	301,521	13.7%
Gross Capital Invested	378,844	560,810	48.0%

Source: DWS CROCI. Data as available on 13th December 2021. The above table is an aggregation of 20 U.S. companies for which we have data from 1981.

The companies with deep history to 1981 break into the following:

- ➔ 7 companies from IT
- ➔ 4 companies from Consumer Staples
- ➔ 3 companies from Industrials
- ➔ 2 companies each from Energy, Health Care and Materials

Given the diverse set of sectors, further analysis at the aggregate level may not be that advantageous. We are reminded of the assessment by a reporter of Andrew Carnegie's business empire, "My God, you'll never believe the sort of money there is in running libraries."

Nevertheless, there are useful insights to be gained from analysing companies with similar characteristics over a 40-year time frame. To achieve this, we have created two categories to study:

- ➔ Consumer-oriented names – includes Consumer Staples and Healthcare companies {total 6 companies}
- ➔ Commodity-cyclical names – includes Energy and Materials {total 4 companies}

We ignore IT and Industrials because they do not represent contemporary companies in these sectors. Most of the current crop of the mega-cap tech companies have too short a history for such an exercise, so IT companies with deep history are not representative of contemporary large cap IT companies.

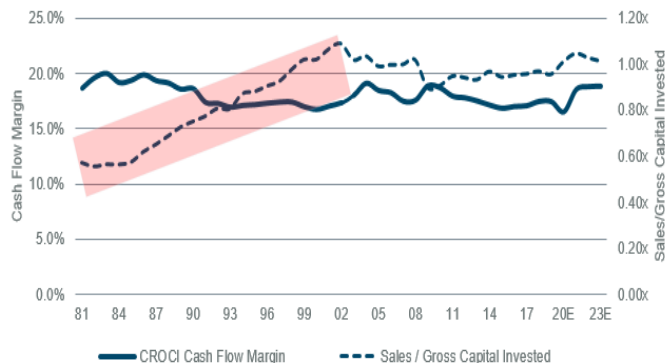
¹⁹ Prior to the 2007-09 recession, the 1981-82 recession was the worst economic downturn in the United States since the Great Depression. Lasting from July 1981 to November 1982, this economic downturn was triggered by tight monetary policy in an effort to fight mounting inflation.

Consumer-oriented names

Economic profits just about managed to remain positive during the early 1980s with CROCI marginally above the cost of capital. Conventional wisdom suggests this sector has pricing power to wield (a function of relatively inelastic demand) and hence should be able to combat inflation. Defensive characteristics notwithstanding, inflation kept profitability flat for the first few years of the 1980s. Thereafter there was nearly two decades of return expansion.

Productivity growth was the main driver for the improving profitability. Over the twenty years in question, margins experienced a modest compression, whereas sales growth consistently outpaced growth in capital invested. Only in the mid-2000s did productivity improvement start to plateau.

Figure 37: CROCI – Select Consumer-oriented names (1981-23E) Figure 38: CROCI Drivers – select Consumer-oriented names (1981-23E)



Source: DWS, CROCI. Data as available on 13th December 2021.

Source: DWS, CROCI. Data as available on 13th December 2021.

The decline in sales over the past decade and a half could be a function of: 1) the companies growing large and bringing high base effect into play, 2) heightened competition from the e-commerce players, 3) sector specific challenges like competition from generic companies for healthcare sector. However, the growth in GCI has largely moved in tandem with that of the sales courtesy of the significant improvement in the working capital requirement in relation to the sales. As can be seen in the following figure, working capital requirement has over the years declined driven by 1) improved inventory management courtesy of the supply chain innovations and 2) as the companies grow larger, presumably command better bargaining power over their supply chain.

Figure 39: Sales & GCI Growth* – Select Consumer-Oriented names (1981-20) Figure 40: Sales in relation to capital employed – Select Consumer-Oriented names (1981-20)



Source: DWS, CROCI. Data as available on 13th December 2021. *Trailing 5 years CAGR

Source: DWS, CROCI. Data as available on 13th December 2021.

The key takeaway in the present context of higher inflation: the selected consumer names have seen their sales growth trend decelerate to around 2%, significantly lower than in the past. These companies at an aggregate level have a high enough CROCI cash flow margin buffer to offset higher input cost without changing the selling price. Assuming sales growth revives enough to offset the inflationary impact on the GCI, consumer-oriented companies should largely be able to generate economic profits in an inflationary environment. For this, it is imperative to have pricing power. **A consumer franchise that allows the value of the product to the purchaser, rather than its production cost, to be the major determinant of selling price, is the one likely to be in a better position to generate economic profits during inflationary period.**

Consumer Staples sector

We can attempt to gauge the pricing power within the Consumer Staples sector specifically in the current scenario. General inflation is expected to be in mid- to high single digits at the start of 2022. This range might vary from company to company based on their raw material mix and operations set-up. Supply chain disruptions continued to be pressure points alongside rising commodity prices. Labour shortage-related disruptions were higher than at the end of 2021. **Companies are resorting to pricing actions, productivity improvements and innovations in the face of an accelerating inflation environment.** Pricing actions have been seen across the sector, with expectations of further price increases in the near future, depending on how inflation progresses. **It is interesting to note that price elasticity has apparently not been affected—there has been no major drop in volume on account of price hikes.**

Commodity-cyclical names

Commodity-cyclical names began the decade with negative economic profits and remained value destructive for almost two decades. While margins improved significantly between 1981 to 1987, productivity halved. Then when productivity improved between 1987 and 1990, margins saw a sharp compression, keeping returns below the cost of capital.

Figure 41: CROCI – Select Commodity-cyclical names (1981-23E) Figure 42: CROCI Drivers – Select Commodity-cyclical names (1981-23E)



Source: DWS, CROCI. Data as available on 13th December 2021.



Source: DWS, CROCI. Data as available on 13th December 2021.

Commodity-cyclical names—and the energy sector in particular—have shown a strong correlation between their capital investment and commodity or energy prices, which tends to result in a supply glut. Viewed individually, each company’s capital investment decision could potentially be justified; but viewed collectively, the spending often seems irrational. After each round of investment, all the players have more money in the game and returns turn more anaemic.

This helps explain the scenario around the start of 1980 (Figure 42). Substantial capital expenditure associated with the oil crisis in the 1970s combined with falling demand in the aftermath in the early 1980s led to a serious surplus of crude oil. The world price of oil had peaked in 1980 at over US\$35 per barrel (equivalent to \$110 per barrel in 2020 dollars, when adjusted for inflation); it fell in 1986 from \$27 to below \$10 (\$64 to \$24 in 2020 dollars). Perhaps we get a better sense of the boom-bust cyclical nature of the sector from the following chart. We can see that the period of high energy prices (1970s and then around 2000s) spur higher capex in the industry and that in turn leads to a period of economic returns (as the supply expansion is higher than the demand absorption).

Commodities had a great year in 2021, hence capex decisions at the sector level once again become important to track. This is because capital allocators in commodity-cyclical sectors have in the past tended to abhor conditions of shortage—even though those are the only circumstances permitting them good returns. Whenever shortages appear, the typical capital allocator simply can't wait to expand capacity and thereby plug the hole through which money is showering upon them.

Figure 43: Sales & GCI Growth* – Select Commodity-cyclical names (1981-20)



Source: DWS, CROCI. Data as available on 13th December 2021.
*Trailing 5 years CAGR

2.3 Value through the CROCI prism

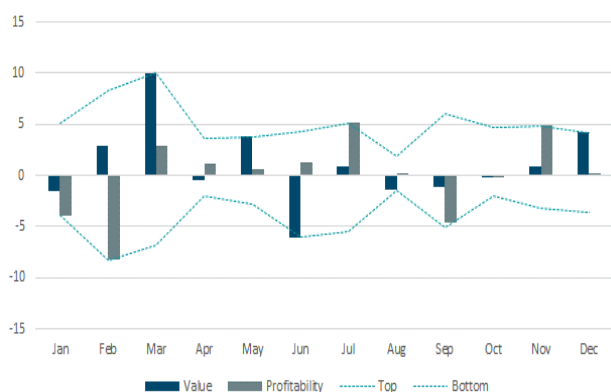
2021: the year of volatile earnings

2021 was more volatile than usual in terms of factor leadership. The performance of style factors has varied materially between regions too—something which has been relatively rare over the past decade. The reactions of different countries towards the pandemic, the sudden appearance of new COVID variants plus the lifting of lockdowns and tentative moves towards normality have had a major impact on which factors have performed and when.

The year started with a strong focus on value, particularly low-quality price-to-book companies typical of early regime change. In the second quarter after a bumpy couple of months, quality value moved into the lead with more of a focus on profitability as investors became more comfortable with the sustainability of earnings levels. The rapid spread of the Delta Variant pushed non-fundamental factors back to the fore. By the end of the year, there was a move back towards fundamentals again.

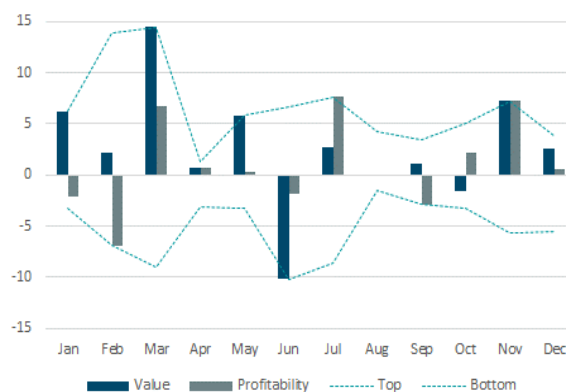
We have used the Bloomberg style factors to analyse factor leadership over the year. Within that universe of factors, CROCI strategies tend to have highest exposure to Value and Profitability, although these are by no means perfect representations of Economic Value. The charts below show these two factors within the context of the full factor universe for global equities and for the US, Europe and Japan. The blue bars represent the performance of the Value factor, the grey bars the performance of the Profitability factor, and the lines indicate the best and worst returns within the full factor universe in each month.

Figure 44: MSCI World Factor Chart (2021)



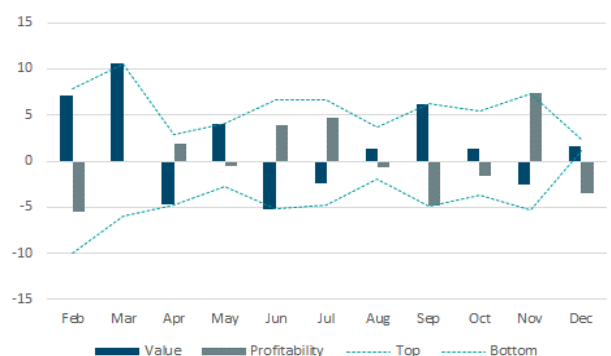
Source: DWS, CROCI, Bloomberg Finance L.P., data as of December 17th 2021

Figure 45: U.S. Factor Chart (2021)



Source: DWS, CROCI, Bloomberg Finance L.P., data as of December 17th 2021

Figure 46: EU Factor Chart (2021)



Source: DWS, CROCI, Bloomberg Finance L.P., data as of December 17th 2021

Figure 47: Japan Factor Chart (2021)



Source: DWS, CROCI, Bloomberg Finance L.P., data as of December 17th 2021

In every region, both Value and Profitability factors swung from best to worst performing factor and back again from one month to the next. Given the variety of measures of value in the market, the Value factor is an amalgam of several different elements. The difficulty for fundamental investors has been the reduced visibility around earnings resulting from the very volatile background including both COVID factors, & inflation and interest rate factors. Earnings visibility has been the most challenging this year for several decades. Figure 48 below shows how earnings surprises spiked at the start of the pandemic and then again around the time the Delta Variant emerged. (It is interesting that in the last available data point at the end of November last year the surprise level continued to fall off sharply. This coincided with improved performance of the profitability factor.)

Figure 48: Earnings Surprises



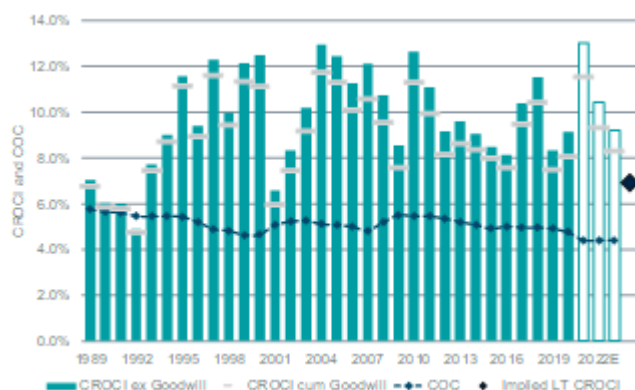
Source: DWS, CROCI, FactSet, data as of December 17th 2021

As a result, the type of value that dominated in 2021 came from low P/BV companies, even if their profitability was very weak. This sort of company is what we have referred to as Aggressive Value in our work in the past (measured simply as low Economic P/BV and nothing else), and we can see that generally Aggressive Value tends to get short boosts in transitional periods and then typically gives way to Quality Value (which also considers profitability and other quality elements), and that tends to have the longer-term performance.

In 2021, Aggressive Value strongly outperformed. The 30 companies globally with the lowest economic price-to-book outperformed the MSCI World by around 17%, with the strongest regional outperformance coming in the US and in Emerging Markets. (The periods of most significant performance were in February, when the top performing sectors in MSCI World were Energy (+15.9%) and then Financials (10.0%) versus the benchmark up 2.6%, and in September when the top performing sectors in MSCI World were Energy (+9.4%) and then Financials (-1.3%) versus the benchmark up -4.1%). Quality Value also outperformed MSCI World but a 30 stock global portfolio beat MSCI World by 240bps over the year.

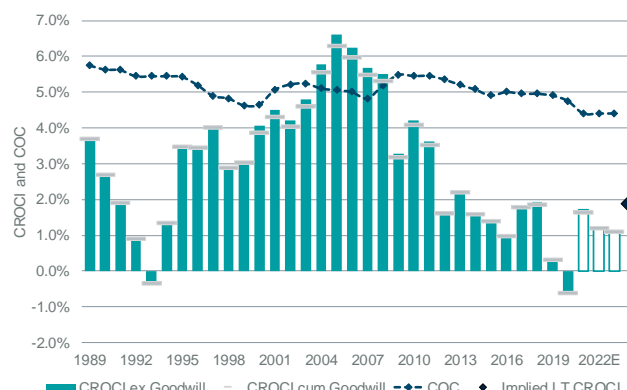
The valuation of the two is very interesting – global equities as a benchmark trades on a FY1 Economic PE of 32x. Aggressive Value is cheaper at 25x (although with an Economic P/BV of 0.43x). Quality Value is on 12x, with a CROCI of 12.5% (compared to Aggressive Value with 1.2% and Global Equities with 8.9%). So there is genuinely attractive valuation in Quality Value – at a discount of more than 60% to the broader market. This difference in profitability and valuation is clearly visible in the returns charts for both styles below.

Figure 49: Quality Value CROCI



Source: DWS, CROCI, Data as on 15th December 2021. Data corresponds to a portfolio built by taking the cheapest 30 stocks based on FY1 Economic PE, after removing the bottom tercile of companies by CROCI, the top tercile of companies by financial leverage and the top tercile of companies by 12m daily volatility.

Figure 50: Aggressive Value CROCI



Source: DWS, CROCI, Data as on 15th December 2021. Data corresponds to a portfolio built by selecting the 30 cheapest stocks by FY1 EV/NCI.

At the end of the summer, we published a report looking at the impact on equities and particularly on value of rising interest rates and inflation²⁰. That work suggested that Quality Value stocks are the ones that tend to thrive in an inflationary environment, as they are typically lower capital intensity and higher profitability. They have also tended to do better than the rest of the market when rates are rising, especially given that their financial leverage is much lower. (The financial leverage of Quality Value is 7% vs 81% for Aggressive Value.)

Value remains compelling cheap compared to history

Regular readers of our Outlook will be familiar with our analysis of the cheapest decile of valuation compared to the market average, which we have followed since 2003.

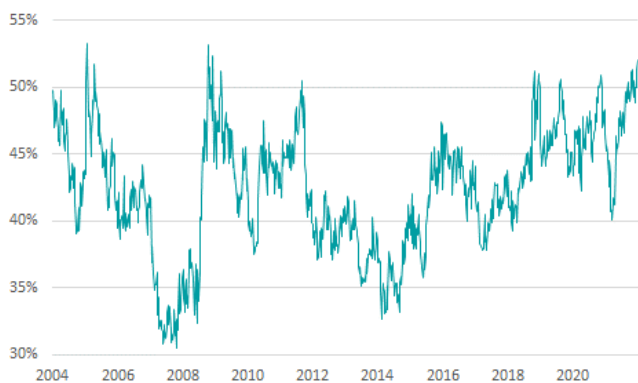
As of the start of 2022, the valuation discount of the cheapest stocks is close its highest level since the financial crisis. Globally, the distance from the cheapest decile in the market to the equity market average is at its widest since we first started to measure it in 2003.

It is widest in Europe, where the distance from median valuation to the cheapest decile is at 56%, based on year end valuations. The US is the next widest at around 52%. Both of these are close to all-time wides. Japan is at 47%, below its peak in late 2020, but largely because of an improvement in median CROCI since the height of the pandemic.

In the past, periods of particularly wide dispersion have tended to lead to a mean reversion of cheap Economic PE companies. This is particularly clear in the US and Europe after the financial crisis and then again around 2012.

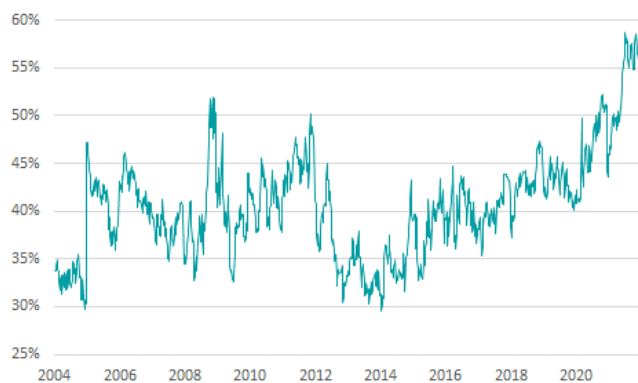
²⁰ The impact of rising rates and inflation on equities, DWS Research Institute - CROCI, Francesco Curto/Colin McKenzie, 28 July 2021

Figure 51: Dispersion of valuation in the US market



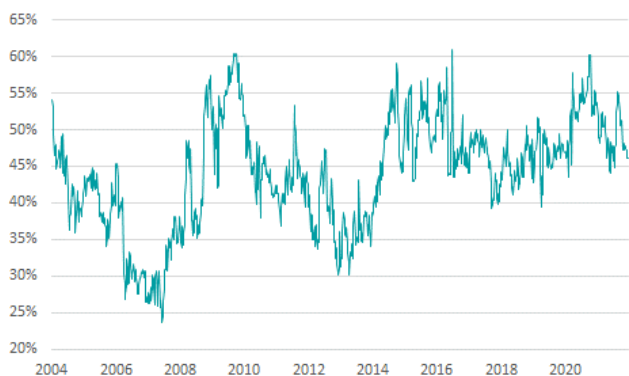
Source: DWS CROCI, Data as of 17th January 2022. Past performance, whether live or simulated, is not a reliable indicator of future results.

Figure 52: Dispersion of valuation in the European market



Source: DWS CROCI, Data as of 17th January 2022. Past performance, whether live or simulated, is not a reliable indicator of future results.

Figure 53: Dispersion of valuation in the Japanese market



Source: DWS CROCI, Data as of 17th January 2022. Past performance, whether live or simulated, is not a reliable indicator of future results.

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Section 3:

Market Valuation

3.1 Regional & Sector Valuations

A solid year for commodities contributed to a significant upgrade in the cash returns of the Materials and the Energy sectors. Both now feature amongst the cheapest five sectors. In last year's Outlook, Energy was the most expensive sector globally on FY1 numbers. Pharmaceuticals and Consumer Durables continue to be in pole position.

Semiconductors is another new entry into the cheapest sectors globally. The economics of this sub-sector improved significantly last year on the back of capacity expansion not keeping pace with the "revenge-shopping" driven rush in demand. In fact, among all industry groups, the cash returns of semiconductors saw the highest upgrade for both 2021E and 2022E, with Retailing in second place.

Figure 54: Global equity valuations by industry group (GICS Level 2)

	Economic PE				CROCI			
	2020	2021e	2022e	2023e	2020	2021e	2022e	2023e
Global Equities	37.1	33.7	30.2	27.4	7.1%	8.9%	9.5%	9.9%
Pharma Biotech & Life Sci.	25.9	23.2	21.3	19.4	14.5%	14.4%	15.0%	15.6%
Consumer Durables & Apparel	39.4	27.0	23.6	20.0	7.7%	11.0%	12.0%	12.9%
Materials	34.0	25.2	24.5	24.8	5.3%	7.4%	7.1%	6.5%
Energy	nm	26.9	25.1	28.3	-1.6%	2.9%	3.5%	2.5%
Semis & Semi Equipment	29.0	26.9	25.7	25.2	21.4%	27.7%	27.9%	28.7%
Retailing	32.7	30.8	27.4	24.8	8.8%	14.8%	13.5%	12.9%
Tech. Hardware & Equipment	32.8	28.4	27.7	24.8	7.5%	9.7%	9.7%	10.6%
Automobiles & Components	93.7	39.8	27.9	23.9	1.2%	2.5%	3.3%	3.7%
Capital Goods	34.2	35.2	29.5	26.6	7.2%	8.4%	9.6%	10.6%
Media & Entertainment	36.8	30.9	29.8	23.5	15.0%	14.0%	14.7%	15.5%
Food Beverage & Tobacco	31.1	31.5	30.3	27.2	12.8%	12.7%	13.5%	14.5%
Food & Staples Retailing	33.1	33.1	31.1	30.8	6.3%	6.5%	5.9%	6.0%
Utilities	33.6	32.1	31.9	31.5	3.2%	3.4%	3.4%	3.3%
Transportation	76.0	42.0	32.6	25.9	2.8%	3.7%	4.2%	5.4%
Household & Personal Products	36.1	38.7	33.9	30.9	15.0%	13.6%	13.9%	14.4%
Health Care Equip. & Services	42.4	38.7	34.6	30.8	16.1%	20.0%	18.3%	19.0%
Software & Services	42.6	46.3	41.7	37.1	25.4%	27.0%	28.5%	28.7%
Com. & Professional Services	43.2	47.1	42.1	38.6	15.9%	18.5%	19.6%	21.5%
Consumer Services	127.4	75.8	42.1	33.6	6.9%	12.7%	13.9%	16.2%
Telecommunication Services	53.0	48.0	44.5	42.0	2.4%	2.7%	2.3%	2.3%

Source: DWS, CROCI. The table shows the median numbers by sector. Data as available on 17th December 2021. Past performance is not a reliable indicator of future results.

By median valuation, Japan is now cheapest region overall with U.S. in second place and Europe bringing up the rear.

Amongst the top five cheapest sectors for each region, there are two overlaps between the US, Europe, and Japan — Pharmaceuticals and Consumer Durables.

The Transportation sector stands out in Europe, moving from 16th last year to the second cheapest industry group in Europe. It also saw the highest 2021 CROCI upgrade within the region. While there are several underlying drivers, the strongest driver came from logistical services providers. These providers benefited from a pickup in global manufacturing, robust e-commerce and restocking activity, and increased demand for expedited freight amid supply-chain bottlenecks.

Figure 55: US equity valuations by industry group (GICS Level 2)

	Economic PE				CROCI			
	2020	2021e	2022e	2023e	2020	2021e	2022e	2023e
US Equities	35.8	33.4	30.3	28.1	12.3%	15.1%	15.3%	15.6%
Pharma., Biotech. & Life Sci.	24.6	20.4	20.1	19.7	21.8%	23.8%	23.0%	23.1%
Consumer Durables & Apparel	34.2	22.9	21.5	19.0	9.4%	15.0%	15.9%	16.8%
Energy	nm	29.9	26.2	26.5	-2.7%	3.6%	4.8%	5.1%
Retailing	26.8	29.7	26.8	24.5	10.1%	16.6%	15.4%	15.0%
Semis & Semi Equipment	27.5	25.4	27.3	27.0	24.6%	33.0%	34.1%	33.4%
Automobiles & Components	80.4	38.3	27.3	24.2	1.9%	3.8%	4.4%	4.8%
Food & Staples Retailing	33.1	28.9	27.4	26.4	9.1%	11.4%	10.5%	10.8%
Materials	36.9	30.9	27.6	30.7	6.1%	12.2%	10.8%	9.7%
Media & Entertainment	32.8	31.0	29.8	24.6	18.4%	19.1%	20.6%	20.5%
Capital Goods	33.8	37.1	30.0	26.6	17.5%	18.5%	19.4%	20.5%
Food Beverage & Tobacco	29.5	31.5	31.1	29.7	16.9%	16.4%	16.3%	16.2%
Utilities	33.3	31.9	31.6	31.6	3.5%	3.7%	3.6%	3.6%
Transportation	35.3	37.0	32.1	28.1	6.3%	7.4%	7.4%	8.4%
Health Care Equip. & Services	42.9	38.2	32.6	28.6	20.7%	22.6%	23.0%	22.9%
Tech. Hardware & Equipment	37.1	32.2	34.4	29.8	11.4%	12.8%	13.0%	14.1%
Household & Personal Products	35.0	40.0	35.1	32.8	17.8%	18.4%	18.1%	18.5%
Telecommunication Services	31.0	32.5	38.2	37.4	3.8%	3.5%	2.9%	2.7%
Consumer Services	136.0	61.9	41.1	29.0	6.8%	14.4%	13.2%	13.8%
Com. & Professional Services	42.2	45.4	42.0	39.4	16.3%	21.0%	21.5%	23.2%
Software & Services	46.4	46.3	46.1	39.9	25.9%	31.1%	29.9%	31.4%

Source: DWS, CROCI. The table shows the median numbers by sector.

Data as available on 17th December 2021. Past performance is not a reliable indicator of future results.

Figure 56: European equity valuations by industry group (GICS Level 2)

	Economic PE				CROCI			
	2020	2021e	2022e	2023e	2020	2021e	2022e	2023e
European Equities	39.3	37.4	32.7	30.0	6.9%	8.3%	9.4%	9.8%
Tech. Hardware & Equipment	19.1	21.0	18.5	15.7	11.8%	11.4%	12.0%	12.5%
Transportation	30.5	27.1	21.2	19.3	9.0%	13.3%	11.6%	11.2%
Pharma., Biotech. & Life Sci.	25.5	24.8	21.9	18.6	12.4%	13.3%	13.5%	13.8%
Consumer Durables & Apparel	41.8	32.2	25.8	23.7	8.0%	14.9%	14.0%	15.9%
Retailing	54.2	36.5	26.3	23.1	7.1%	8.4%	9.2%	10.7%
Media & Entertainment	37.6	33.2	27.1	23.9	8.1%	10.0%	12.1%	13.8%
Materials	40.7	31.3	27.3	25.1	4.7%	6.7%	6.8%	6.1%
Household & Personal Products	30.9	33.5	30.9	29.1	12.2%	13.5%	14.4%	14.9%
Food Beverage & Tobacco	35.3	35.7	31.5	29.2	12.4%	12.5%	13.4%	13.8%
Energy	nm	25.4	32.5	63.9	-2.5%	2.9%	2.1%	1.0%
Capital Goods	36.1	38.5	32.8	27.9	7.2%	9.5%	10.0%	10.1%
Utilities	36.5	32.1	33.5	32.1	2.9%	3.2%	3.2%	3.2%
Health Care Equip. & Services	39.3	37.9	33.6	30.0	10.2%	12.0%	12.3%	12.7%
Automobiles & Components	130.1	44.6	35.7	31.5	0.7%	1.9%	2.3%	2.4%
Semis & Semi Equipment	36.7	38.8	36.9	31.5	7.2%	11.4%	12.1%	12.4%
Software & Services	37.4	46.7	38.7	33.3	21.5%	21.9%	22.4%	23.0%
Com. & Professional Services	47.6	49.3	42.2	38.6	15.9%	18.9%	20.8%	21.9%
Consumer Services	118.9	91.8	47.2	34.5	9.4%	8.5%	15.5%	16.8%
Telecommunication Services	55.8	55.9	48.9	48.2	2.5%	2.1%	2.3%	2.2%
Food & Staples Retailing	58.7	525.8	85.1	291.3	2.7%	1.3%	1.7%	1.2%

Source: DWS, CROCI. The table shows the median numbers by sector.
Data as available on 17th December 2021. Past performance is not a reliable indicator of future results.

Figure 57: Japanese equity valuations by industry group (GICS Level 2)

	Economic PE				CROCI			
	2020	2021e	2022e	2023e	2020	2021e	2022e	2023e
Japanese Equities	48.9	33.8	28.4	25.4	2.3%	3.7%	4.0%	4.7%
Media & Entertainment	22.6	24.2	18.5	17.8	15.3%	24.6%	23.7%	24.0%
Pharma., Biotech. & Life Sci.	23.0	26.3	21.8	22.3	7.1%	7.5%	8.8%	9.6%
Materials	27.0	23.6	23.0	21.4	3.0%	3.8%	3.8%	3.8%
Software & Services	27.4	29.1	25.0	21.9	4.0%	4.1%	5.2%	5.9%
Consumer Durables & Apparel	20.6	37.0	27.2	24.3	1.5%	3.7%	4.1%	4.4%
Semis & Semi Equipment	19.9	29.0	28.3	25.7	18.0%	25.4%	23.5%	22.5%
Capital Goods	31.6	58.1	31.7	27.9	1.7%	3.3%	4.0%	4.4%
Automobiles & Components	24.1	127.4	38.4	25.9	0.5%	1.8%	3.1%	3.5%
Household & Personal Products	35.7	44.1	40.2	38.3	5.6%	5.0%	8.1%	10.0%
Food Beverage & Tobacco	32.1	38.3	40.3	31.0	4.0%	3.9%	5.2%	6.1%
Tech. Hardware & Equipment	36.2	52.8	43.6	36.9	1.7%	3.4%	3.8%	4.0%
Utilities	56.8	77.3	418.4	202.1	0.9%	0.2%	0.3%	0.4%
Telecommunication Services	511.7	511.8	511.7	511.7	2.1%	2.1%	1.9%	1.9%
Transportation	nm	nm	659.5	37.1	-5.4%	-0.5%	2.7%	3.2%

Source: DWS, CROCI. The table shows the median numbers by sector.
Data as available on 17th December 2021. Past performance is not a reliable indicator of future results.

Section 4:

Markets and Sectors

Figure 58: Global Sector Valuation 2021E

		EV/NCI	CROCI	Ec PE
Communication Services (8.4% weight in MSCI World)	Current	2.25x	6.2%	36.2x
	5Y	1.90x	5.7%	39.5x
	10Y	1.73x	5.4%	41.4x
	20Y	1.66x	6.1%	37.2x
Consumer Discretionary (10.3%)	Current	2.49x	5.3%	47.2x
	5Y	1.64x	5.3%	46.7x
	10Y	1.54x	5.1%	48.7x
	20Y	1.37x	4.9%	51.3x
Consumer Staples (8.3%)	Current	4.20x	12.7%	33.2x
	5Y	3.67x	11.7%	36.0x
	10Y	3.29x	11.5%	36.4x
	20Y	2.94x	11.5%	36.7x
Energy (4.8%)	Current	0.79x	3.3%	24.3x
	5Y	0.80x	1.9%	40.7x
	10Y	0.83x	2.7%	28.9x
	19Y	1.08x	5.1%	15.5x
Financials* (15.8%) (15.9x)	Current	1.11x	10.4%	10.7x (17.6x)
	5Y	1.15x	9.8%	11.4x (16.7x)
	10Y	1.22x	10.1%	11.1x (15.9x)
	20Y	1.76x	11.7%	9.5x (13.0x)
Health Care (13.0%)	Current	4.39x	17.1%	25.7x
	5Y	3.54x	14.5%	30.3x
	10Y	3.14x	14.5%	30.4x
	20Y	2.92x	14.4%	30.5x
Industrials (11.2%)	Current	2.34x	6.2%	37.5x
	5Y	1.97x	6.9%	33.6x
	10Y	1.84x	6.6%	35.3x
	20Y	1.74x	6.6%	35.2x
Information Technology (17.3%)	Current	7.17x	19.4%	37.0x
	5Y	4.18x	15.5%	46.1x
	10Y	3.55x	15.4%	46.6x
	20Y	3.25x	13.3%	53.9x
Materials (4.4%)	Current	1.70x	8.8%	19.2x
	5Y	1.34x	4.7%	36.3x
	10Y	1.30x	4.9%	34.6x
	20Y	1.28x	5.6%	30.5x
Utilities (3.4%)	Current	1.05x	2.9%	36.7x
	5Y	0.96x	3.2%	32.9x
	10Y	0.92x	3.2%	32.5x
	20Y	0.91x	3.6%	29.2x
COC		4.40%	Banks COE	7.50%

Glossary:

EV/NCI: An economically adjusted measure of the price-to-book. Similar to Tobin's Q, this is a ratio of market value of assets to replacement value of assets. An EV/NCI greater than 1 implies that the market expects value creation (in equilibrium, EV/NCI = CROCI/COC).

* Financials: The Financial sector excludes Insurance but includes Banks and Diversified Financials. Note that the PE of Financials is not comparable to Industrials as we estimate that they have a different Cost of Equity due to the higher leverage. Numbers in brackets are risk adjusted Economic PE.

Source: DWS CROCI. Data as on 17 December 2021.

Figure 59: Regional Sector Valuation

2022E		US	Europe	Japan	A-Pac	GEMs	Value
Communication Services	EV/NCI	3.10	1.16	1.04	1.25	1.26	US
	CROCI	10.3%	2.6%	1.3%	3.7%	4.0%	
	Ec PE	30.1	44.8	79.9	34.0	31.6	
Consumer Discretionary	EV/NCI	4.51	1.59	0.87	1.40	1.16	Japan
	CROCI	9.9%	4.2%	3.2%	4.5%	4.0%	
	Ec PE	45.5	37.4	27.5	31.1	29.3	
Cons. Staples	EV/NCI	4.58	4.09	2.05	3.16	3.74	GEMs
	CROCI	14.5%	12.9%	6.5%	9.6%	12.6%	
	Ec PE†	31.7	31.6	31.3	32.9	29.6	
Energy	EV/NCI	1.06	0.68	0.46	0.55	0.50	GEMs
	CROCI	4.3%	2.3%	0.9%	2.3%	2.7%	
	Ec PE	24.6	29.1	53.6	24.1	18.9	
Financials*	P/B	1.82	0.81	0.55	0.63	0.52	GEMs
	Inf. Adj. ROC	12.0%	7.7%	5.7%	9.3%	9.2%	
	PE	16.0	10.8	9.8	6.8	5.7	
	PE (risk adj)†	26.7	18.1	16.4	11.4	9.6	
Health Care	EV/NCI	5.06	3.33	2.21	5.16	1.39	GEMs
	CROCI	21.3%	13.8%	9.3%	13.8%	7.9%	
	Ec PE	23.8	24.1	23.8	37.5	17.6	
Industrials	EV/NCI	3.34	2.82	1.12	0.97	0.90	GEMs
	CROCI	10.2%	9.8%	3.5%	4.7%	5.2%	
	Ec PE	32.9	28.9	31.6	20.5	17.4	
Information Technology	EV/NCI	11.09	6.49	1.78	2.14	2.14	A-Pac
	CROCI	27.6%	17.4%	6.1%	9.6%	9.5%	
	Ec PE	40.2	37.2	29.0	22.4	22.4	
Materials	EV/NCI	2.88	1.45	0.69	1.35	1.25	GEMs
	CROCI	10.1%	6.3%	2.4%	8.1%	8.3%	
	Ec PE	28.6	23.0	28.4	16.7	15.1	
Utilities	EV/NCI	1.24	0.99	0.57	0.72	0.62	Europe
	CROCI	3.7%	3.1%	0.4%	0.8%	0.4%	US
	Ec PE	33.6	32.0	149.2	87.1	140.9	

Source: DWS CROCI. Data as on 17 December 2021.

* Financials: Asia Pacific Financials primarily represents Chinese and Australian Banks; GEMs Financials primarily represents Chinese and South African banks.

† Reflects accounting PE adjusted for relative differential in cost of capital.

‡ Japan Energy Sector consists of one company – JX Holdings

Figure 60: Regional Valuations

		2021E	2022E	2023E
USA	Sales Growth	15.6%	6.0%	5.0%
	CROCI	11.4%	11.6%	11.8%
	EV/FCF	29.6	26.5	23.4
	Economic PE	36.1	33.7	30.7
	Accounting PE	25.4	23.9	22.0
Europe	Sales Growth	11.6%	5.8%	2.3%
	CROCI	5.7%	6.1%	6.0%
	EV/FCF	26.2	22.5	21.0
	Economic PE	34.3	30.7	29.2
	Accounting PE	18.9	17.2	16.5
Japan	Sales Growth	10.8%	3.3%	2.6%
	CROCI	2.9%	3.3%	3.5%
	EV/FCF	40.2	26.4	23.4
	Economic PE	38.7	32.7	29.1
	Accounting PE	16.5	15.0	14.0
Emerging Markets	Sales Growth	22.8%	4.6%	2.4%
	CROCI	5.1%	4.7%	4.7%
	EV/FCF	20.6	17.5	15.9
	Economic PE	22.7	22.8	21.5
	Accounting PE	13.1	13.0	12.5

Source: DWS CROCI. Data as on 17 December 2021.

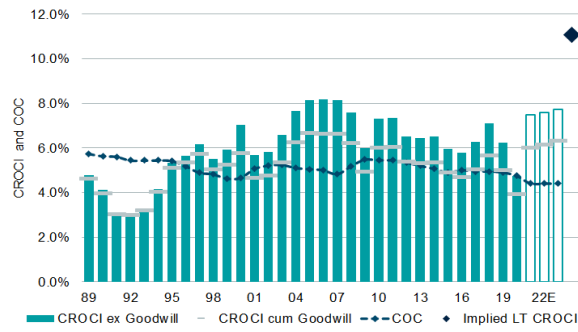
Figure 61: Benchmark Indices Valuation

	Acct. PE	Ec. PE	Div. Yield	FCF Yield	EV/NCI	CROCI	CROCI	CROCI	NCI Growth	Earnings Growth	Market Cap/EV
	2022E	2022E	2022E	2022E	2022E	2022E	5YA	Implied	2007- 22E	2007- 22E	2022E
Benchmarks											
CROCI Global	20.2	31.8	1.8%	4.1%	2.4	7.6%	6.4%	10.6%	33.9%	24.8%	86.5%
DJ Global Titans	26.4	35.3	1.2%	3.5%	5.2	14.6%	12.7%	22.7%	86.4%	102.2%	98.1%
S&P 500	24.1	33.9	1.3%	3.7%	4.0	11.9%	10.0%	17.7%	66.4%	93.1%	90.1%
NASDAQ-100 Index	31.2	38.8	0.6%	3.1%	7.4	19.2%	18.3%	32.7%	243.3%	328.5%	98.3%
DJ Industrial Average	25.0	36.9	1.4%	3.9%	5.3	14.4%	13.2%	23.3%	50.2%	68.6%	94.8%
TOPIX 100	15.0	31.1	2.1%	4.0%	1.2	3.7%	3.5%	5.1%	68.1%	-11.7%	86.7%
STOXX 600	17.0	30.1	2.7%	4.5%	1.9	6.2%	5.4%	8.2%	37.8%	5.1%	76.9%
Euro STOXX 600	17.6	33.5	2.3%	3.9%	1.7	5.0%	4.4%	7.4%	38.8%	3.0%	72.2%
Germany DAX	14.7	31.3	2.3%	3.9%	1.4	4.6%	4.0%	6.3%	65.6%	39.1%	61.9%
France CAC 40	20.7	33.3	2.0%	4.0%	2.4	7.2%	5.9%	10.5%	34.8%	5.9%	84.9%
FTSE 100	13.0	24.6	4.1%	6.1%	1.7	7.1%	6.3%	7.6%	33.1%	-13.4%	75.8%
Switzerland SMI	22.6	28.0	2.3%	4.3%	3.8	13.7%	11.8%	16.8%	15.5%	13.7%	94.2%
China & Hong Kong	13.3	22.9	3.5%	6.8%	0.9	4.1%	3.7%	4.1%	124.0%	-24.5%	90.8%
CROCI Emerging Markets	13.0	22.8	3.4%	5.7%	1.1	4.7%	3.8%	4.7%	35.5%	-27.5%	89.7%

Source: DWS CROCI: represents a bottom-up aggregation of the CROCI coverage of the stated benchmark. Data as on 17 December 2021.

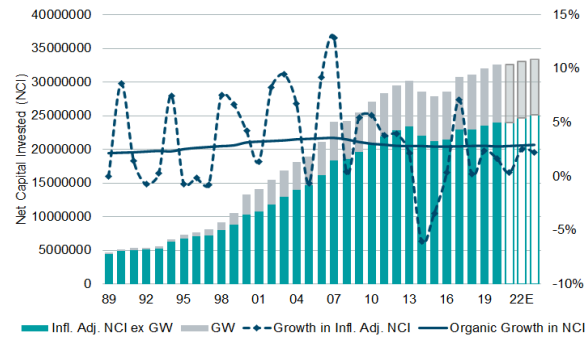
Figure 62: Global Equities CROCI

CROCI cum and ex Goodwill & Implied CROCI

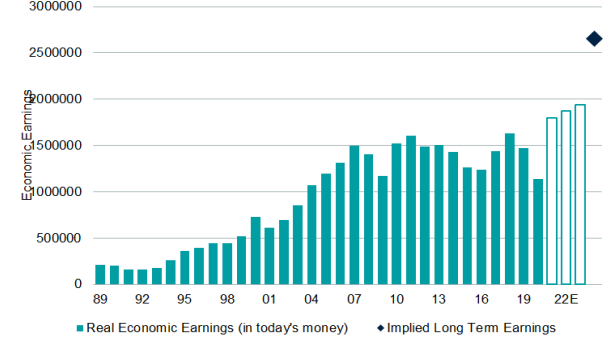


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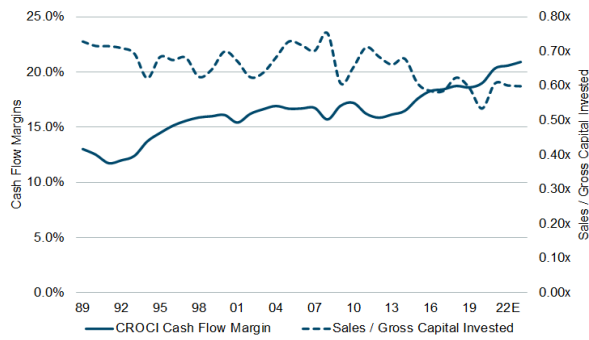
Net Capital Invested*



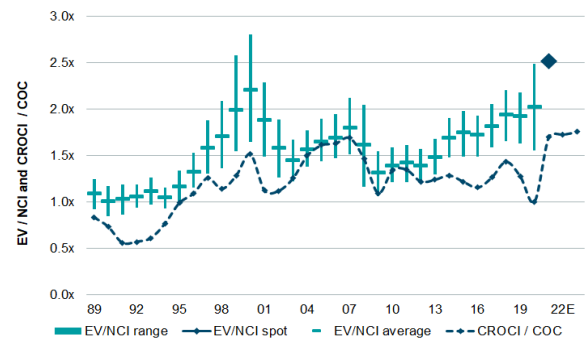
= Economic Earnings & Implied Economic Earnings*



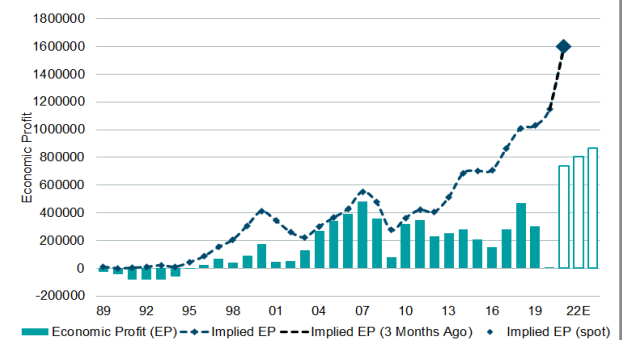
CROCI Drivers



Value & Returns ex Goodwill



Economic Profit & Implied EP ex Goodwill

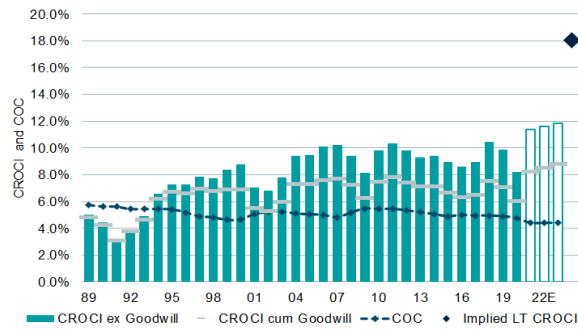


	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021E	2022E	2023E
Enterprise Value (USD bn)	14034	16452	18398	21047	25893	24158	21201	23975	26188	27196	30258	33154	33712	33900	38826	42245	43816	47729	60394	60455	58994
Market Cap (USD bn)	10576	12957	14861	17348	21545	18551	15506	18418	20125	20719	23806	26537	26902	26635	30772	33564	34576	38199	51099	52231	52163
EV/NCI Ex. GW	1.44x	1.56x	1.65x	1.69x	1.80x	1.62x	1.31x	1.38x	1.42x	1.39x	1.48x	1.69x	1.74x	1.72x	1.81x	1.93x	1.92x	2.02x	2.52x	2.41x	2.26x
Economic PE	21.9x	20.4x	20.3x	20.7x	22.0x	21.3x	21.9x	19.0x	19.3x	21.3x	23.0x	25.9x	29.2x	29.8x	29.0x	27.2x	30.8x	42.5x	33.6x	31.7x	29.3x
Accounting PE	16.5x	15.1x	15.0x	15.3x	16.3x	15.3x	15.3x	12.9x	12.7x	13.4x	15.1x	16.8x	18.9x	18.6x	18.2x	17.2x	18.9x	24.4x	21.1x	20.2x	18.9x
Cost of Capital	5.24%	5.10%	5.05%	5.00%	4.82%	5.18%	5.48%	5.45%	5.45%	5.35%	5.20%	5.07%	4.90%	5.00%	4.95%	4.95%	4.90%	4.75%	4.40%	4.40%	4.40%
CROCI Ex. GW	6.6%	7.6%	8.1%	8.2%	8.2%	7.6%	6.0%	7.3%	7.3%	6.5%	6.4%	6.5%	6.0%	5.8%	6.3%	7.1%	6.2%	4.8%	7.5%	7.6%	7.7%
Implied CROCI	7.6%	8.0%	8.3%	8.4%	8.7%	8.4%	7.2%	7.5%	7.7%	7.4%	7.7%	8.6%	8.5%	8.6%	9.0%	9.6%	9.4%	9.6%	11.1%	10.6%	9.9%
Implied Economic Earnings/ Economic Earnings	115%	104%	102%	104%	106%	110%	120%	103%	105%	114%	120%	131%	143%	149%	143%	135%	151%	202%	148%	139%	129%

Source: Company reports, Bloomberg Finance L.P., DWS and CROCI. The table shows aggregate data of companies in CROCI's global coverage. Data in USD as on 17 December 2021. * Displayed in today's money

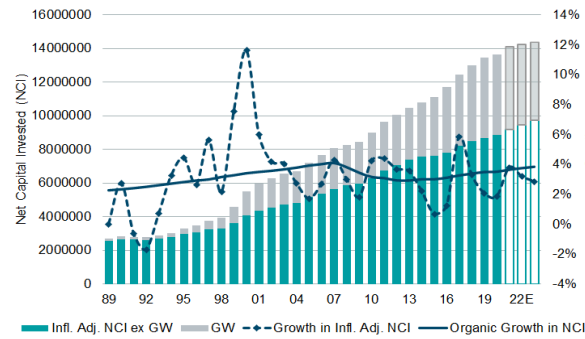
Figure 63: US Equities CROCI

CROCI cum and ex Goodwill & Implied CROCI

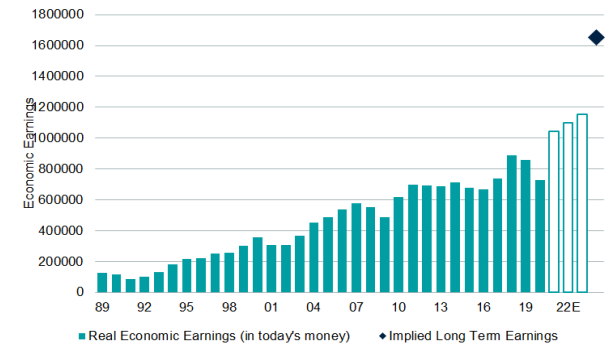


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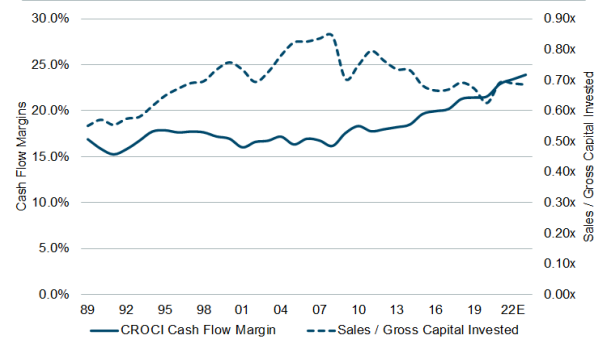
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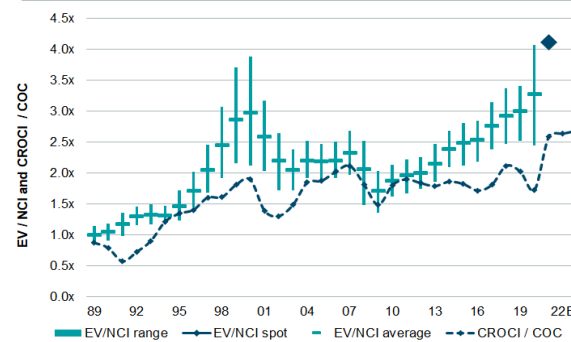
= Economic Earnings & Implied Economic Earnings*



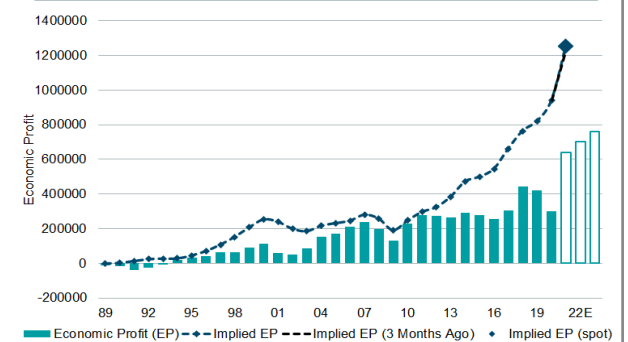
CROCI Drivers



Value & Returns ex Goodwill



Economic Profit & Implied EP ex Goodwill

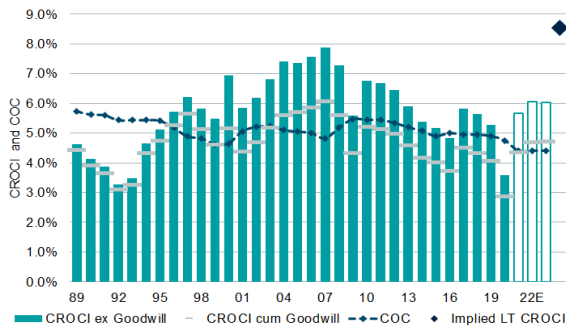


	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021E	2022E	2023E
Enterprise Value (USD bn)	6964	7826	8506	9050	10272	9740	8440	9803	11153	12163	13897	16057	17105	18029	20993	23483	25155	28509	37604	38078	37152
Market Cap (USD bn)	5684	6629	7241	7854	9000	7984	6702	8131	9172	10070	11824	13739	14459	14932	17275	19312	20649	23823	33024	34129	34129
EV/NCI Ex. GW	2.04x	2.19x	2.18x	2.19x	2.31x	2.06x	1.71x	1.86x	1.95x	2.00x	2.14x	2.38x	2.48x	2.53x	2.75x	2.92x	2.99x	3.27x	4.11x	3.92x	3.63x
Economic PE	26.3x	23.3x	23.1x	21.7x	22.7x	21.9x	21.0x	18.9x	18.9x	20.3x	23.0x	25.3x	27.8x	29.5x	30.7x	27.9x	30.2x	39.8x	36.1x	33.7x	30.7x
Accounting PE	19.8x	17.9x	17.7x	16.7x	17.2x	15.7x	16.2x	13.9x	13.4x	14.3x	16.5x	18.1x	19.6x	20.3x	20.8x	19.2x	20.7x	26.6x	25.4x	23.9x	22.0x
Cost of Capital	5.24%	5.10%	5.05%	5.00%	4.82%	5.18%	5.48%	5.45%	5.45%	5.35%	5.20%	5.07%	4.90%	5.00%	4.95%	4.95%	4.90%	4.75%	4.40%	4.40%	4.40%
CROCI Ex. GW	7.8%	9.4%	9.5%	10.1%	10.2%	9.4%	8.1%	9.8%	10.3%	9.8%	9.3%	9.4%	8.9%	8.6%	9.0%	10.5%	9.9%	8.2%	11.4%	11.6%	11.8%
Implied CROCI	10.7%	11.2%	11.0%	11.0%	11.1%	10.7%	9.4%	10.1%	10.7%	10.7%	11.1%	12.1%	12.2%	12.7%	13.6%	14.5%	14.7%	15.5%	18.1%	17.2%	16.0%
Implied Economic Earnings/ Economic Earnings	138%	119%	117%	109%	109%	113%	115%	103%	103%	109%	120%	128%	136%	148%	152%	138%	148%	189%	159%	148%	135%

Source: Company reports, Bloomberg Finance L.P., DWS and CROCI. The table shows aggregate data of companies in CROCI's global coverage. Data in USD as on 17 December 2021. * Displayed in today's money

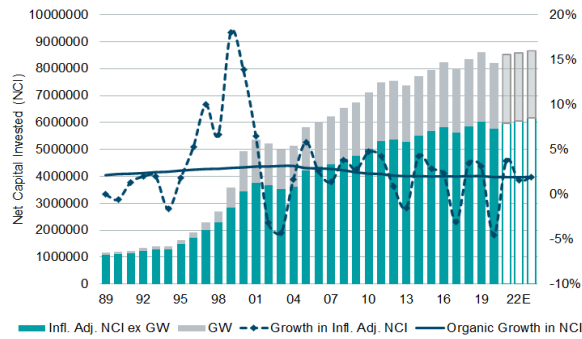
Figure 64: Europe Equities CROCI

CROCI cum and ex Goodwill & Implied CROCI



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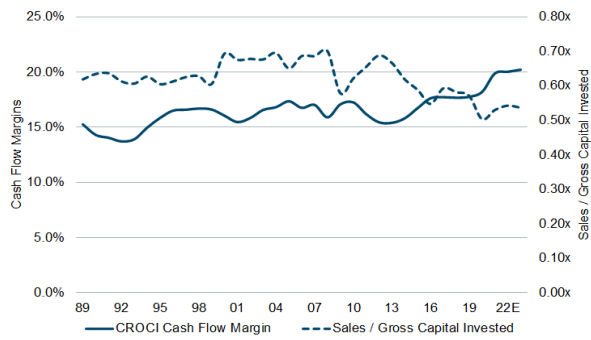
Net Capital Invested*



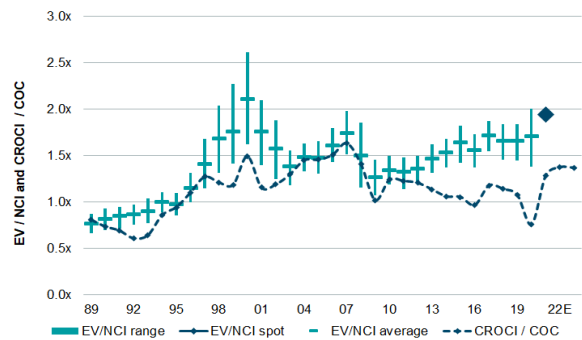
= Economic Earnings & Implied Economic Earnings*



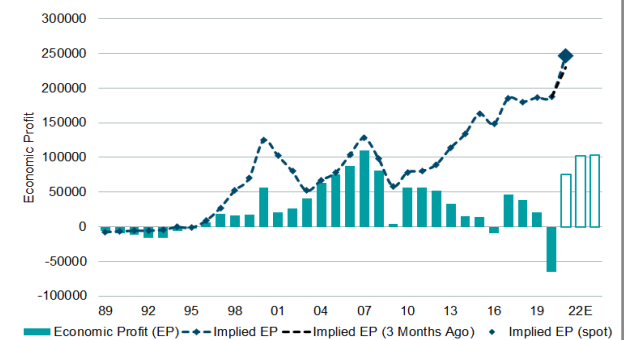
CROCI Drivers



Value & Returns ex Goodwill



Economic Profit & Implied EP ex Goodwill

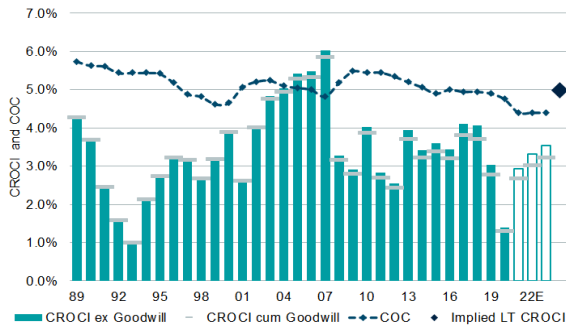


	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021E	2022E	2023E
Enterprise Value (EUR bn)	3626	4061	4814	5517	6240	5716	5090	5729	6070	6396	6904	7628	8531	8351	9019	9182	9613	9590	11575	11465	11239
Market Cap (EUR bn)	2550	3006	3597	4177	4824	3919	3239	3909	4122	4334	4932	5517	6241	5888	6523	6608	6816	6693	8733	8783	8783
EV/NCI Ex. GW	1.38x	1.48x	1.47x	1.60x	1.74x	1.50x	1.26x	1.34x	1.32x	1.36x	1.46x	1.53x	1.64x	1.55x	1.71x	1.66x	1.66x	1.70x	1.94x	1.86x	1.76x
Economic PE	20.2x	20.0x	20.0x	21.2x	22.1x	20.5x	22.7x	19.7x	19.8x	21.0x	24.8x	28.4x	31.8x	32.1x	29.3x	29.4x	31.4x	47.5x	34.3x	30.7x	29.2x
Accounting PE	14.1x	13.5x	13.4x	14.5x	15.0x	13.3x	14.0x	12.4x	11.7x	12.6x	15.8x	18.0x	20.1x	18.8x	17.4x	17.1x	17.8x	25.8x	18.9x	17.2x	16.5x
Cost of Capital	5.24%	5.10%	5.05%	5.00%	4.82%	5.18%	5.48%	5.45%	5.45%	5.35%	5.20%	5.07%	4.90%	5.00%	4.95%	4.95%	4.90%	4.75%	4.40%	4.40%	4.40%
CROCI Ex. GW	6.8%	7.4%	7.4%	7.6%	7.9%	7.3%	5.6%	6.8%	6.7%	6.4%	5.9%	5.4%	5.2%	4.8%	5.8%	5.6%	5.3%	3.6%	5.7%	6.1%	6.0%
Implied CROCI	7.2%	7.5%	7.4%	8.0%	8.4%	7.7%	6.9%	7.3%	7.2%	7.3%	7.6%	7.8%	8.0%	7.8%	8.5%	8.2%	8.1%	8.1%	8.5%	8.2%	7.7%
Implied Economic Earnings/ Economic Earnings	106%	102%	101%	106%	106%	106%	124%	108%	108%	112%	129%	144%	156%	161%	145%	145%	154%	225%	151%	135%	129%

Source: Company reports, Bloomberg Finance L.P., DWS and CROCI. The table shows aggregate data of companies in CROCI's global coverage. Data in EUR as on 17 December 2021. * Displayed in today's money

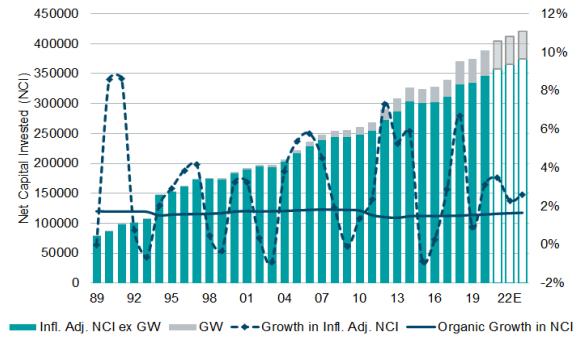
Figure 65: Japan Equities CROCI

CROCI cum and ex Goodwill & Implied CROCI



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Net Capital Invested*

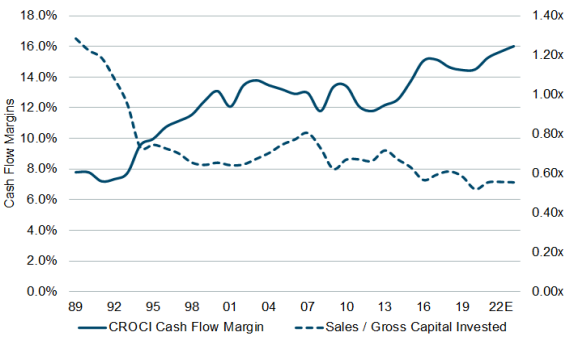


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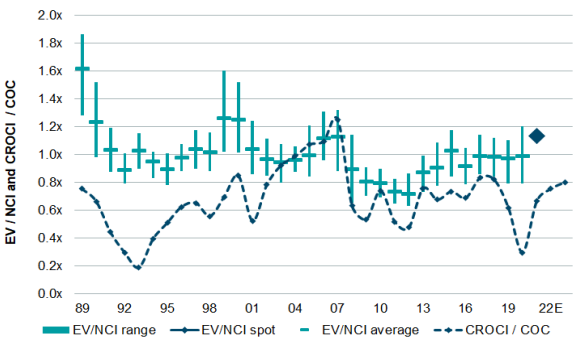
Economic Earnings & Implied Economic Earnings*



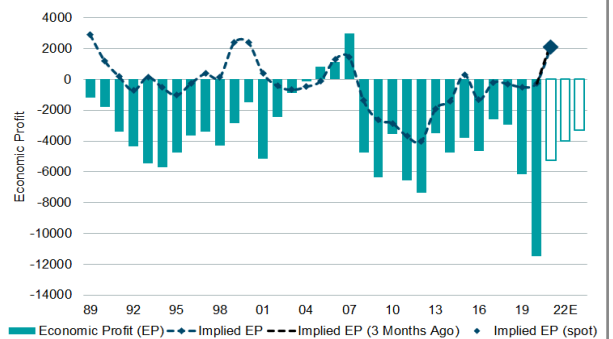
CROCI Drivers



Value & Returns ex Goodwill



Economic Profit & Implied EP ex Goodwill

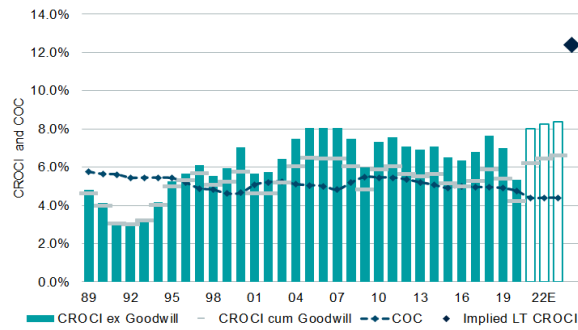


	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021E	2022E	2023E
Enterprise Value (JPY tn)	198	207	223	263	276	222	198	196	182	187	237	261	297	271	302	321	320	337	405	399	390
Market Cap (JPY tn)	125	142	170	212	220	152	130	134	118	118	172	196	228	206	244	256	248	266	336	336	336
EV/NCI Ex. GW	0.94x	0.96x	0.99x	1.11x	1.12x	0.89x	0.80x	0.79x	0.73x	0.71x	0.87x	0.90x	1.02x	0.91x	0.99x	0.98x	0.97x	0.98x	1.13x	1.08x	1.03x
Economic PE	19.4x	19.0x	18.3x	20.3x	18.6x	27.3x	27.6x	19.6x	25.8x	28.0x	22.0x	26.4x	28.4x	26.5x	24.0x	24.2x	32.0x	70.3x	38.7x	32.7x	29.1x
Accounting PE	17.1x	15.5x	15.6x	17.1x	16.6x	30.9x	21.8x	13.4x	16.2x	14.1x	13.6x	13.8x	15.8x	13.5x	13.2x	13.3x	15.1x	18.7x	16.5x	15.0x	14.0x
Cost of Capital	5.24%	5.10%	5.05%	5.00%	4.82%	5.18%	5.48%	5.45%	5.45%	5.35%	5.20%	5.07%	4.90%	5.00%	4.95%	4.95%	4.90%	4.75%	4.40%	4.40%	4.40%
CROCI Ex. GW	4.8%	5.0%	5.4%	5.5%	6.0%	3.3%	2.9%	4.0%	2.8%	2.5%	3.9%	3.4%	3.6%	3.4%	4.1%	4.1%	3.0%	1.4%	2.9%	3.3%	3.5%
Implied CROCI	4.9%	4.9%	5.0%	5.6%	5.4%	4.6%	4.4%	4.3%	4.0%	3.8%	4.5%	4.6%	5.0%	4.6%	4.9%	4.9%	4.8%	4.7%	5.0%	4.8%	4.5%
Implied Economic Earnings/ Economic Earnings	102%	97%	92%	101%	90%	141%	152%	107%	141%	150%	115%	134%	139%	132%	119%	120%	157%	334%	170%	144%	128%

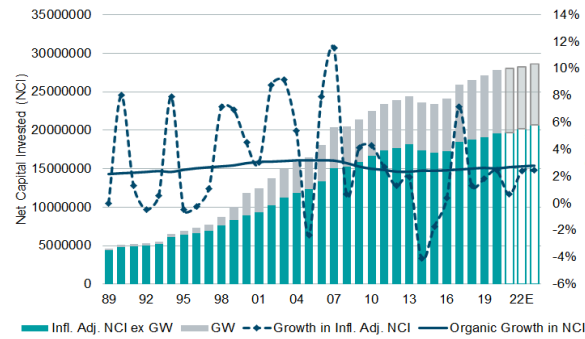
Source: Company reports, Bloomberg Finance L.P., DWS and CROCI. The table shows aggregate data of companies in CROCI's global coverage. Data in JPY as on 17 December 2021. * Displayed in today's money

Figure 66: Developed Markets Equities CROCI

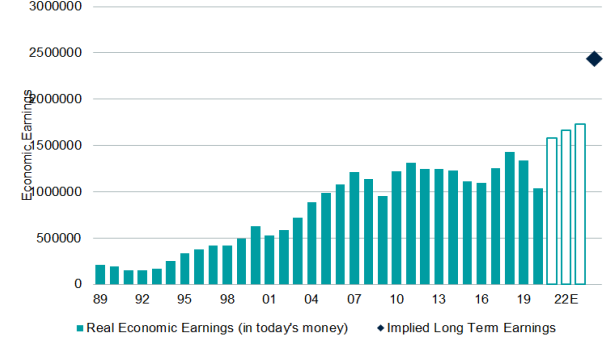
CROCI cum and ex Goodwill & Implied CROCI



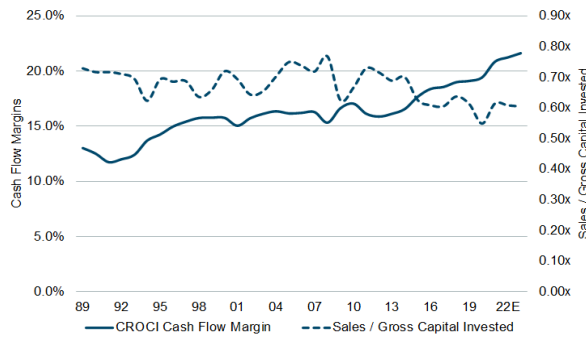
Net Capital Invested*



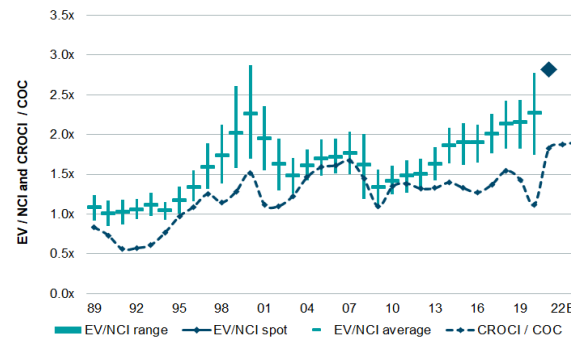
Economic Earnings & Implied Economic Earnings*



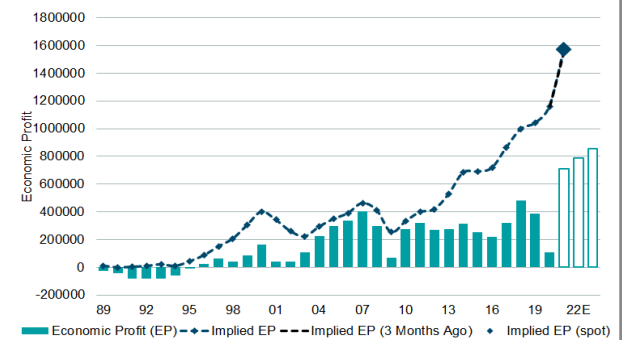
CROCI Drivers



Value & Returns ex Goodwill



Economic Profit & Implied EP ex Goodwill

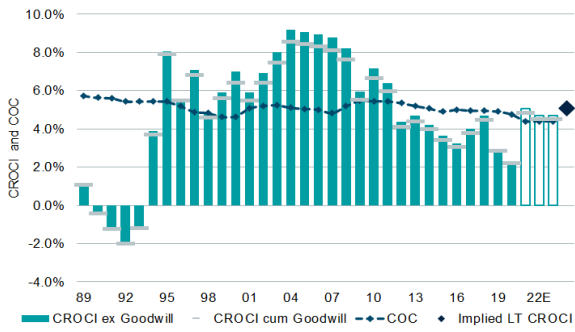


	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021E	2022E	2023E
Enterprise Value (USD bn)	13178	15259	16861	18759	22159	20910	18372	20631	22600	23544	26402	29241	29834	30397	34797	38009	39758	43682	55384	55553	54288
Market Cap (USD bn)	9915	11996	13595	15387	18210	15771	13180	15620	17128	17797	20818	23489	23823	23898	27498	30086	31273	34750	46700	47835	47835
EV/NCI Ex. GW	1.48x	1.61x	1.70x	1.71x	1.77x	1.62x	1.34x	1.42x	1.48x	1.50x	1.63x	1.86x	1.90x	1.90x	2.00x	2.13x	2.15x	2.27x	2.82x	2.70x	2.53x
Economic PE	23.0x	21.5x	21.2x	21.3x	21.9x	21.6x	22.3x	19.3x	19.6x	21.3x	23.6x	26.2x	29.2x	29.8x	29.5x	27.9x	30.7x	42.7x	35.2x	32.8x	30.2x
Accounting PE	17.3x	15.9x	15.7x	15.8x	16.2x	15.4x	15.7x	13.2x	12.9x	13.8x	16.0x	17.6x	19.4x	19.0x	18.8x	17.9x	19.4x	25.4x	22.4x	21.2x	19.8x
Cost of Capital	5.24%	5.10%	5.05%	5.00%	4.82%	5.18%	5.48%	5.45%	5.45%	5.35%	5.20%	5.07%	4.90%	5.00%	4.95%	4.95%	4.90%	4.75%	4.40%	4.40%	4.40%
CROCI Ex. GW	6.4%	7.5%	8.0%	8.1%	8.1%	7.5%	6.0%	7.3%	7.5%	7.1%	6.9%	7.1%	6.5%	6.4%	6.8%	7.6%	7.0%	5.3%	8.0%	8.2%	8.4%
Implied CROCI	7.8%	8.2%	8.6%	8.6%	8.5%	8.4%	7.3%	7.7%	8.1%	8.0%	8.5%	9.4%	9.3%	9.5%	9.9%	10.5%	10.5%	10.8%	12.4%	11.9%	11.1%
Implied Economic Earnings/ Economic Earnings	121%	110%	107%	106%	106%	112%	122%	105%	107%	114%	123%	133%	143%	149%	146%	138%	150%	203%	155%	144%	133%

Source: Company reports, Bloomberg Finance L.P., DWS and CROCI. The table shows aggregate data of companies in CROCI's global coverage. Data in USD as on 17 December 2021. * Displayed in today's money

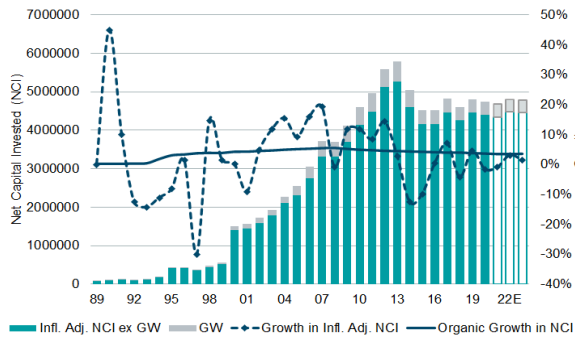
Figure 67: Emerging Markets Equities CROCI

CROCI cum and ex Goodwill & Implied CROCI

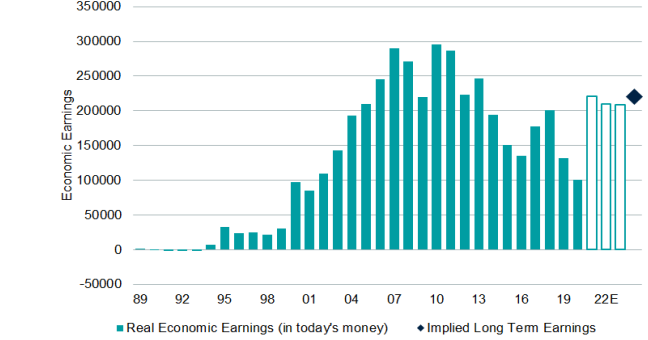


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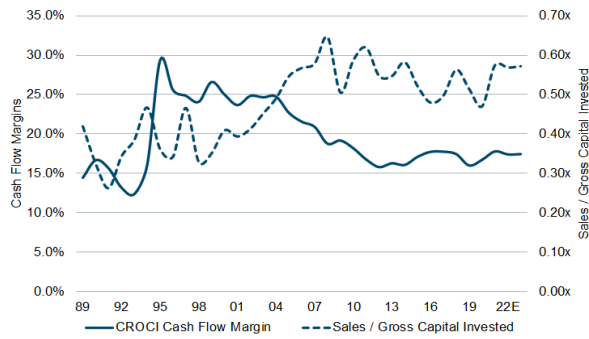
Net Capital Invested*



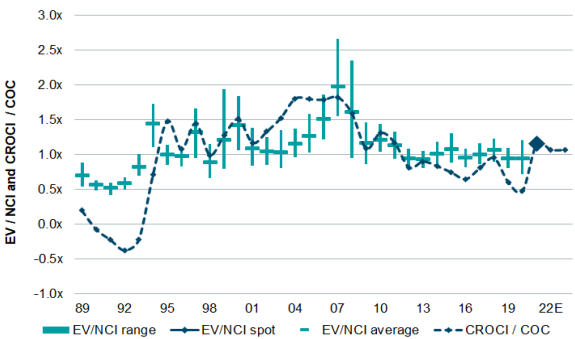
= Economic Earnings & Implied Economic Earnings*



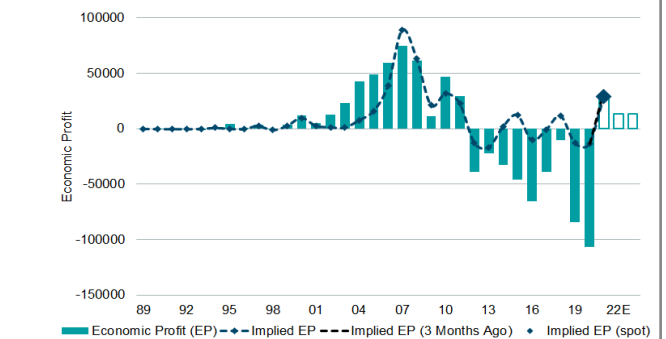
CROCI Drivers



Value & Returns ex Goodwill



Economic Profit & Implied EP ex Goodwill

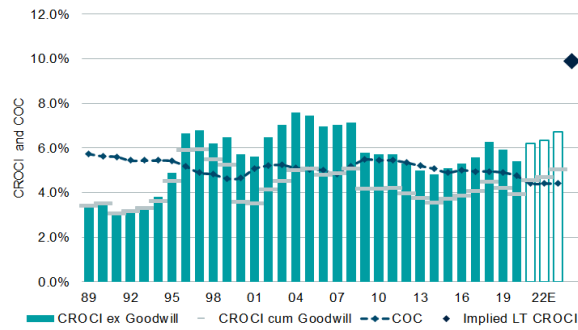


	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021E	2022E	2023E
Enterprise Value (USD bn)	856	1193	1538	2288	3734	3249	2829	3344	3588	3652	3857	3914	3878	3504	4029	4236	4058	4046	5010	4902	4706
Market Cap (USD bn)	660	961	1266	1961	3335	2780	2326	2798	2997	2922	2988	3048	3079	2738	3274	3479	3303	3448	4399	4396	4328
EV/NCI Ex. GW	1.02x	1.14x	1.26x	1.51x	1.97x	1.60x	1.16x	1.21x	1.13x	0.94x	0.92x	1.01x	1.07x	0.94x	1.00x	1.06x	0.94x	0.93x	1.15x	1.07x	1.01x
Economic PE	12.8x	12.5x	13.9x	16.9x	22.5x	19.5x	19.5x	16.9x	17.7x	21.6x	19.8x	23.9x	29.4x	29.2x	25.0x	22.5x	31.9x	40.9x	22.7x	22.8x	21.5x
Accounting PE	9.7x	9.1x	10.2x	12.1x	17.2x	15.1x	13.2x	11.4x	11.4x	11.5x	11.0x	12.5x	15.8x	15.5x	14.3x	12.5x	15.0x	17.4x	13.1x	13.0x	12.5x
Cost of Capital	5.24%	5.10%	5.05%	5.00%	4.82%	5.18%	5.48%	5.45%	5.45%	5.35%	5.20%	5.07%	4.90%	5.00%	4.95%	4.95%	4.90%	4.75%	4.40%	4.40%	4.40%
CROCI Ex. GW	8.0%	9.2%	9.1%	8.9%	8.8%	8.2%	5.9%	7.1%	6.4%	4.4%	4.7%	4.2%	3.6%	3.2%	4.0%	4.7%	2.9%	2.3%	5.1%	4.7%	4.7%
Implied CROCI	5.4%	5.8%	6.3%	7.5%	9.5%	8.3%	6.3%	6.6%	6.2%	5.0%	4.8%	5.1%	5.2%	4.7%	4.9%	5.2%	4.6%	4.4%	5.1%	4.7%	4.4%
Implied Economic Earnings/ Economic Earnings	67%	64%	70%	84%	108%	101%	107%	92%	97%	116%	103%	121%	144%	146%	124%	112%	156%	194%	100%	100%	95%

Source: Company reports, Bloomberg Finance L.P., DWS and CROCI. The table shows aggregate data of companies in CROCI's global coverage. Data in USD as on 17 December 2021. * Displayed in today's money

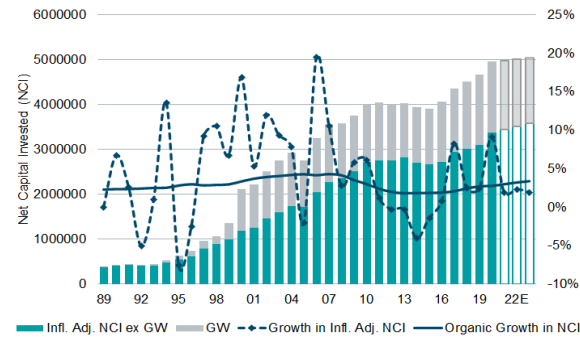
Figure 68: Communication Services CROCI

CROCI cum and ex Goodwill & Implied CROCI

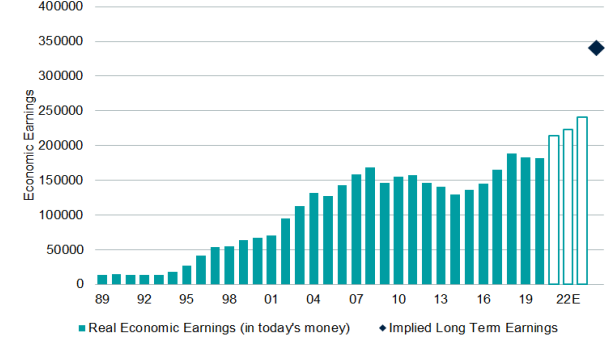


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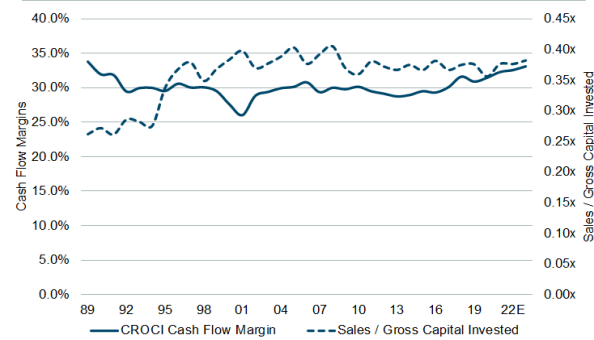
Net Capital Invested*



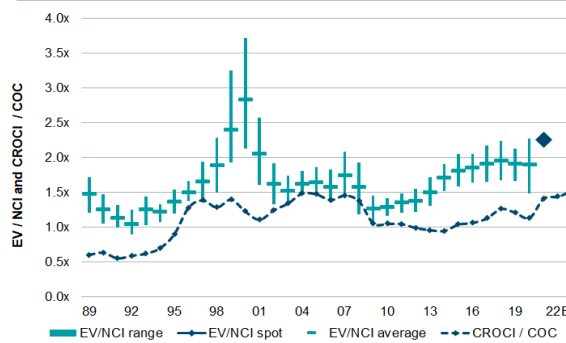
= Economic Earnings & Implied Economic Earnings*



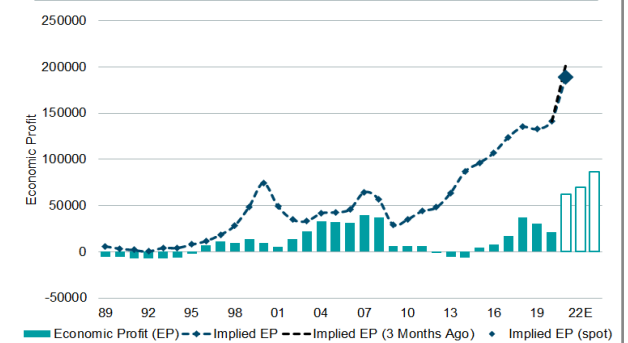
CROCI Drivers



Value & Returns ex Goodwill



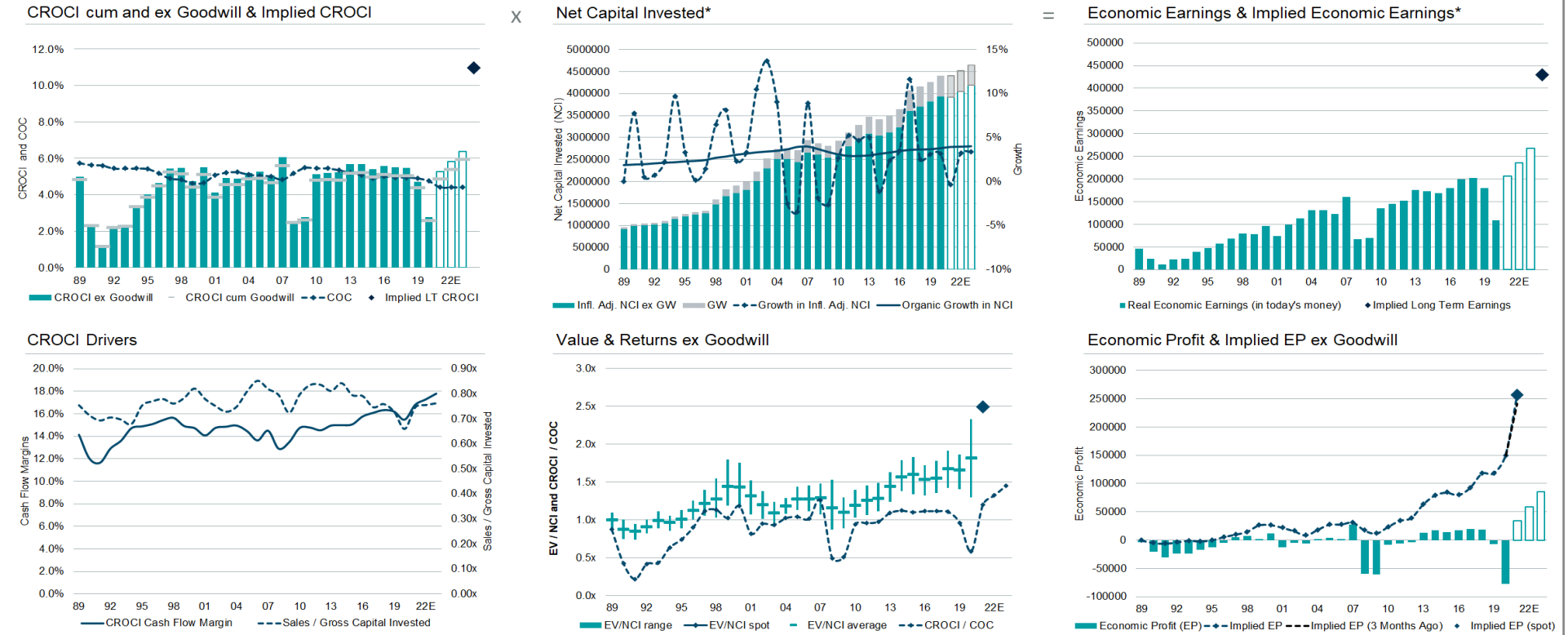
Economic Profit & Implied EP ex Goodwill



	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021E	2022E	2023E
Enterprise Value (USD bn)	1863	2163	2183	2531	3149	3031	2643	2920	3146	3301	3712	4135	4394	4654	5253	5598	5708	6303	7734	7484	7261
Market Cap (USD bn)	1244	1536	1607	1784	2418	2125	1753	2025	2188	2311	2666	3145	3375	3537	4072	4282	4409	4978	6404	6337	6337
EV/NCI Ex. GW	1.52x	1.61x	1.64x	1.57x	1.74x	1.57x	1.26x	1.28x	1.35x	1.37x	1.49x	1.71x	1.81x	1.85x	1.91x	1.95x	1.91x	1.90x	2.25x	2.08x	1.94x
Economic PE	21.6x	21.3x	22.0x	22.6x	24.8x	22.1x	21.7x	22.4x	23.6x	25.9x	30.0x	35.5x	35.5x	34.9x	34.2x	31.2x	32.2x	35.2x	36.2x	32.9x	29.0x
Accounting PE	15.7x	15.4x	15.6x	15.9x	17.7x	14.6x	12.1x	13.0x	13.3x	13.5x	16.3x	19.6x	20.8x	19.5x	20.1x	18.8x	19.1x	20.2x	21.4x	19.7x	17.8x
Cost of Capital	5.24%	5.10%	5.05%	5.00%	4.82%	5.18%	5.48%	5.45%	5.45%	5.35%	5.20%	5.07%	4.90%	5.00%	4.95%	4.95%	4.90%	4.75%	4.40%	4.40%	4.40%
CROCI Ex. GW	7.0%	7.6%	7.4%	7.0%	7.0%	7.1%	5.8%	5.7%	5.7%	5.3%	5.0%	4.8%	5.1%	5.3%	5.6%	6.3%	5.9%	5.4%	6.2%	6.3%	6.7%
Implied CROCI	8.0%	8.2%	8.3%	7.9%	8.4%	8.2%	6.9%	7.0%	7.3%	7.4%	7.8%	8.7%	8.9%	9.3%	9.5%	9.7%	9.3%	9.0%	9.9%	9.2%	8.6%
Implied Economic Earnings/ Economic Earnings	113%	109%	111%	113%	120%	114%	119%	122%	129%	139%	156%	180%	174%	174%	169%	154%	158%	167%	159%	145%	127%

Source: Company reports, Bloomberg Finance L.P., DWS and CROCI. The table shows aggregate data of companies in CROCI's global coverage. Data in USD as on 17 December 2021. * Displayed in today's money

Figure 69: Consumer Discretionary CROCI

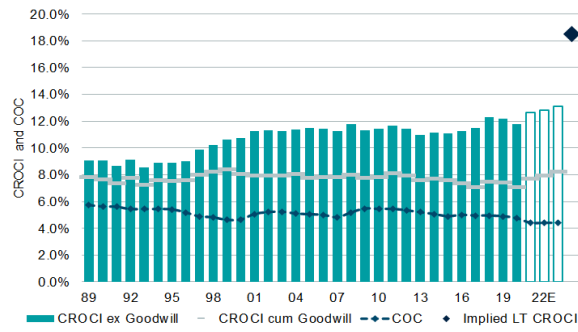


	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021E	2022E	2023E
Enterprise Value (USD bn)	2023	2399	2610	2603	2925	2604	2459	2792	3128	3359	4000	4341	4605	4634	5299	5933	6126	7035	9763	9653	9474
Market Cap (USD bn)	1116	1399	1593	1806	2046	1544	1453	1917	2209	2384	3007	3293	3476	3413	3923	4451	4517	5393	8234	8246	8246
EV/NCI Ex. GW	1.09x	1.18x	1.27x	1.27x	1.29x	1.15x	1.10x	1.19x	1.25x	1.28x	1.44x	1.56x	1.60x	1.53x	1.55x	1.67x	1.65x	1.81x	2.49x	2.34x	2.19x
Economic PE	22.3x	22.6x	24.1x	25.1x	21.3x	44.9x	39.7x	23.1x	24.1x	24.6x	25.3x	27.5x	29.6x	27.4x	28.1x	30.6x	35.1x	65.6x	47.2x	40.2x	34.3x
Accounting PE	14.7x	14.3x	16.0x	18.6x	16.4x	40.7x	38.0x	13.8x	14.2x	14.2x	15.7x	16.4x	17.1x	15.8x	16.5x	18.3x	20.6x	35.4x	29.7x	24.8x	21.5x
Cost of Capital	5.24%	5.10%	5.05%	5.00%	4.82%	5.18%	5.48%	5.45%	5.45%	5.35%	5.20%	5.07%	4.90%	5.00%	4.95%	4.95%	4.90%	4.75%	4.40%	4.40%	4.40%
CROCI Ex. GW	4.9%	5.2%	5.3%	5.1%	6.0%	2.6%	2.8%	5.1%	5.2%	5.2%	5.7%	5.7%	5.4%	5.6%	5.5%	5.5%	4.7%	2.8%	5.3%	5.8%	6.4%
Implied CROCI	5.7%	6.0%	6.4%	6.4%	6.2%	6.0%	6.0%	6.5%	6.8%	6.9%	7.5%	7.9%	7.8%	7.6%	7.7%	8.3%	8.1%	8.6%	11.0%	10.3%	9.6%
Implied Economic Earnings/ Economic Earnings	117%	115%	122%	126%	103%	233%	218%	126%	131%	131%	132%	140%	145%	137%	139%	151%	172%	311%	208%	177%	151%

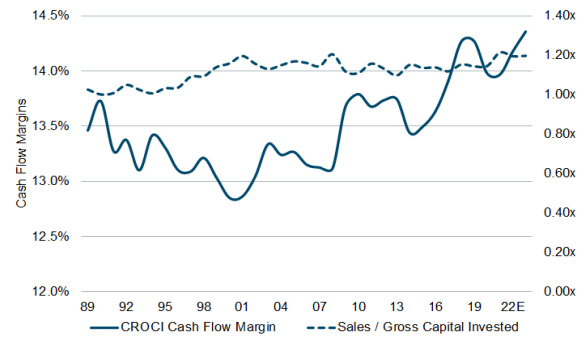
Source: Company reports, Bloomberg Finance L.P., DWS and CROCI. The table shows aggregate data of companies in CROCI's global coverage. Data in USD as on 17 December 2021. * Displayed in today's money

Figure 70: Consumer Staples CROCI

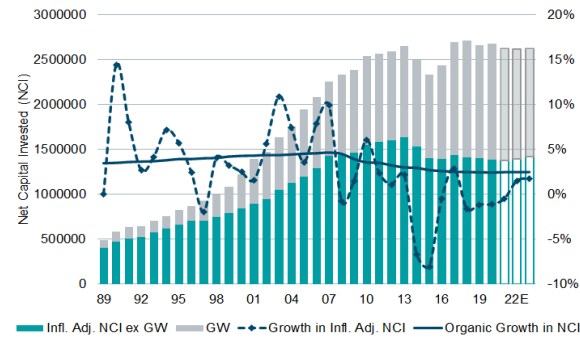
CROCI cum and ex Goodwill & Implied CROCI



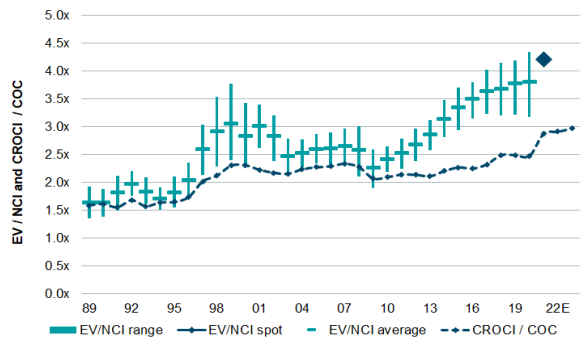
CROCI Drivers



Net Capital Invested*



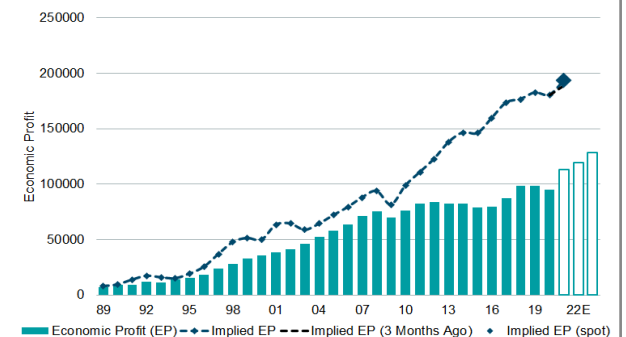
Value & Returns ex Goodwill



Economic Earnings & Implied Economic Earnings*



Economic Profit & Implied EP ex Goodwill

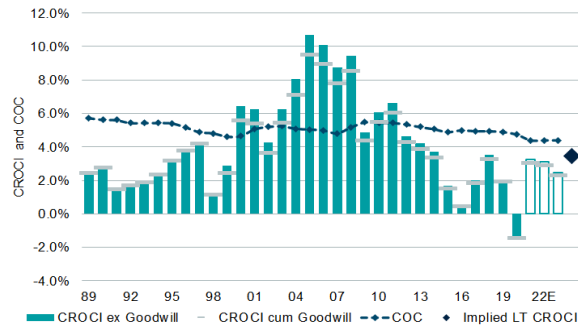


	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021E	2022E	2023E
Enterprise Value (USD bn)	1885	2094	2329	2578	2940	2955	2680	3092	3367	3673	4079	4247	4249	4468	4835	4901	5069	5152	5766	5761	5659
Market Cap (USD bn)	1526	1723	1904	2157	2475	2300	2095	2495	2707	2993	3390	3543	3597	3763	4005	3999	4189	4295	4921	4995	4995
EV/NCI Ex. GW	2.47x	2.52x	2.58x	2.60x	2.64x	2.58x	2.25x	2.41x	2.52x	2.67x	2.85x	3.13x	3.35x	3.50x	3.63x	3.67x	3.77x	3.80x	4.20x	4.04x	3.83x
Economic PE	21.9x	22.1x	22.5x	22.7x	23.5x	21.9x	19.8x	21.2x	21.7x	23.4x	26.0x	28.1x	30.1x	31.1x	31.6x	29.8x	30.9x	32.3x	33.2x	31.6x	29.3x
Accounting PE	17.0x	17.5x	17.8x	18.3x	18.8x	17.0x	14.7x	15.7x	15.6x	17.0x	19.1x	20.8x	22.0x	22.5x	22.4x	20.6x	21.6x	22.3x	23.1x	22.0x	20.4x
Cost of Capital	5.24%	5.10%	5.05%	5.00%	4.82%	5.18%	5.48%	5.45%	5.45%	5.35%	5.20%	5.07%	4.90%	5.00%	4.95%	4.95%	4.90%	4.75%	4.40%	4.40%	4.40%
CROCI Ex. GW	11.3%	11.4%	11.5%	11.4%	11.3%	11.8%	11.3%	11.4%	11.7%	11.4%	11.0%	11.2%	11.1%	11.2%	11.5%	12.3%	12.2%	11.8%	12.7%	12.8%	13.1%
Implied CROCI	12.9%	12.8%	13.0%	13.0%	12.7%	13.3%	12.3%	13.2%	13.7%	14.3%	14.8%	15.9%	16.4%	17.5%	18.0%	18.2%	18.5%	18.1%	18.5%	17.8%	16.8%
Implied Economic Earnings/ Economic Earnings	115%	113%	114%	114%	113%	113%	109%	115%	118%	125%	135%	142%	148%	156%	156%	148%	151%	154%	146%	139%	129%

Source: Company reports, Bloomberg Finance L.P., DWS and CROCI. The table shows aggregate data of companies in CROCI's global coverage. Data in USD as on 17 December 2021. * Displayed in today's money

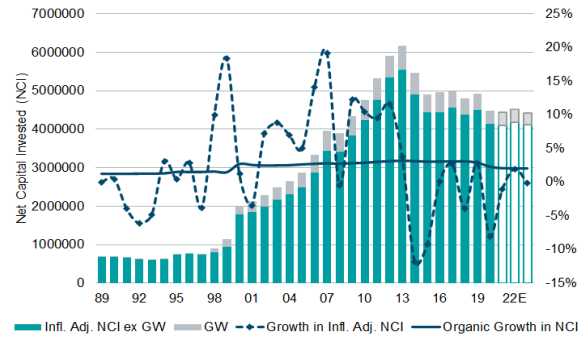
Figure 71: Energy CROCI

CROCI cum and ex Goodwill & Implied CROCI



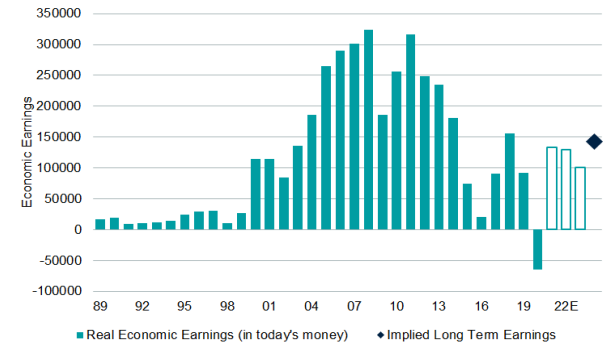
X

Net Capital Invested*

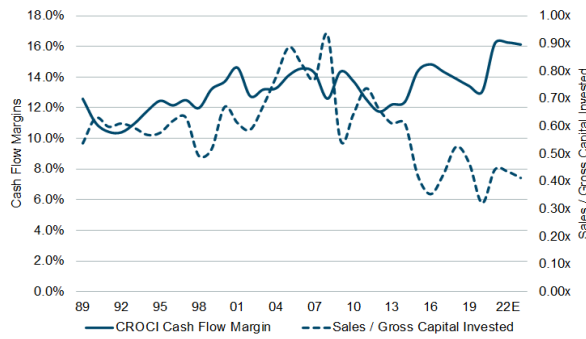


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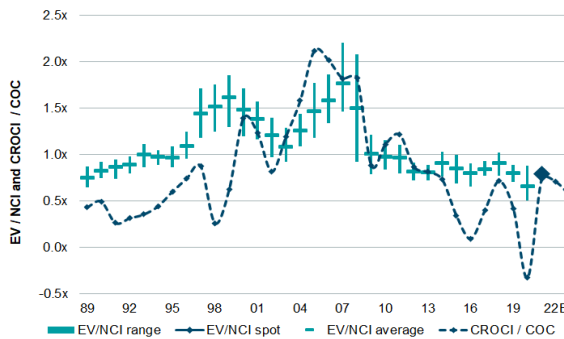
Economic Earnings & Implied Economic Earnings*



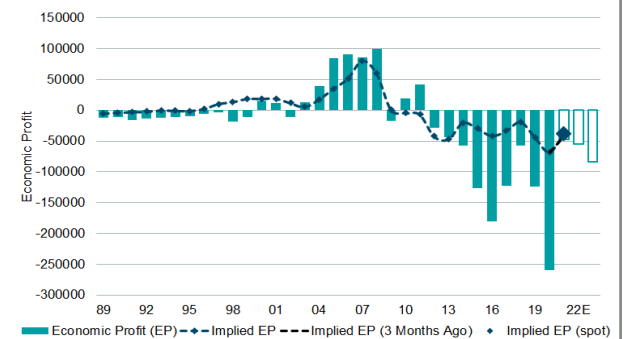
CROCI Drivers



Value & Returns ex Goodwill



Economic Profit & Implied EP ex Goodwill

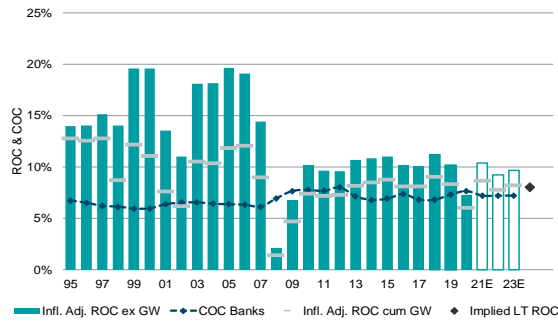


	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021E	2022E	2023E
Enterprise Value (USD bn)	1337	1688	2180	2806	3844	3455	2757	2973	3451	3394	3618	3799	3321	3162	3473	3719	3472	2675	3245	3120	2952
Market Cap (USD bn)	1162	1565	2069	2661	3689	3181	2400	2572	2966	2831	2949	3099	2623	2413	2696	2976	2664	1822	2442	2441	2409
EV/NCI Ex. GW	1.08x	1.25x	1.46x	1.58x	1.76x	1.50x	1.00x	0.97x	0.97x	0.81x	0.80x	0.91x	0.85x	0.79x	0.84x	0.91x	0.80x	0.65x	0.79x	0.73x	0.69x
Economic PE	17.3x	15.6x	13.7x	15.7x	20.1x	15.8x	20.7x	16.1x	14.6x	17.4x	18.9x	24.4x	50.5x	nm	42.2x	25.6x	38.7x	nm	24.3x	23.5x	27.9x
Accounting PE	10.8x	9.6x	9.2x	10.0x	12.8x	10.3x	12.8x	10.0x	8.6x	9.2x	10.3x	12.6x	22.5x	37.4x	18.0x	12.4x	14.3x	68.9x	9.7x	9.3x	10.4x
Cost of Capital	5.24%	5.10%	5.05%	5.00%	4.82%	5.18%	5.48%	5.45%	5.45%	5.35%	5.20%	5.07%	4.90%	5.00%	4.95%	4.95%	4.90%	4.75%	4.40%	4.40%	4.40%
CROCI Ex. GW	6.3%	8.1%	10.7%	10.1%	8.8%	9.5%	4.9%	6.1%	6.6%	4.7%	4.2%	3.7%	1.7%	0.5%	2.0%	3.5%	2.1%	-1.6%	3.3%	3.1%	2.5%
Implied CROCI	5.7%	6.4%	7.4%	7.9%	8.5%	7.8%	5.5%	5.3%	5.3%	4.3%	4.2%	4.6%	4.1%	4.0%	4.1%	4.5%	3.9%	3.1%	3.5%	3.2%	3.0%
Implied Economic Earnings/ Economic Earnings	91%	79%	69%	78%	97%	82%	113%	88%	79%	93%	98%	124%	248%	846%	209%	127%	190%	nm	107%	103%	123%

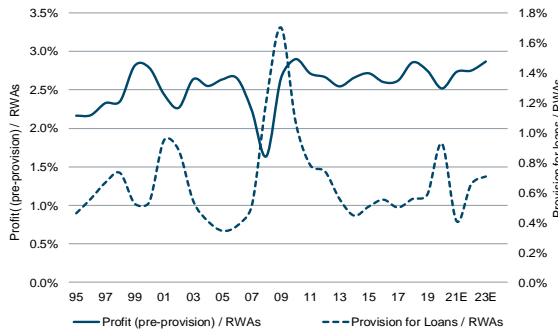
Source: Company reports, Bloomberg Finance L.P., DWS and CROCI. The table shows aggregate data of companies in CROCI's global coverage. Data in USD as on 17 December 2021. * Displayed in today's money

Figure 72: Financials CROCI

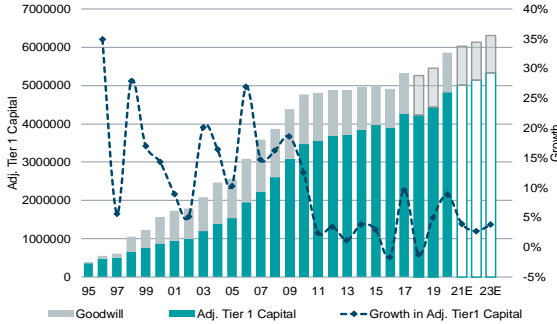
Inflation Adjusted ROC cum and ex Goodwill & Implied ROC



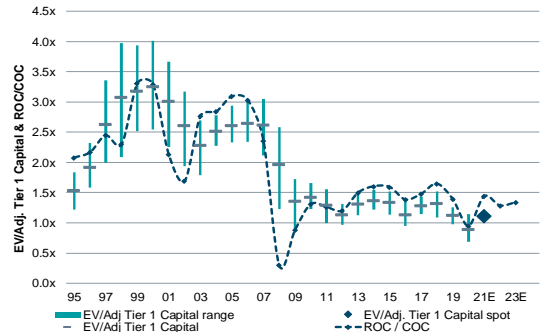
Return Drivers



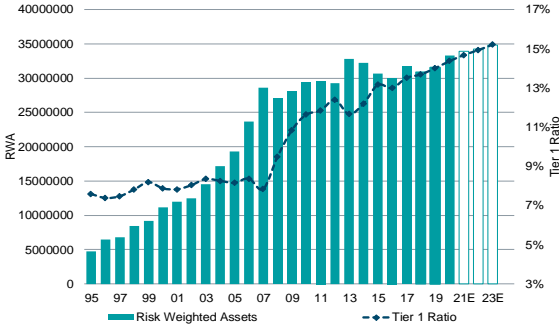
Adjusted Tier 1 Capital *



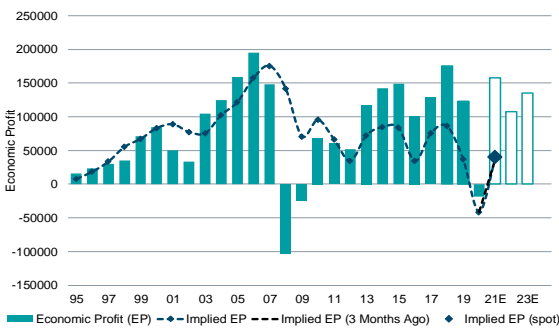
Value & Returns ex Goodwill



RWA * & Tier 1 Ratio



Economic Profit & Implied EP ex Goodwill

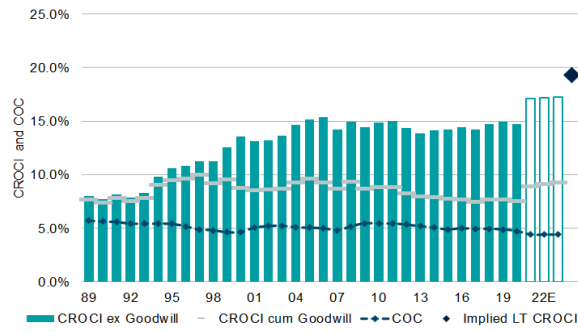


	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021E	2022E	2023E
Enterprise Value (USD bn)	2059	2668	3112	4024	4649	4156	3507	4142	3905	3654	4322	4731	4847	4070	5096	5265	4781	4193	5557	5495	5421
Market Cap (USD bn)	1816	2335	2738	3661	4186	3236	2620	3484	3306	3133	3920	4294	4356	3676	4625	4775	4206	3562	4902	4848	4772
EV/Adjusted Tier 1 Capital	2.28x	2.51x	2.60x	2.64x	2.61x	1.96x	1.36x	1.42x	1.29x	1.13x	1.31x	1.36x	1.33x	1.13x	1.28x	1.32x	1.12x	0.89x	1.11x	1.05x	0.98x
Adjusted PE	12.6x	13.8x	13.3x	13.8x	18.1x	95.9x	20.3x	14.0x	13.3x	11.8x	12.3x	12.5x	12.1x	11.1x	12.7x	11.8x	11.0x	12.2x	10.7x	11.3x	10.1x
COC Adjusted PE	15.7x	17.3x	16.7x	17.4x	23.0x	128.5x	28.3x	20.0x	18.7x	17.7x	16.8x	16.7x	17.1x	16.3x	17.5x	16.2x	16.4x	19.7x	17.6x	18.5x	16.6x
Accounting PE	11.5x	12.3x	12.2x	13.2x	16.1x	51.8x	19.8x	11.5x	10.0x	9.5x	10.1x	9.8x	10.2x	9.7x	10.7x	9.9x	8.9x	9.5x	8.6x	9.2x	8.4x
Cost of Capital (COC) - Financials	6.54%	6.40%	6.35%	6.30%	6.12%	6.94%	7.66%	7.76%	7.66%	8.01%	7.12%	6.78%	6.90%	7.35%	6.80%	6.80%	7.30%	7.65%	7.20%	7.20%	7.20%
Inflation Adjusted ROC ex Goodwill	18.1%	18.2%	19.6%	19.1%	14.4%	2.0%	6.7%	10.1%	9.6%	9.6%	10.7%	10.9%	11.0%	10.2%	10.0%	11.2%	10.2%	7.3%	10.4%	9.2%	9.6%
Implied ROC	14.9%	16.1%	16.5%	16.7%	16.0%	13.6%	10.4%	11.0%	9.8%	9.1%	9.3%	9.2%	9.2%	8.3%	8.7%	9.0%	8.2%	6.8%	8.0%	7.5%	7.0%
Implied Economic Earnings/ Economic Earnings	86%	93%	84%	87%	111%	666%	155%	109%	102%	95%	87%	85%	84%	82%	87%	80%	80%	94%	77%	82%	73%
Adjusted Tier 1 Capital Ex. GW (USD bn)	905	1063	1196	1522	1780	2117	2580	2913	3039	3221	3304	3479	3634	3602	3984	3998	4269	4730	4991	5248	5543
Adjusted Tier 1 Capital Cum. GW (USD bn)	1560	1866	1990	2417	2869	3167	3688	4024	4118	4284	4345	4472	4584	4540	4970	4976	5252	5747	6006	6261	6556
Inflation Adjusted Earnings (USD bn)	164	193	235	291	257	43	173	295	293	310	352	378	399	366	400	447	434	343	517	485	535

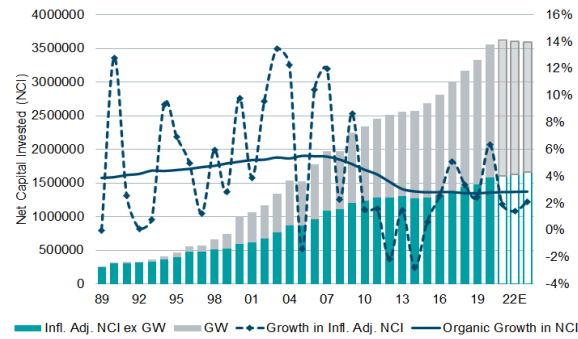
Source: Company reports, Bloomberg Finance L.P., DWS and CROCI. The table shows aggregate data of companies in CROCI's global coverage. Data in USD as on 17 December 2021. * Displayed in today's money

Figure 73: Healthcare CROCI

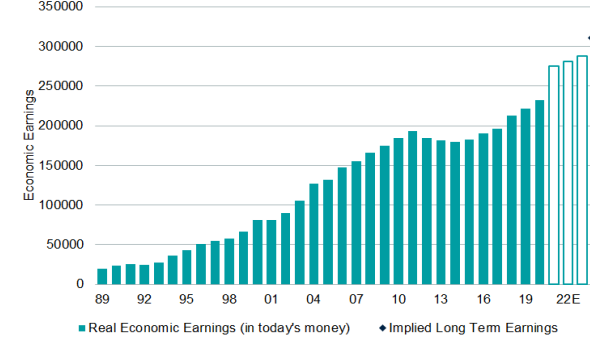
CROCI cum and ex Goodwill & Implied CROCI



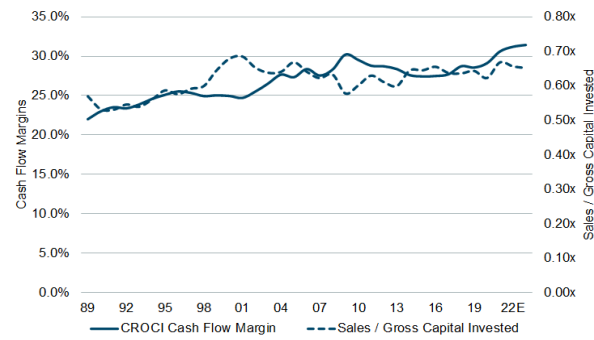
Net Capital Invested*



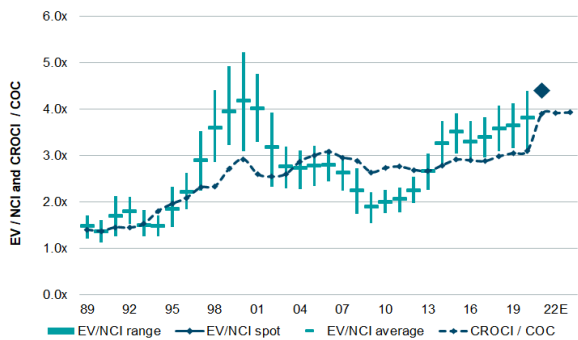
Economic Earnings & Implied Economic Earnings*



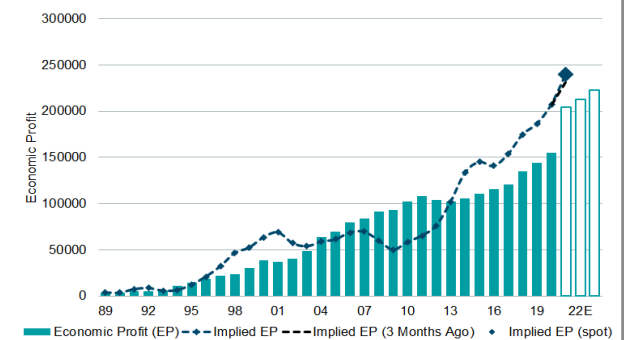
CROCI Drivers



Value & Returns ex Goodwill



Economic Profit & Implied EP ex Goodwill



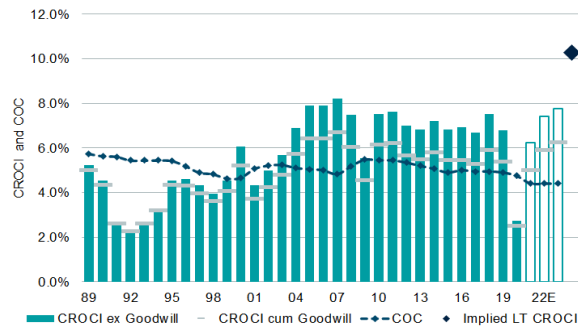
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021E	2022E	2023E
Enterprise Value (USD bn)	1614	1825	1902	2146	2338	2099	1953	2155	2333	2574	3144	3794	4148	4042	4408	4910	5249	5925	7064	6889	6661
Market Cap (USD bn)	1557	1780	1872	2046	2224	1936	1739	1922	2050	2263	2859	3429	3698	3496	3761	4128	4382	4974	6125	6154	6154
EV/NCI Ex. GW	2.76x	2.72x	2.77x	2.79x	2.62x	2.24x	1.88x	1.99x	2.06x	2.24x	2.66x	3.26x	3.50x	3.30x	3.39x	3.57x	3.64x	3.81x	4.39x	4.14x	3.85x
Economic PE	20.3x	18.6x	18.3x	18.1x	18.4x	15.0x	13.0x	13.4x	13.7x	15.6x	19.2x	23.1x	24.6x	22.8x	23.8x	24.2x	24.4x	25.9x	25.7x	24.1x	22.3x
Accounting PE	20.2x	18.6x	18.5x	17.8x	17.7x	14.2x	12.7x	12.3x	12.3x	13.7x	16.8x	19.2x	20.2x	18.0x	18.3x	18.3x	18.3x	19.5x	19.3x	18.3x	17.4x
Cost of Capital	5.24%	5.10%	5.05%	5.00%	4.82%	5.18%	5.48%	5.45%	5.45%	5.35%	5.20%	5.07%	4.90%	5.00%	4.95%	4.95%	4.90%	4.75%	4.40%	4.40%	4.40%
CROCI Ex. GW	13.6%	14.7%	15.1%	15.4%	14.2%	14.9%	14.5%	14.9%	15.0%	14.4%	13.8%	14.1%	14.2%	14.5%	14.2%	14.8%	14.9%	14.7%	17.1%	17.2%	17.3%
Implied CROCI	14.5%	13.9%	14.0%	13.9%	12.6%	11.6%	10.3%	10.9%	11.2%	12.0%	13.8%	16.5%	17.1%	16.5%	16.8%	17.7%	17.9%	18.1%	19.3%	18.2%	17.0%
Implied Economic Earnings/ Economic Earnings	106%	95%	92%	91%	89%	78%	71%	73%	75%	83%	100%	117%	120%	114%	118%	120%	120%	123%	113%	106%	98%

Source: Company reports, Bloomberg Finance L.P., DWS and CROCI. The table shows aggregate data of companies in CROCI's global coverage. Data in USD as on 17 December 2021. * Displayed in today's money

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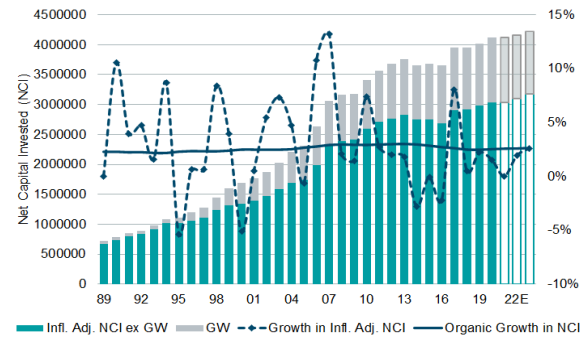
Figure 74: Industrials CROCI

CROCI cum and ex Goodwill & Implied CROCI

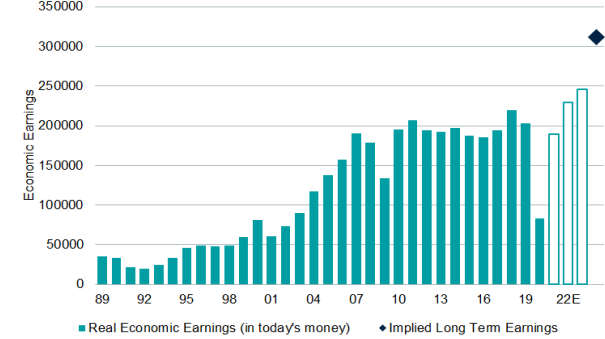


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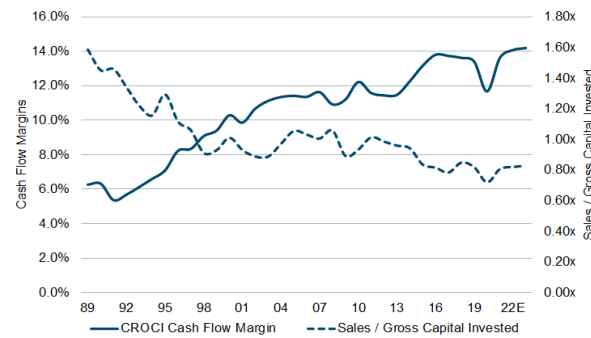
Net Capital Invested*



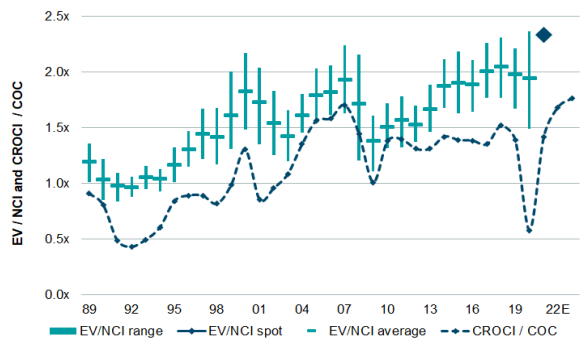
= Economic Earnings & Implied Economic Earnings*



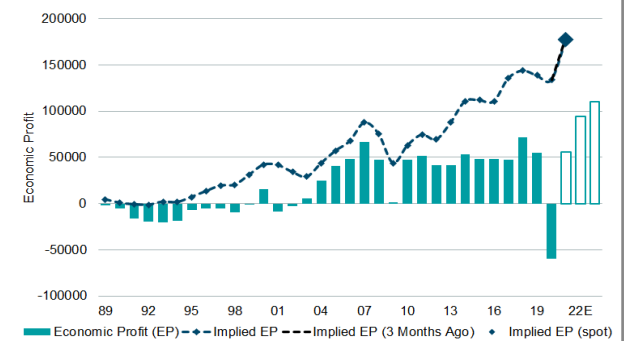
CROCI Drivers



Value & Returns ex Goodwill



Economic Profit & Implied EP ex Goodwill

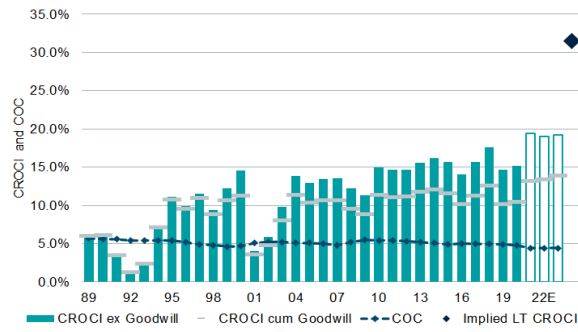


	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021E	2022E	2023E
Enterprise Value (USD bn)	1872	2265	2577	3015	3787	3512	2926	3453	3779	3781	4242	4692	4823	4731	5481	5702	5725	5809	7073	7015	6870
Market Cap (USD bn)	1330	1705	2009	2363	2972	2430	1860	2386	2641	2575	3109	3526	3584	3449	4075	4203	4170	4187	5508	5547	5547
EV/NCI Ex. GW	1.42x	1.61x	1.79x	1.82x	1.93x	1.71x	1.38x	1.50x	1.57x	1.52x	1.66x	1.87x	1.90x	1.88x	2.00x	2.04x	1.98x	1.94x	2.34x	2.23x	2.09x
Economic PE	25.0x	23.4x	22.6x	23.0x	23.5x	22.9x	24.9x	20.0x	20.6x	21.7x	24.4x	26.0x	27.9x	27.2x	29.9x	27.2x	29.1x	70.7x	37.5x	30.1x	27.0x
Accounting PE	17.5x	16.6x	16.6x	16.5x	17.3x	16.3x	18.6x	13.8x	13.4x	13.3x	15.8x	16.6x	17.8x	16.7x	18.4x	16.7x	17.2x	31.6x	20.5x	17.8x	16.4x
Cost of Capital	5.24%	5.10%	5.05%	5.00%	4.82%	5.18%	5.48%	5.45%	5.45%	5.35%	5.20%	5.07%	4.90%	5.00%	4.95%	4.95%	4.90%	4.75%	4.40%	4.40%	4.40%
CROCI Ex. GW	5.7%	6.9%	7.9%	7.9%	8.2%	7.5%	5.5%	7.5%	7.6%	7.0%	6.8%	7.2%	6.8%	6.9%	6.7%	7.5%	6.8%	2.7%	6.2%	7.4%	7.8%
Implied CROCI	7.4%	8.2%	9.0%	9.1%	9.3%	8.9%	7.6%	8.2%	8.5%	8.2%	8.6%	9.5%	9.3%	9.4%	9.9%	10.1%	9.7%	9.2%	10.3%	9.8%	9.2%
Implied Economic Earnings/ Economic Earnings	131%	119%	114%	115%	113%	118%	137%	109%	112%	116%	127%	132%	137%	136%	148%	135%	143%	336%	165%	132%	119%

Source: Company reports, Bloomberg Finance L.P., DWS and CROCI. The table shows aggregate data of companies in CROCI's global coverage. Data in USD as on 17 December 2021. * Displayed in today's money

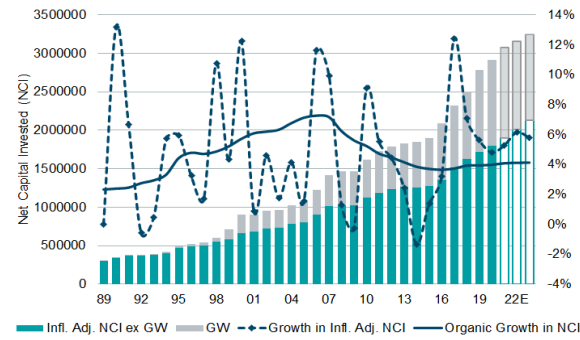
Figure 75: Information Technology CROCI

CROCI cum and ex Goodwill & Implied CROCI

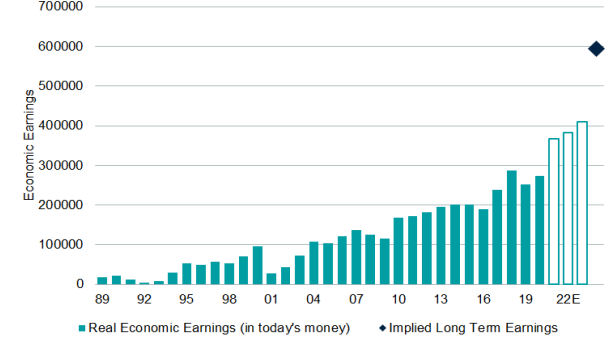


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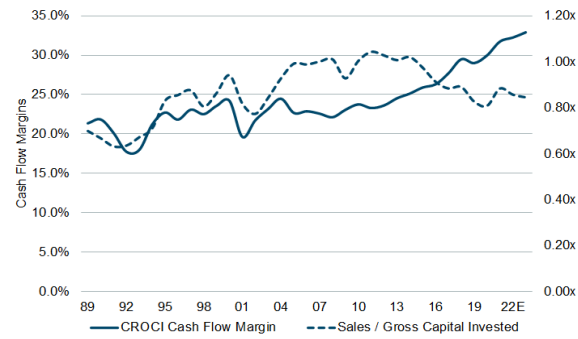
Net Capital Invested*



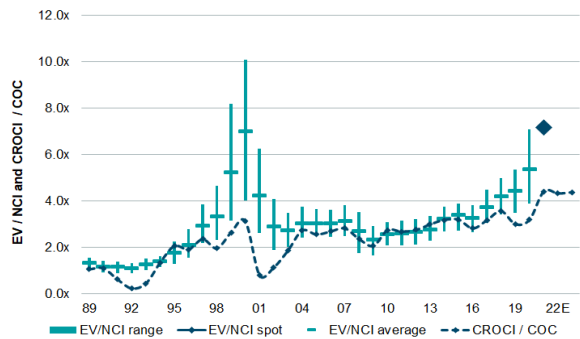
= Economic Earnings & Implied Economic Earnings*



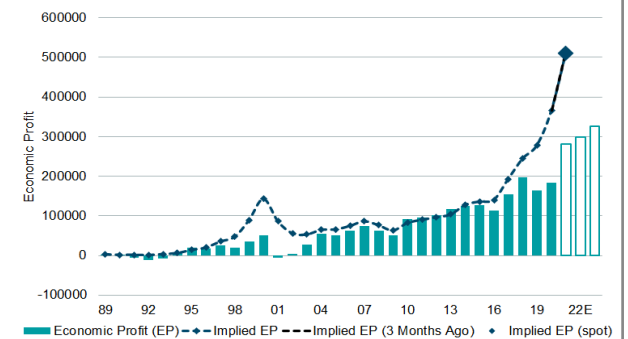
CROCI Drivers



Value & Returns ex Goodwill



Economic Profit & Implied EP ex Goodwill



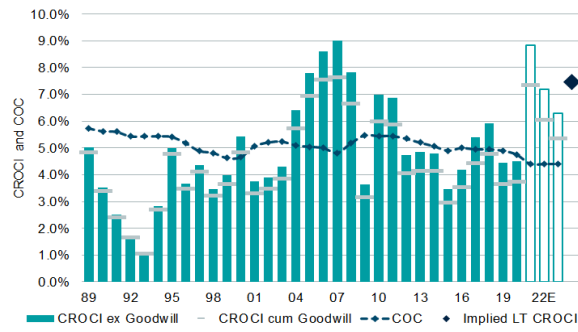
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021E	2022E	2023E
Enterprise Value (USD bn)	1608	1901	1954	2230	2637	2350	2040	2485	2692	2901	3125	3650	3954	4069	5328	6496	7349	9461	13480	14272	13894
Market Cap (USD bn)	1651	1970	2041	2287	2647	2286	2035	2526	2709	2933	3238	3743	4030	4090	5265	6309	7026	9141	13169	14211	14211
EV/NCI Ex. GW	2.71x	3.01x	3.03x	3.02x	3.12x	2.69x	2.30x	2.55x	2.59x	2.65x	2.76x	3.22x	3.37x	3.23x	3.72x	4.18x	4.41x	5.36x	7.17x	6.98x	6.31x
Economic PE	27.8x	21.7x	23.5x	22.5x	23.0x	22.0x	20.4x	17.1x	17.8x	18.0x	17.8x	20.0x	21.5x	23.0x	23.7x	23.7x	30.0x	35.4x	37.0x	36.7x	32.8x
Accounting PE	26.1x	20.2x	21.6x	20.0x	19.6x	19.5x	16.7x	13.7x	14.0x	14.1x	14.4x	15.6x	16.3x	16.8x	17.3x	17.3x	21.0x	24.7x	26.6x	26.8x	24.3x
Cost of Capital	5.24%	5.10%	5.05%	5.00%	4.82%	5.18%	5.48%	5.45%	5.45%	5.35%	5.20%	5.07%	4.90%	5.00%	4.95%	4.95%	4.90%	4.75%	4.40%	4.40%	4.40%
CROCI Ex. GW	9.8%	13.9%	12.9%	13.4%	13.6%	12.2%	11.3%	14.9%	14.6%	14.7%	15.5%	16.1%	15.7%	14.1%	15.7%	17.6%	14.7%	15.2%	19.4%	19.0%	19.2%
Implied CROCI	14.2%	15.4%	15.3%	15.1%	15.0%	13.9%	12.6%	13.9%	14.1%	14.2%	14.3%	16.3%	16.5%	16.2%	18.4%	20.7%	21.6%	25.5%	31.5%	30.7%	27.8%
Implied Economic Earnings/ Economic Earnings	146%	111%	119%	113%	111%	114%	112%	93%	97%	97%	92%	101%	105%	115%	117%	117%	147%	168%	163%	162%	144%

Source: Company reports, Bloomberg Finance L.P., DWS and CROCI. The table shows aggregate data of companies in CROCI's global coverage. Data in USD as on 17 December 2021. * Displayed in today's money

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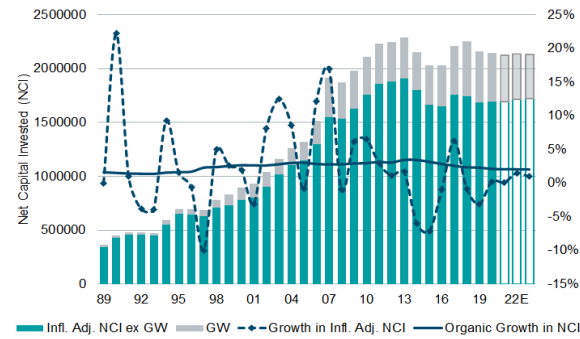
Figure 76: Materials CROCI

CROCI cum and ex Goodwill & Implied CROCI

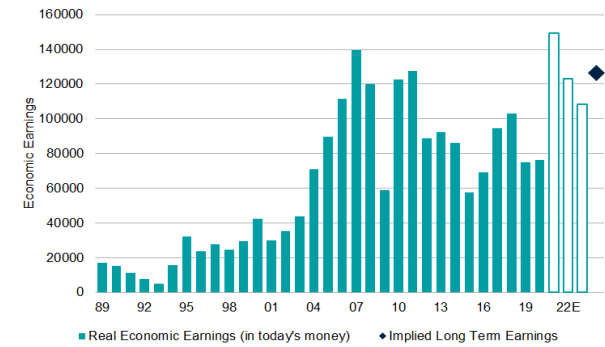


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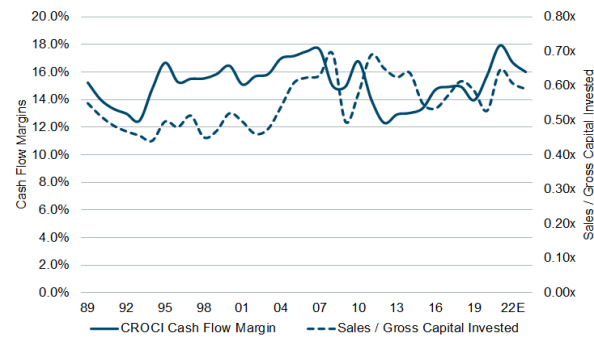
Net Capital Invested*



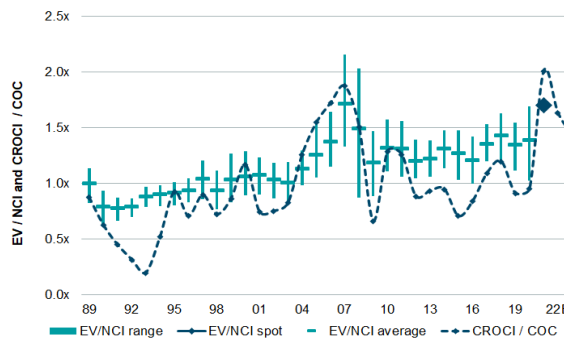
= Economic Earnings & Implied Economic Earnings*



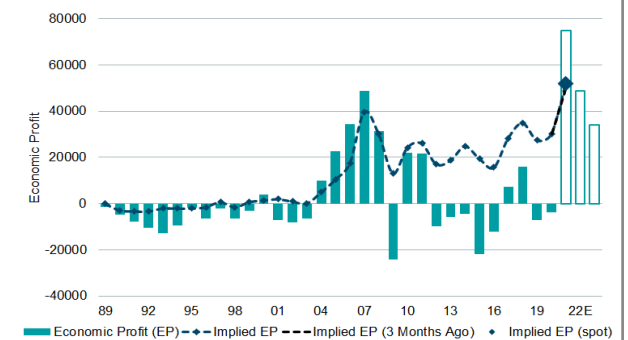
CROCI Drivers



Value & Returns ex Goodwill



Economic Profit & Implied EP ex Goodwill

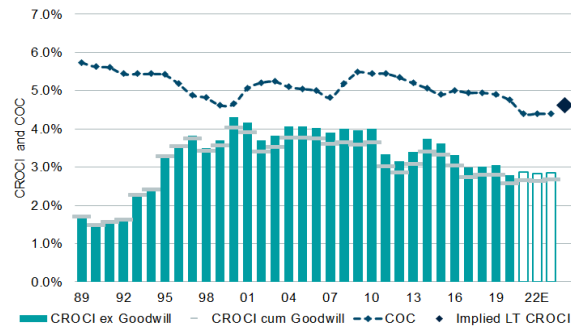


	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021E	2022E	2023E
Enterprise Value (USD bn)	714	867	1027	1303	1988	1777	1538	1866	2020	1922	2019	2084	1907	1829	2209	2360	2192	2300	2873	2801	2693
Market Cap (USD bn)	507	671	856	1111	1622	1373	1124	1483	1585	1417	1494	1539	1365	1324	1728	1845	1661	1786	2375	2377	2340
EV/NCI Ex. GW	1.01x	1.13x	1.25x	1.37x	1.71x	1.49x	1.19x	1.31x	1.31x	1.20x	1.22x	1.31x	1.26x	1.21x	1.35x	1.43x	1.34x	1.38x	1.70x	1.60x	1.51x
Economic PE	23.3x	17.6x	16.1x	15.9x	18.9x	19.0x	32.7x	18.8x	19.1x	25.4x	25.1x	27.2x	36.6x	28.8x	25.0x	24.1x	30.2x	30.6x	19.2x	22.3x	23.9x
Accounting PE	14.7x	11.4x	10.8x	10.8x	12.9x	13.5x	18.7x	12.7x	12.5x	15.5x	16.1x	16.4x	20.7x	16.1x	14.8x	13.9x	16.2x	16.4x	11.4x	13.4x	14.5x
Cost of Capital	5.24%	5.10%	5.05%	5.00%	4.82%	5.18%	5.48%	5.45%	5.45%	5.35%	5.20%	5.07%	4.90%	5.00%	4.95%	4.95%	4.90%	4.75%	4.40%	4.40%	4.40%
CROCI Ex. GW	4.3%	6.4%	7.8%	8.6%	9.0%	7.8%	3.6%	7.0%	6.9%	4.7%	4.8%	4.8%	3.5%	4.2%	5.4%	5.9%	4.5%	4.5%	8.8%	7.2%	6.3%
Implied CROCI	5.3%	5.7%	6.3%	6.8%	8.2%	7.7%	6.5%	7.2%	7.1%	6.4%	6.3%	6.6%	6.2%	6.0%	6.7%	7.1%	6.6%	6.6%	7.5%	7.0%	6.6%
Implied Economic Earnings/ Economic Earnings	122%	90%	81%	80%	91%	99%	179%	102%	104%	136%	131%	138%	180%	144%	124%	119%	148%	145%	85%	98%	105%

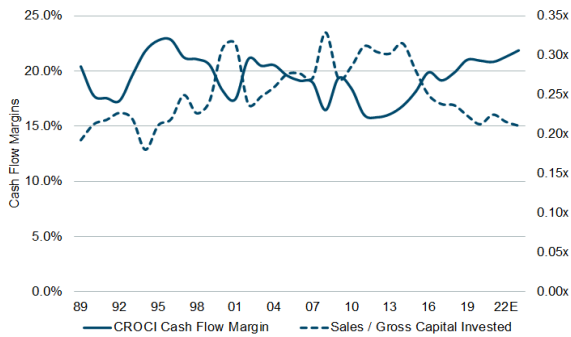
Source: Company reports, Bloomberg Finance L.P., DWS and CROCI. The table shows aggregate data of companies in CROCI's global coverage. Data in USD as on 17 December 2021. * Displayed in today's money

Figure 77: Utilities CROCI

CROCI cum and ex Goodwill & Implied CROCI

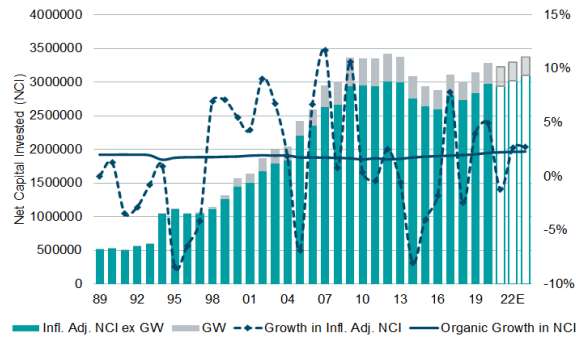


CROCI Drivers

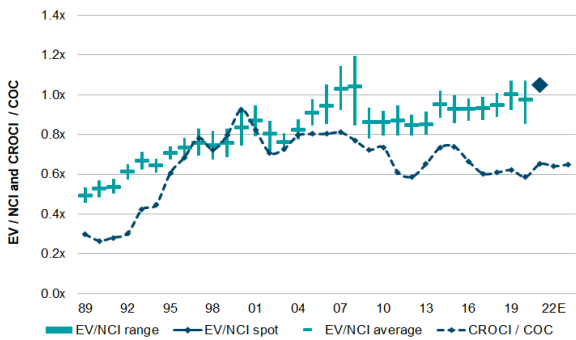


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Net Capital Invested*



Value & Returns ex Goodwill

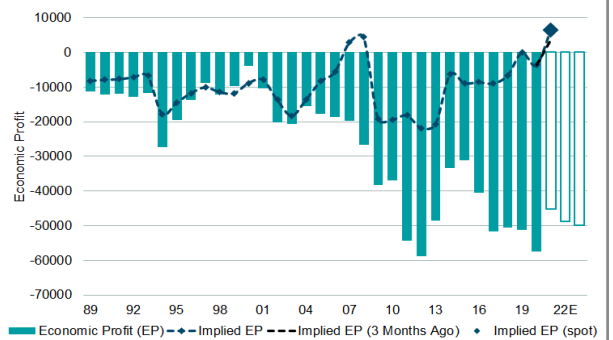


=

Economic Earnings & Implied Economic Earnings*



Economic Profit & Implied EP ex Goodwill



	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021E	2022E	2023E
Enterprise Value (USD bn)	1098	1229	1608	1799	2232	2332	2173	2205	2236	2254	2276	2360	2242	2240	2451	2472	2751	2851	3090	3159	3235
Market Cap (USD bn)	466	586	883	1098	1403	1338	1021	1064	1039	980	1056	1172	1094	1088	1170	1226	1396	1417	1624	1625	1625
EV/NCI Ex. GW	0.76x	0.82x	0.91x	0.94x	1.03x	1.04x	0.86x	0.86x	0.87x	0.85x	0.85x	0.95x	0.93x	0.93x	0.93x	0.95x	1.00x	0.97x	1.05x	1.02x	1.00x
Economic PE	19.9x	20.2x	22.4x	23.4x	26.3x	26.0x	21.7x	21.5x	26.1x	26.9x	25.1x	25.4x	25.6x	28.0x	31.2x	31.5x	32.9x	34.9x	36.7x	36.3x	35.1x
Accounting PE	12.3x	12.8x	14.8x	16.4x	18.2x	17.4x	12.9x	13.2x	17.1x	15.5x	14.9x	15.4x	14.5x	15.1x	16.3x	17.7x	18.1x	18.7x	20.2x	19.0x	17.4x
Cost of Capital	5.24%	5.10%	5.05%	5.00%	4.82%	5.18%	5.48%	5.45%	5.45%	5.35%	5.20%	5.07%	4.90%	5.00%	4.95%	4.95%	4.90%	4.75%	4.40%	4.40%	4.40%
CROCI Ex. GW	3.8%	4.1%	4.1%	4.0%	3.9%	4.0%	4.0%	4.0%	3.3%	3.1%	3.4%	3.7%	3.6%	3.3%	3.0%	3.0%	3.0%	2.8%	2.9%	2.8%	2.9%
Implied CROCI	4.0%	4.2%	4.6%	4.7%	5.0%	5.4%	4.7%	4.7%	4.7%	4.5%	4.4%	4.8%	4.5%	4.6%	4.6%	4.7%	4.9%	4.6%	4.6%	4.5%	4.4%
Implied Economic Earnings/ Economic Earnings	104%	103%	113%	117%	127%	135%	119%	117%	142%	144%	131%	129%	125%	140%	154%	156%	161%	166%	161%	160%	154%

Source: Company reports, Bloomberg Finance L.P., DWS and CROCI. The table shows aggregate data of companies in CROCI's global coverage. Data in USD as on 17 December 2021. * Displayed in today's money

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Glossary A: Introduction to CROCI

Cash Return on Capital Invested (CROCI) is a cash-flow-based analysis which, by making a series of economic adjustments to traditional accounting data using only publicly available primary sources, aims to make non-financial companies comparable—regardless of industry or domicile. The main areas where CROCI “economic data” differ from accounting data are as follows:

- Accounting for “hidden” liabilities – CROCI Enterprise Value (EV) includes not only financial liabilities (such as debt) but also operational liabilities (such as operating lease commitments, warranties, pension funding, specific provisions etc).
- Depreciating similar assets in a similar manner - Adjusting depreciation to reflect “economic depreciation” and effective useful economic life.
- Replacement value of assets – Inflating the value of net assets using the relevant inflator (based on the real age of assets).
- Unreported assets – Systematically capitalizing real cash-generative assets that are left off the balance sheet. Research and development costs and advertising are examples of such assets.

Economic PE (Ec.PE): is the CROCI version of the PE ratio and is calculated as $EV/(CROCI * NCI)$ or $(EV/NCI)/CROCI$

RISK CONSIDERATIONS

CROCI Methodology: The analysis above has been built on the CROCI premise that stocks with lower CROCI Economic P/E ratios may outperform stocks with higher CROCI Economic P/E ratios over time. This premise may not be correct and prospective investors should evaluate this assumption prior to investing based on CROCI analysis. CROCI represents one of many possible ways to analyse and value stocks. Potential investors must form their own view of the CROCI methodology and evaluate whether CROCI and investments associated with CROCI are appropriate for them. The CROCI Team does not provide investment advice.

CROCI analysis: The discussion above is based on analysis of agglomerations of the companies in the CROCI universe, which consists of over 800 companies globally. These agglomerations of companies may not be representative of the countries, regions, and sectors which they are intended to reflect.

Past Performance is not a reliable indicator of future results and any forecasts may not be realised.

Glossary B: CROCI & Real Value

Real Value Economic value as calculated by the CROCI process via the adjustments to and normalisations of reported financial statements, conducted by CROCI's team of company analysts.

Notes: The CROCI process seeks to make company financial data more consistent, comparable, and economically meaningful through a series of reviews and adjustments. This contrasts with more conventional definitions of "Value" that tend to be based on accounting measures such as equity or profits.

The term Real Value can be used attributively to refer to companies with the lowest CROCI Economic P/E.

Real Investor An investor whose investments are driven principally by the careful analysis of company fundamentals, including their economic cash returns and their economic valuation. Specifically, a Real Investor has two characteristics:

1. **Fundamental:** any investment is informed or driven by the interplay between the cash flow generation, the capital intensity, and the valuation of that company.

2. **Sceptical of reported financial statements as a guide to investing:** Real Investors believe that the income statement and balance sheet in a company's accounts are not necessarily designed to be helpful to equity investors, and that a synthesis of all the notes to the accounts and diligent restatement of the accounts must happen in order to render valuations comparable and meaningful; and

Real Investors look to economic value to inform investment and believe that the reported financial statement data may not be representative of the economic reality of a company.

Since CROCI makes adjustments to financial statements in order to include all relevant information in the notes to the accounts, and to restate the accounts in order to render economic valuations, which are meaningful and comparable, CROCI may be one valuable approach.

Further Information:

CROCI Team

croci.valuations@dws.com

Important Information:

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