CHEMICALS WINNERS

2015: A STRONG YEAR FOR CHEMICALS DESPITE MACRO HEADWINDS

THE ONE PATH TO PROFITABLE GROWTH

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Roland Berger

Chemicals industry performance in 2015: resilience to macro headwinds

The global chemicals industry had a strong year in 2015, despite numerous challenges in the global economy, such as the continued decline in oil prices, the economic slowdown in China, the contraction in Brazil, and continued sluggishness in Europe. Chemicals industry returns outpaced the S&P 500 by 4 percentage points, as companies continued to deliver returns in excess of their cost of capital by 2%. The share of capital earning above its cost of capital grew from 63% in 2014 to 67% in 2015. At a high level, the industry's growth performance appeared disappointing, with declining revenues and flat invested capital, when measured in US dollars.

Invested capital is our preferred metric to measure growth – see Appendix on page 7

This can, however, largely be attributed to oil-driven raw material price volatility – basic chemicals prices typically dropped by 15-25% throughout the year, in line with the drop in the Brent global oil benchmark – as well as the strengthening of the greenback against foreign currencies. Removing these price effects reveals a different picture: the average US chemical company saw volumes increases of 0-2% over 2014 levels, while within invested capital, long-term assets grew by 2%.

Looking into the performance of the different company types in 2015, Specialty and Commodity chemicals companies (as defined by the SIC classification) delivered strong shareholder returns (7% and 6% respectively) and the best profitable growth performance in 2015, gaining significant representation in the Winners' quadrant of our financial performance matrix. Meanwhile, Diversified players' financial performance lagged the industry. Interestingly, these results are consistent with the analysis of industry performance over a 3-year timeframe (2012-2015) which sees focused companies (Specialty and Commodity) significantly outperform Diversified companies. It confirms the current activist investor thesis behind many portfolio breakups: more focused portfolios create the most shareholder value, as they are simpler to manage and simpler for investors to understand and invest into.

See financial performance matrix on page 4

See our article on the *Dow-DuPont merger*

Back to 2015 performance, fertilizer and agricultural chemical companies were the worst performers with declining returns. From a growth perspective, while invested capital was flat overall, it grew for Commodity and Specialty companies. Long-term assets grew across all company types, with Commodity seeing 10%

growth, reflecting the shale-related investment wave in the US Gulf Coast as well as continued investment in the Middle East.

The analysis of conventional balance sheet and P&L metrics that underlie our growth and risk-adjusted profit measures reinforced these observations. Overall industry EBIT margin percentages expanded to maintain EBIT dollars, as lower raw material prices appeared to have been passed through to customers. Specialty players did see higher overall EBIT dollars as margins expanded faster than their revenue decline – a result of raw material costs falling in line with oil price and prices less exposed to commodity price variations or benefitting from a contract-induced lag effect. Productivity ratios such as working capital as a percentage of sales and asset turnover remained constant. Debt to EBITDA ratios increased slightly, driven by some large acquisitions (such as Solvay's acquisition of Cytec and Olin's acquisition of Dow's chlor-alkali business), but on average, companies were reluctant to take on new debt given the overall economic environment and a more difficult bond market for chemicals companies.

FINANCIAL METRICS

Chemical industry financial performance dashboard[1]
Source: Capital IQ, Roland Berger

		2015	2014	2013-2015 AVERAGE
Growth	Revenue growth [year-on-year]	-9%	-5%	-5%
Profits	EBIT margin	13%	12%	12%
Capital productivity	Working capital [as % of sales]	18%	17%	17%
	Asset turnover	0.8x	0.8x	0.8x
Risk	Debt/EBITDA	2.1x	2.0x	2.0x
Winner's metrics	ROIC-WACC	2%	2%	2%
	Invested capital growth	-1%	-5%	1%
	% of industry earning cost of capital (ROIC > WACC)	67%	63%	66%

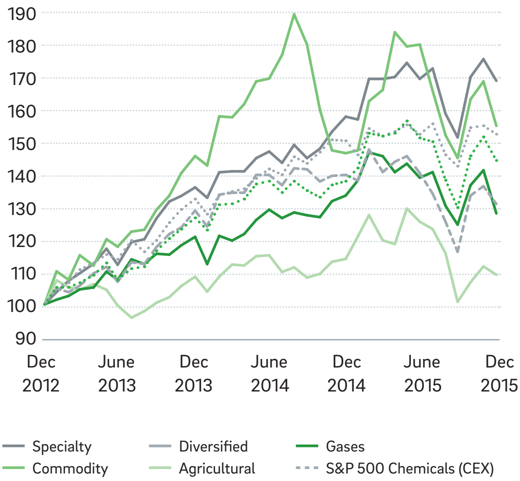
1) Includes 152 chemical companies with publicly available finances and headquartered or listed in developed markets

1) Total shareholder returns account for capital gains and dividends
2) Aggregation of all chemical companies in the analysis
3) 12/31/2012-12/31/2015, 12/31/2013-12/31/2014, 12/31/2014-12/31/2015

THE CHEMICALS INDUSTRY OUTPERFORMED THE S&P 500 IN 2015 IN TERMS OF TOTAL SHAREHOLDER RETURNS

Value of USD 100 invested[1]

Source: Capital IQ, Roland Berger



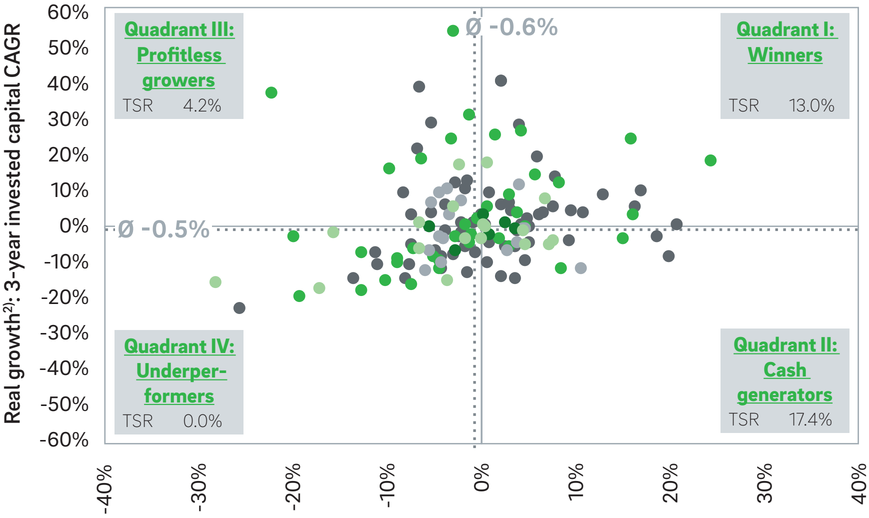
TSR[3] [%]	2015	2014	2013-2015
Specialty	7	16	19
Commodity	6	0	16
Diversified	9	4	14
Agricultural	-4	5	3
Gases	-4	11	9
Chemicals[2]	5	9	13
S&P 500	1	14	15

1) 2013-2015. Includes 150 companies with financials for three full years during Dec 31, 2012 – Dec 31, 2015
2) Real growth adjusted by historical rate of inflation: 1.0% p.a.

ACHIEVING PROFITABLE GROWTH WAS A CHALLENGE FOR THE INDUSTRY; DIVERSIFIED PLAYERS WERE LAGGARDS

Chemical industry financial performance (Winners' matrix) over 2013-2015[1]

Source: Capital IQ, Roland Berger



Segment	Growth	ROIC-WACC
Specialty	1%	1%
Commodity	-1%	-1%
Diversified	-1%	-3%
Agriculture	0%	1%
Gases	-3%	0%

Returns: 3-Year average economic profit spread (ROIC-WACC)

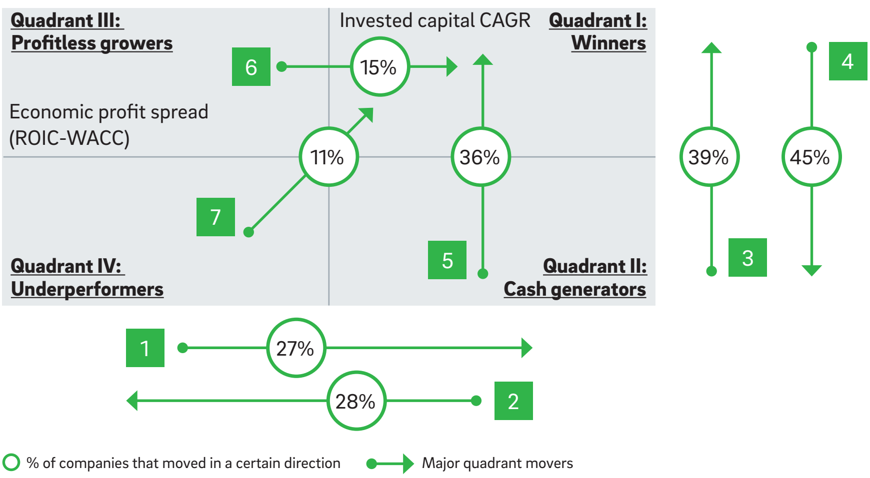
The one path to profitable growth

We analyzed the movements of companies across the quadrants of our Winners' profitable growth matrix, from the 2010-2012 post-financial crisis period to the more stable 2013-2015 period, to understand paths to profitable growth.

Our analysis reveals that: **The list of profitable companies did not change much over time:** Only about 27% of the 63 unprofitable companies relative to the industry average (quadrants III and IV) in 2010-2012 moved to relative profitability in 2013-2015, trading places with a similar percentage of profitable companies moving in the opposite direction 1 2. **The list of growing companies saw much greater fluctuation over the time periods:** Nearly 40% of lower-growth players over 2010-2012 traded places with a similar percentage of high-growth players 3 4. **Profitable companies were more likely to achieve or maintain profitable growth:** More than 35% of quadrant II companies in 2010-2012 were able to migrate to the Winners' quadrant in 2013-2015 5, vs. only 15% of quadrant III 6 and just over 10% of quadrant IV companies 7. **Profitless companies (quadrants III and IV) who improved their profitability did so organically:** None of the quadrant III and IV companies who pursued large acquisitions in 2013-2015 were able to improve their profitability performance.

PROFITABILITY BEFORE GROWTH

Major moves between quadrants[1]: 2010-2012 to 2013-2015
Source: Capital IQ, Roland Berger



1) Arrows represent direction and % of firms moving from one quadrant to another
2) Only major quadrant moves listed; moves with fewer firms and number of firms that stayed within the same quadrant are excluded

These observations indicate that to achieve profitable growth, companies must seek profits before they look for growth. Investors have recognized this: for any 3- or 5-year time period that we run our Winners' analysis, cash generators' (quadrant II) shareholder returns are higher than profitless growers (quadrant III), as is the case over 2013-2015. This means that underperformers first need to better understand who they are, address key gaps and weaknesses (by improving cost position, establishing commercial excellence practices) and aligning their market participation with areas which value what they are good at. Portfolio management in the industry is a crucial factor too: more focused portfolios are easier to understand and manage, and explain to the financial community. Also, shrinking enables a return to profitability and future focus (although this may be hard pill to swallow as it leads to a short-term reduction in size/revenues).

See our article on the *Dow-DuPont merger*

The results also demonstrate that M&A does not solve performance problems. Transactions may divert investor attention and mask performance problems but will rarely facilitate migration towards the Winners' quadrant, especially in the current high transaction multiple environment. Our Winners and Business Essence growth strategy frameworks provide a robust approach to thinking about these issues strategically, with clear line of sight into financial performance and shareholder value creation.

See our articles *The Winners* and *Know Thyself*, part of our "Delivering Profitable Growth" trilogy

Appendix

See our article
The Winners

ROLAND BERGER WINNERS' METRICS

When developing their expectations of financial performance of a company, investors, both implicitly or explicitly, are analyzing its profitability and growth potential, and adjusting these metrics for risk. Typically, investors will develop a financial forecast to build a free cash flow model. Revenue growth will be used as the growth metric, EBIT margin percentage as the profitability metric, and the cost of capital representing the risk adjustment. We believe the best metric to analyze growth is the real growth in the invested capital of a company, which represents the capital on a company's books which finances its assets. It is a better metric to measure growth compared with revenues, which is more commonly used. Revenue trends can be misleading due to price volatility, driven by raw material fluctuations (common in the chemical industry as evidenced in the current cycle) or supply and demand dynamics. Invested capital growth measures the growth in assets and represents additional investment into the enterprise, and is not as affected by raw material price changes. We believe the best metric to measure risk-adjusted profitability takes the difference between the return on invested capital (ROIC) and the weighted average cost of capital (WACC). It is better than EBIT margin because it is a normalized metric, which measures not only profitability, but the amount of capital required to generate the profitability. EBIT margins provide no perspective on the capital intensity of a company and therefore may be misleading when comparing companies with different business models.

THE RIGHT METRICS TO MEASURE GROWTH, PROFITABILITY, AND RISK

Source: Roland Berger

Invested capital

Total Debt + Total Equity

Risk-adjusted profitability

ROIC − WACC

ROIC
(Return on Invested Capital)

$$\frac{\text{NOPAT (Net Operating Profit After Tax)}}{\textbf{Invested Capital}}$$

WACC
(Weighted Average Cost of Capital)

$$\frac{[(\text{Cost of Equity} \times \text{Equity}) + (\text{After Tax Cost of Debt} \times \text{Debt})]}{\textbf{Invested Capital}}$$

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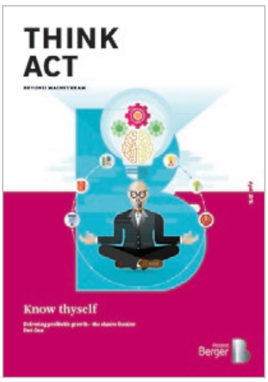
THINK ACT – THE WINNERS
How chemical companies deliver superior shareholder value

As part of our extensive strategy work in the chemical industry, we have observed that chemical companies deliver a very wide range of shareholder returns (dividends and capital gains). We thus set out to investigate how chemical companies create value for their shareholders.

THINK ACT – THE GAUNTLET IS THROWN
The Dow-DuPont merger

The Dow-DuPont transaction is an activist-driven response to demands to create more value for shareholders. The merger creates an industrial behemoth with over USD 120 billion in market capitalization and over USD 80 billion in combined revenue, that is expected to be broken up into three independent, publicly-traded companies focused on Agriculture, Material Sciences and Specialty Products.



THINK ACT – KNOW THYSELF
Delivering profitable growth – the elusive frontier
Part One

Growth is emerging as a fundamental challenge across many industries. In addition, for the time period 2012-2015, only 23% of companies (14% of invested capital) has delivered profitable growth. This lackluster performance in growth stems from a number of factors. Underlying GDP growth has slowed, competition has become increasingly intense, and companies have focused on "upgrading" their businesses resulting in the exit from less profitable sectors.