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KEY TAKEAWAYS

CHEMICALS AT THE CROSSROADS: A PICTURE OF A CHANGING INDUSTRY 2007-2010

- In general, the chemical industry continued to perform well in the first three quarters of 2008, even as GDP began to decline. However, in the fourth quarter, orders and shipments collapsed as problems in the financial sector finally spilled over into the industrial economy.
- Signs of recovery in the chemical industry began in early 2009, well ahead of the general economy.
- Industrial output of U.S. chemicals is expected to grow 3.4% - 4.2% annually through 2012, but this level of growth may depend on the successful execution of fiscal and monetary policy by the federal government.
- EPA activism also could create headwinds for the U.S. chemical industry, limiting its prospects for growth.

CAP AND TRADE

- The cap and trade bill now under consideration in congress will require companies to reduce greenhouse gas emissions and will have effects on U.S. manufacturing that are difficult to predict.
- Chemical companies will be affected disproportionately; large firms may be mostly unaffected or even benefit. Smaller firms with less flexibility and scale will suffer.
- Cap and trade probably will not reduce greenhouse gas emissions without greater international cooperation.
- Cap and trade legislation is unlikely to pass in its current form due to growing skepticism about the underlying science and economics.

AN INDUSTRY TRANSFORMED: CHEMICALS M&A 2007-2010

- 2007-2008 was a period during which there were a number of multi-billion dollar, industry “transformational” deals. Few large deals occurred in 2009 due to the credit crunch and uncertainty surrounding the business and regulatory climate. Instead, buyers focused more on lower-risk transactions that enhanced existing strategic strengths.
- The period leading up to the economic crisis of 2008-2009 was characterized by parity between private equity groups and strategic buyers in terms of M&A activity and valuation.
- Strategic buyers, especially those with strong balance sheets, now have an advantage over private equity groups that still have limited (but improving) access to the credit markets.
- 2010 is likely to be a good year for chemicals M&A due to rising valuations and pent-up demand.
### U.S. CHEMICAL INDUSTRY:
A GRAPHICAL OVERVIEW

#### REVENUES AND GDP

**U.S. Chemical Industry Revenues and GDP 2007 – 2009**

Source: Bureau of Economic Analysis and Grace Matthews. Chemical industry revenues are represented by the indexed performance of 59 selected chemical companies.

#### RAILCAR LOADINGS

**Chemical Railcar Loadings: March 2007 – November 2009**

Source: American Association of Railroads

#### REVENUES

**Chemical Industry Value of Shipments**

Source: U.S. Census Bureau

#### PRODUCTION OUTLOOK

**Global Chemistry Production Outlook**

Source: American Chemistry Council

#### PRODUCTION AND CAPACITY TRENDS

**Chemical Industry Production and Capacity Utilization**

Source: Federal Reserve Board

#### INVENTORIES

**Ratio of Chemical Industry Inventories to Shipments: January 2007 – October 2009**

Source: Bureau of Labor Statistics
Integrated into the supply chain for the production of everything from automobiles to pharmaceuticals, chemical manufacturing is often viewed as a bellwether for the U.S. economy’s industrial output. As the chemical industry goes, so goes GDP. As a result, it comes as no surprise that the extraordinary events that have roiled the U.S. economy over the past two years have had a deep impact on the chemical industry. What is surprising is that although the recession began in December 2007, it wasn’t apparent based on the performance of the chemicals industry until the fall of 2008, when the troubles in the financial sector finally spilled over into the industrial economy.

Our analysis shows that North American chemical companies continued to report revenue growth until the third quarter of 2008, even as real GDP began to falter and then decline (Figure 1). For example, when year-over-year real GDP declined by 0.7% in the first quarter of 2008, chemical industry revenues grew by 4.6%. Second and third quarter growth was also strong, coming in at 4.6% and 3.5% respectively. Some of this growth can be attributed to chemical producers raising prices in response to higher energy costs, but unit volumes also were increasing during this period. Weekly railcar loadings of chemicals – the closest proxy we have to a real-time indicator of the health of the chemical industry – showed a steady uptrend during this period, with volumes rising nearly 4% between March 2007 and September 2008 (Figure 2). But there were warning signals that things were about to change. Fundamentals were deteriorating in the first half of 2008. Margins were being squeezed, especially for manufacturers of commodity petrochemicals that were challenged by rising energy and feedstock costs during what in retrospect was the third financial bubble of the decade: a period when the price of crude oil more than doubled in less than 18 months to a record level of over $147 per barrel. Production and capacity utilization were declining, partly due to increased energy costs and partly due to weakening demand in end markets – notably housing and construction, but also in other consumer durables markets such as automobiles and electronics (Figure 3).

Figure 1: U.S. Chemical Industry Revenues and GDP 2007 – 2009

Source: Bureau of Economic Analysis and Grace Matthews. Chemical industry revenues are represented by the indexed performance of 59 selected chemical companies.

1 The National Bureau of Economic Research, a group of private economists charged with dating business cycles, announced in December 2008 that business activity had peaked in December 2007, marking the beginning of the recession.
2 Chemical railcar loadings are published weekly by the Association of American Railroads, and measure the number of freight cars loaded with chemical products in the previous week. Though it does not measure tonnage, it is still a useful and timely measure of unit volume trends. The American Chemistry Council reports that railroad shipments account for about 23% of chemical transportation tonnage and 20% of chemical transportation costs.
3 The first two bubbles were, of course, technology stocks during 1997 - 2000 and real estate between 2003 and 2007. Financial bubbles may be recognizable only in retrospect, and it may be too early to say whether oil prices in 2007-2008 were a classic bubble. But the evidence speaks for itself. The rapid increase between January 2007 and July 2008 was hardly justified by global industrial production, supply constraints, or any other macro variable that affects the price of oil. Also, as steep as the increase in crude oil prices was, the fall was even steeper: on December 21, 2008, oil was trading at $33.87 per barrel, less than ¼ of the $147.27 record reached a little over four months earlier on July 11th.
And then came the 4th quarter of 2008, which effectively began in mid-September with the bankruptcy of Lehman Brothers and the $85 billion bailout of AIG by the Federal Reserve. These two events seemed to expose all the excesses in the financial markets that had been building for years. The financial system came very close to a “systemic” collapse, nearly dragging the entire global economy with it. Although the economy had already been in recession for almost a year, economists then were seriously debating whether a repeat of the Great Depression was at hand.

To avoid a worst case scenario, the Federal Reserve cut interest rates nearly to zero and injected trillions of dollars into the economy to boost liquidity, while Congress passed first the Troubled Asset Relief Program (“TARP”) and then a massive $787 billion stimulus plan initiated by the new Obama administration. The credit markets were effectively frozen as banks, no longer sure how to value certain financial assets on their balance sheets, refused to make new loans as they hoarded cash as a reserve against future write-downs they believed were inevitable. In short, banks’ earnings became irrelevant as liquidity became the only meaningful metric.

The ripple effects of the turmoil in the financial markets on chemical manufacturing, as with just about every other industry, were dramatic and immediate. In the fourth quarter of 2008, demand for chemicals collapsed along with consumer spending, and inventory levels rose as companies could not cut production fast enough. (Figure 4).

In late 2008 and early 2009, BASF, Dow Chemical, PPG, Ineos, Eastman, 3M, Praxair, Huntsman and others announced plant closures, layoffs or other restructuring initiatives. For some, that wasn’t enough: LyondellBasell, Chemtura, and Tronox had to seek Chapter 11 bankruptcy protection. Pending M&A transactions were delayed due to difficulties in obtaining financing or the deteriorating financial performance of the target companies. And some high-profile deals, like Hexion’s agreement to acquire Huntsman,
were cancelled outright, and the uncertainty surrounding Dow’s acquisition of Rohm & Haas remained up until the day of closing.

In the first few months of 2009, there was a relentless parade of bad news, but the seeds of recovery had been planted. The stock market turned around in early March of 2009; the credit markets began to thaw, and by summer, GDP was growing again. Using the chemical industry as a bellwether for the larger economy, incipient signs of recovery were beginning to take hold as early as January 2009. Weekly chemical railcar loadings, which plunged in the last four months of 2008, stabilized in January and stayed within a relatively tight range of 24,000 to 27,000 carloads per week until mid-summer, when a discernable uptrend began to take hold (Figure 5). Industrial production of chemical products and capacity utilization also began to make a strong comeback beginning in January. Throughout the year, a weakening U.S. dollar supported exports, and the chemical industry was able to take advantage of relatively strong demand in emerging markets such as China, where many major producers had built new plants in previous years. In the fourth quarter of 2009, BASF, Dow, RPM, A. Schulman, and PPG all reported improvements in profits as a result of cost-cutting, even though revenues continued to be weak.

For 2010, absent any unforeseen shocks to the financial system or a relapse into a double-dip recession, we can expect continued improvements in profitability as the benefits of cost-cutting and restructuring undertaken in 2009 impact the bottom line. Revenues also should begin a gradual recovery as the economic expansion spreads and deepens in all sectors of the economy. According to the American Chemistry Council, global chemical industry output is projected to increase 4.6% in 2010, offsetting a decline of that percentage in 2009, although this improvement does not return production to previous levels. Growth in the developed economies – North America and Europe – will not be as strong as in Asia and other developing regions. The ACC projects growth of 3.4% in the U.S. and 2.7% in Western Europe for the chemical industry. The real growth will be in the emerging markets,
with chemical production in the Asia-Pacific region growing at 6.9% and Latin America at 4.8%. China, supported by the government’s heavy investments in the materials industries, is expected to grow by more than 11% (Figure 6).

Looking beyond 2010, the prospects for the U.S. chemical industry are less clear, and the growth scenario described above depends very much on the ultimate success of the government’s recent fiscal and monetary policy. It may be true that the extraordinary and unprecedented efforts of the federal government during late 2008 and early 2009 stabilized the financial markets and set the stage for recovery. But it may be too early to tell whether this will “work” in the long-run, because whatever the short-term effects, the ultimate economic costs of the government’s actions are still undetermined. The expansion of the money supply and the federal debt over the past 16 months are the largest ever in peacetime, and to think these expansions will not have unintended, and perhaps difficult to control, side effects may be extraordinarily naïve. Federal Reserve Chairman Ben Bernanke has been glib about the Fed’s loose monetary policy, merely saying that, at the appropriate time, the central bank will act quickly to withdraw excess liquidity to ward off any incipient inflation.

As for the fiscal stimulus, ramping up government spending to stimulate the economy historically has come too late in the cycle to do any good, and ends up mostly just ratcheting up the national debt and increasing the pressure for new taxation. Also, the effects of the fiscal stimulus may prove to be fleeting. Spending on infrastructure and other “hard asset” projects may benefit chemical manufacturing in the short-term, but lasting, long-term growth will depend on the health of consumer markets. If consumer demand remains weak because of a lingering debt burden, chemicals -- specialties in particular -- could become mired in a low-growth scenario for years. The “Cash for Clunkers” program may offer a preview of this dynamic: vehicle sales rose dramatically during the summer of 2009 when the program was in effect, but fell off quickly once the program was discontinued in August.

4 Of the six fiscal stimulus packages passed in response to the six recessions between 1948 and 1982, all were enacted after the recovery already had begun. See “If it Ain’t Broke, Don’t Fix It”, Bruce Bartlett, Wall Street Journal, Dec. 2, 1992. That the chemical industry began to recover as early as January 2009 suggests that this recession and recovery may be following a familiar pattern.

5 As further evidence that the effects of government stimulus may be temporary, consider that in November 2009, housing sales fell by 16% as home buyers anticipated the expiration of the homebuyer’s tax credit. The tax credit has since been extended to April 2010.
Added together, the after-effects of the federal government’s recession-fighting policies of 2008-2009 could mean higher inflation, persistently high unemployment, and anemic real economic growth. In short, we could be headed for a return to the stagflation economy of the 70s.

It doesn’t take too much imagination to think how this might affect a still weakened industry. If you paid attention only to the stock market, you might think a “V” shaped recovery was underway, but the fundamental data doesn’t support this view. Though chemical industry shipments stabilized in 2009 (Figure 7), it’s like a “reset” button was pressed: growth is slow and fragile from a lower baseline, and it will be a long time before industry shipments return to the peak level attained in the summer of 2008. Other signs of fragility: a downtrend in industry employment, on-going for many years, accelerated during the downturn and shows no signs of recovery. With all the plant closings and tightened credit conditions, business investment is down and capacity for many basic chemicals is shifting overseas.

There are other industry-specific risks that will affect chemical manufacturers over the next few years. Manufacturers are beginning to brace for a less business-friendly regulatory environment. With the new Democratic administration, an emphasis on going “green” is going to become more pronounced as the focus shifts in 2010 from healthcare and financial reform to environmental and energy policy. Though the shift to a greener economy will offer opportunities for chemical manufacturers in the long-term, the transition is not likely to be without pain. Cap and trade, the subject of the following article, if passed would disproportionately cut into the profitability of the U.S. chemical industry and put it at a competitive disadvantage relative to foreign competitors who don’t have the same constraints.

The EPA has already adopted a more activist posture, having determined last April that six greenhouse gases pose a threat to human health and should be regulated under the Clean Air Act. A likely outcome is that energy-intensive industries, such as chemicals and steel, would have higher operating costs if carbon dioxide is regulated and would then have an additional motivation to move production overseas. Also on the EPA’s agenda is the reform of the Toxic Substances Control Act (TSCA). Proposals under consideration include fees on chemical manufacturers to help pay for safety assessments of commercial compounds and easing limitations on the agency’s ability to place restrictions on or ban chemicals that are not considered safe.

Further, the Obama administration appears to be the most union-friendly administration since FDR. President Obama and a number of other Democratic congressional leaders support the Employee Free Choice Act (EFCA), now under consideration in Congress. If passed, the Act will amend the National Labor Relations Act to allow “card check”, a method that would enable employees to organize a union by getting a simple majority of employees to sign authorization forms, or “cards”, stating they wish to be represented by a union. It would make unions easier to organize by by-passing the typical process of having employees vote to unionize through secret ballots. As pointed out by its many critics, eliminating the secret ballot opens the way for coercive tactics on the part of labor organizers and strips away an employee’s right to privacy in deciding whether to support union representation. If passed, the Act will
inevitably raise labor costs for smaller manufacturers and put them at a relative disadvantage to foreign competitors who have access to non-unionized labor.

If we have focused on some of the more difficult challenges facing the chemical industry, we want to emphasize that these issues affect the short-term outlook the most, and that growth resulting from innovation, the real driver of long-term change in the chemical industry, is difficult to predict and even harder to quantify. Ten years from now, the U.S. chemical industry is likely to look considerably different than it does today. Where practical, production of basic petrochemicals and inorganics probably will have shifted overseas. U.S.-based operations will largely consist of specialty manufacturers who have been able to adapt to the changed economics of the 21st century. The trend for some specialty chemicals to become commodities will have continued, with manufacturers that have focused of developing brands supported by low-cost manufacturing, efficient distribution, and excellent customer service likely to be survivors. But there will be newer “specialties” coming online that will represent a new, high-tech image for the industry. Nanotechnology, energy storage, and bio-polymers are just three examples of areas that are ripe for innovation and commercialization. Just as digital computers may have been the cutting-edge industry in the 20th century, material science -- in particular chemical material science -- may be the cutting-edge industry in the 21st.
CAP AND TRADE: CHEMICAL INDUSTRY WINNERS AND LOSERS

Over the past year a carbon dioxide (CO₂) cap and trade program, known as the Waxman-Markey bill, has been making its way through the United States Congress. The purported goal of the controversial bill is to address global warming and encourage the development of new, clean energy technologies. Controversial from the beginning, the bill has measures that could impose costly restrictions on energy-intensive industries, ultimately reducing their international competitiveness, lowering profitability, and likely eliminating jobs. Support from Democratic politicians and environmentalists, particularly after the Democrats won control of Congress and the White House in 2008, had outweighed the opposition from the Republican Party and other interested parties. However, recent developments surrounding the rigor of data collection and analysis supporting claims of climate change (including the possibility of deliberate misrepresentations and the suppression of contravening evidence) have raised questions about the likelihood of passage.

The key provisions of the bill, if ratified, will limit, or "cap" CO₂ emissions in the U.S. The cap is set to decline over time, forcing carbon emissions to fall to 83% of 2005 levels by 2020 and eventually to 17% of 2005 levels by 2050. Regulated entities, such as companies in carbon-intensive industries (e.g., electric power utilities; steel, chemical and other heavy manufacturers) would be required to hold allowances that permit them to emit CO₂, with each allowance worth one metric ton of CO₂. Initially, all major emitters of CO₂ would receive allowances sufficient to cover their current level of emissions. After this initial distribution, a market for trading allowances would develop, providing allowance holders the ability to sell their unused allowances to other companies. In practice, as the annual cap is reduced and the total number of allowances in circulation declines, companies would be forced to either reduce emissions or purchase additional allowances on the open market. In theory, it would be a relatively straight-forward economic decision: a company will choose whichever option is less expensive at the time. But as in any free market, as the supply of allowances decreases over time, their prices will rise, and choosing emissions abatement will increasingly become the more attractive option.

The plan appears as if it would work mechanically, but it is clear that cap and trade will raise the price of energy and energy-related goods to American consumers; the question of "how much" has been the subject of much controversy⁶. What has not received as much attention is just how much cap and trade is going to harm U.S. industry’s competitive position against foreign companies that do not operate under such restrictions, especially in emerging economies such as India and China. Steel, paper and chemicals, all of which are carbon-intensive and face tight competition in the global marketplace, would be especially affected.

⁶ Based on an analysis of a discussion draft of the bill, the Environmental Protection Agency estimates that cap and trade would cost the average household between $98 and $140 per year. The Congressional Budget Office estimates that the bill would be relatively deficit neutral for the federal government, with an average cost to households of about 0.2% of annual income. Other groups have disputed these estimates: the Competitive Enterprise Institute believes the bill would be essentially the “largest tax hike in history”, and the American Petroleum Institute estimates that the bill would raise the price of gasoline and other fuels to the equivalent of $4.00 a gallon by today’s standards.
One of the largest sources of CO₂ emissions in the U.S., accounting for about 5% of the total, is the chemical industry. The effects of limiting CO₂ emissions and carbon trading on the industry are likely to be complex, and to the extent that some companies may be able to pass their increased costs on to consumers, they may benefit from the program. Increased costs at the end-user level also will raise demand for energy-saving products such as a hybrid vehicles, solar panels, and energy-efficient appliances. Manufacturers that provide materials used in energy-saving products (e.g., silicon used to manufacture solar panels) may experience sales growth from increased product demand. DuPont, for example, expects its sales of renewable materials that displace fossil fuels to double to $8 billion by 2015⁷.

But the fact remains that, over time, the cap will be reduced, and an allowance to emit CO₂ will become increasingly expensive, disproportionately affecting chemical manufacturers. For large chemical players, the effects of cap and trade on overall company profitability may be minimal. These companies can access new carbon abatement technologies and other alternative energy programs, and spread their cost over a large revenue and asset base. In general, they also have greater flexibility than smaller companies in addressing the issue: some are installing projects that will lower both their energy costs and CO₂ emissions, potentially allowing them to generate revenue by selling their unused allowances. Dow Chemical, for example, uses methane from a landfill to power a plant in Dalton, GA, where it makes carpet backing. Further, from an unpleasant realpolitik perspective, large firms, through political connections and lobbyist efforts, have an advantage over their smaller competitors in shaping the details of the legislation.

Additionally, large chemical players can roll out abatement technologies and new energy-saving programs over a large pool of operating plants. They can shift production to their more efficient facilities, and as more emission-abatement programs are employed throughout their companies, implementation costs will decrease. They can also transfer production overseas, where many already have established operations in regions that don’t regulate CO₂ emissions, such as Asia or the Middle East.

On the other hand, small chemical firms likely will face a different set of challenges. These firms may have limited access to capital and/or carbon abatement technologies. They may not be able to shift production to more efficient plants or overseas, leaving them no choice but to purchase additional allowances or install abatement technologies. The effects may be especially harmful to small companies that are growing – and creating jobs. With their CO₂ emissions capped and with the cap declining every year, incremental revenues from growth will be accompanied by escalating costs, such that requiring them to pay to emit more CO₂ would act as a disincentive, slowing or even curtailing their growth. It will create a “Wizard of Oz”-like situation for mid-sized U.S. based manufacturers: “Surrender Dorothy” is writ large on the horizon. Passage of Waxman-Markey will likely drive a number of viable, privately-held U.S. chemical manufacturers toward selling to major multinationals.

If the Waxman-Markey bill is ratified, large chemical manufacturers will ultimately be in a position to benefit at the expense of smaller manufacturers – indeed, that may be one reason why some large companies have come out in support of the bill. Whether the bill will actually mitigate global warming is open to question, especially since any meaningful reduction in global greenhouse gas emissions will require significant cooperation at an international level.

This being the case, the issue may really come down to whether it is good industrial policy for the United States to penalize smaller manufacturers – especially those using energy intensive processes -- for their success, especially since small companies have historically created most of the new jobs in our economy. The bill may be well-intentioned, but unless it has some reasonable chance to achieve its goals, why does it make sense if its only real effect would be to hurt U.S. manufacturing and ship jobs overseas?

Throughout much of 2009, the chances for passage of the bill appeared high. The bill was passed in the House of Representatives over the summer of 2009 and sent on to the Senate. The bill faces a tougher environment there.

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especially given the Republican party’s nearly unanimous opposition and the loss of the Democrat’s filibuster-proof supermajority with the election of Republican Scott Brown to the vacant Massachusetts Senate seat. Further, there is a growing suspicion among the electorate that “cap and trade” is much more about favorable economics for those who cap and those who trade, instead of making a true impact on limiting climate change. Finally, climate change skeptics are now being taken seriously in both scientific and media circles, which hopefully will lead to better science and more intelligent legislation.
For most of the first decade of the century, chemicals had all the characteristics that make for a robust M&A market: the emergence of multi-national players with an appetite for growth, the prospect for enhanced profitability through synergies and economies of scale, the easy availability of debt financing and private equity capital, and especially a pipeline of attractive assets – with valuations rising, shareholders of privately-held firms with strong cash flows and defensible market niches were more than willing to bring assets to market. Established chemical strategic firms, understanding that the surest way to grow faster than the economy was through acquisitions, transformed themselves into multi-nationals with diverse product portfolios that extended into a number of end-use markets.

The apex for chemicals M&A was 2007, when transactions totaling more than $55 billion in value were completed, 31% higher than the previous record year of 2006 with $42 billion. The numbers were skewed somewhat by a number of “transformational” mega-deals, that is, large transactions that represented a fundamental make-over of a well-known company and by implication altered the shape of the entire industry. In 2007, Basell merged with Lyondell in a deal valued at $19.2 billion and SABIC purchased General Electric’s plastics business for $11.6 billion. Other industry-shaping transactions that were announced in 2007, but not completed until early 2008, included Akzo Nobel’s acquisition of ICI for $16.6 billion and PPG’s purchase of SigmaKalon Group for $3.2 billion.

2007 also may have been the high-water mark for private equity’s investment in the industry. Since 2003, private equity firms had been raising significant amounts of new capital, and with easy credit availability, were under pressure to put those funds to work (Figure 2). Private equity played a big role in the steady upward trend in chemical transaction multiples during this period, and to many investment bankers working in the chemicals area, it appeared that private equity buyers basically had parity with strategics when it came to competing for high-quality assets. Because private equity funds had access to easy credit and were investing in market segments that were consolidating, many became quasi-strategic firms themselves, as they first acquired a platform company and then followed up with additional strategic bolt-on acquisitions.

The credit crunch that began in the summer of 2007 seemed initially to affect only the larger transactions, particularly those that were highly leveraged. Hexion’s aborted acquisition of Huntsman is a case in point. At the height of the M&A boom in June 2007, Hexion, owned by private equity giant Apollo Management, outbid Basell to announce that it would acquire Huntsman for $10.4 billion. But as the credit crisis and the economic downturn deepened, Huntsman’s

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1 Estimated by Young & Partners, New York, counting transactions with a value greater than $25 million.
performance deteriorated. First Apollo and Hexion, and then their banks, tried to back out of the deal, claiming that Huntsman’s level of debt would render the combined companies insolvent. Huntsman went to court, and eventually settled with Apollo, Hexion and the banks for a combined $2.7 billion.

Smaller transactions continued to close through the fourth quarter of 2007 and the first three quarters of 2008. Strategics often could fund deals with cash, stock, or a combination of the two, and private equity buyers could be more creative with transaction structures and financing arrangements. But as 2008 progressed, deal volume slowed as banks continued to tighten lending standards as the sub-prime crisis began to spill over into other sectors of the credit markets.

After the collapse of Lehman Brothers in September, the financial markets entered into a period of near chaos that lasted through the end of the year. Most potential buyers and sellers could not justify entering the M&A market at this time. With the economy in the midst of the worst recession since World War II, revenue and earnings visibility was nonexistent, making it nearly impossible for potential buyers to get an accurate read on a company’s future cash flows. Valuation became a matter of guess work, with neither public company values nor private transactions having much to offer in the way of guidance. Public company multiples, after declining in late 2008, actually began to increase after the first quarter of 2009, but this was due to a combination of depressed revenues and earnings and increasing market capitalizations after the stock market turned around in early March. But most investors recognized these “improved” valuations for what they were: statistical outliers that are typical at the end of a recession or the beginning of a recovery (Figure 3). Many would-be sellers of quality chemical firms, aware that private market values remained down, realized that there was just too much risk involved in putting their companies on the market. Under the circumstances, it was easier to just do nothing, preserve cash, and wait for the markets to stabilize and a sustainable recovery to begin.

Some strategic transactions continued to move forward, but there were many roadblocks on the way to closing. The experience of Dow Chemical was symptomatic of many companies trying to do deals during this period. Determined to remake itself into a less-cyclical, more-specialties focused company, Dow in July 2008 announced it would acquire Rohm & Haas for $18.8 billion. Late in 2008, a planned JV with Kuwait’s Petrochemical Industries Company fell through. Dow, which had been counting on receiving $9 billion from the JV that would be used to support the Rohm & Haas deal, found itself without the financing it needed to complete the transaction. Dow and Rohm & Haas both made their case in court, and after a three month delay, the deal did close in April 2009.

Both the economy and the financial markets stabilized in the first quarter of 2009, and deal flow gradually began to recover. Though overall deal activity for 2009 was down even from the depressed levels of 2008, there are signs that conditions are improving. Banks, though still cautious, are lending again, and cash-rich companies have begun making acquisitions where they can find a good value and a solid strategic rationale. Restructuring efforts have also begun to pay off, with some companies under leveraged or flush with cash that could be used to support acquisitions.

We believe that 2010 is going to be a surprisingly good year for chemicals M&A. There has been nearly two years of depressed activity during which a number of high-quality companies have been withheld from the market.
Multiples may come back sooner than many have expected, and as soon as a few deals close at good valuations, a lot of good companies are going to come to market.

Those in the best position to move forward are the well-capitalized strategic buyers (Figure 4). Simply put, companies with low debt, excess cash balances, and strong operating cash flows can “afford” the risk of making acquisitions, whereas competitors with weaker balance sheets cannot. And if they have a history of successful growth through acquisitions, now may be a great time for these companies to seek out high-quality targets. As an example, coatings companies like Akzo Nobel, PPG Industries, RPM, Valspar, and Sherwin-Williams, among others, have managed to emerge from the recession with relatively strong balance sheets and have a core competency in strategic M&A. Many of these companies can pursue opportunities without the need to seek outside financing or, if they choose to do so, can receive favorable terms based on the strength of their balance sheets.

A recent pick-up in M&A activity suggests that large, billion-dollar strategic deals may be ready for a comeback. An example is Air Products’ recent efforts to acquire Airgas. In September 2009, Air Products offered an all stock deal to Airgas, and when that was rejected, offered a combination of stock and cash that was also rejected as “undervalued” by Airgas’s board. In early February 2010, Air Products came back with an all cash proposal of $60 per share, representing a 40% premium over the price Airgas’s stock was trading at before the offer. Air Products had already received a commitment for debt financing from J.P. Morgan. Although there are solid strategic reasons for merging the companies, Airgas’s board still believed the offer “grossly undervalued” Airgas, and rejected the proposal. At the time of this writing, Air Products is going hostile with their bid.

Without the driver of potential synergizes, private equity firms face a more challenging landscape, but given that they have a lot of capital and chemicals are an attractive area to invest, they are likely to compete for high-quality assets. Dow Chemical, for example, has put its $5.0 billion/year styrenics and aromatics business on the block, and a number of private equity group have shown interest, including Apollo, Bain Capital, TPG Capital, and Rhone Capital. Credit conditions are improving, and banks are likely to loosen restrictions even more as the economy improves. Until that time, private equity groups will compete by being more creative with deal structures. One approach is to “over-equitize” a transaction, where the private equity group initially invests more equity in a deal and

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**Figure 4: Financial Strength of Selected Chemical Manufacturers**

<table>
<thead>
<tr>
<th>Company</th>
<th>Net Debt* / EBITDA</th>
<th>Enterprise Value / Revenues (ttm)</th>
<th>Enterprise Value / EBITDA (ttm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3M</td>
<td>0.4</td>
<td>2.6</td>
<td>9.8</td>
</tr>
<tr>
<td>Akzo Nobel N.V.</td>
<td>1.0</td>
<td>0.9</td>
<td>7.2</td>
</tr>
<tr>
<td>Air Products &amp; Chemicals, Inc.</td>
<td>2.0</td>
<td>2.6</td>
<td>10.5</td>
</tr>
<tr>
<td>Albemarle Corporation</td>
<td>1.6</td>
<td>1.2</td>
<td>12.8</td>
</tr>
<tr>
<td>Ashland Inc.</td>
<td>1.6</td>
<td>0.5</td>
<td>5.6</td>
</tr>
<tr>
<td>BASF Corporation</td>
<td>1.5</td>
<td>0.9</td>
<td>5.9</td>
</tr>
<tr>
<td>The Dow Chemical Company</td>
<td>5.2</td>
<td>1.2</td>
<td>16.1</td>
</tr>
<tr>
<td>Cytec Industries, Inc.</td>
<td>2.3</td>
<td>0.9</td>
<td>9.7</td>
</tr>
<tr>
<td>DSM N.V.</td>
<td>1.6</td>
<td>0.9</td>
<td>8.4</td>
</tr>
<tr>
<td>DuPont</td>
<td>2.3</td>
<td>1.4</td>
<td>10.8</td>
</tr>
<tr>
<td>Eastman Chemical Company</td>
<td>1.3</td>
<td>1.0</td>
<td>7.9</td>
</tr>
<tr>
<td>H.B. Fuller Co.</td>
<td>0.7</td>
<td>0.9</td>
<td>7.6</td>
</tr>
<tr>
<td>The Lubrizol Corporation</td>
<td>0.6</td>
<td>1.4</td>
<td>7.0</td>
</tr>
<tr>
<td>Olin Corporation</td>
<td>NA**</td>
<td>0.8</td>
<td>5.2</td>
</tr>
<tr>
<td>PPG Industries, Inc.</td>
<td>1.9</td>
<td>1.0</td>
<td>9.1</td>
</tr>
<tr>
<td>RPM International</td>
<td>1.4</td>
<td>0.9</td>
<td>7.7</td>
</tr>
<tr>
<td>The Sherwin-Williams Company</td>
<td>0.7</td>
<td>1.1</td>
<td>8.8</td>
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<tr>
<td>Sensient Technologies Corp.</td>
<td>2.2</td>
<td>1.5</td>
<td>8.8</td>
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<tr>
<td>The Valspar Corporation</td>
<td>1.7</td>
<td>1.2</td>
<td>8.4</td>
</tr>
<tr>
<td>W.R. Grace &amp; Co.</td>
<td>0.4</td>
<td>0.6</td>
<td>5.9</td>
</tr>
<tr>
<td><strong>Median</strong></td>
<td><strong>1.6</strong></td>
<td><strong>1.0</strong></td>
<td><strong>8.4</strong></td>
</tr>
<tr>
<td><strong>Mean</strong></td>
<td><strong>1.6</strong></td>
<td><strong>1.2</strong></td>
<td><strong>8.7</strong></td>
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</table>

*Net Debt = Funded debt minus cash and cash equivalents.
**Cash balances exceeds debt.
seeks debt financing later. Other alternatives include using earn-outs, seller notes, and “in-house” debt as substitutes for traditional bank financing.

One issue that private equity investors will have to face in the next few years is their exit strategy for portfolio companies acquired in the pre-recession period when valuations were at a peak. If a portfolio company was purchased at a cyclical peak for a high multiple, a private equity seller would do well to consider a customized approach to selling the business. A traditional process that results in bids that are all below an acceptable threshold can be a disaster: the company may have to be pulled off the market and its future value could be significantly impaired. A better course may be a targeted, yet still competitive, process, where the potential buyers would be limited to those that have an exceptional strategic or synergistic fit with the portfolio company. In these cases, extensive up-front work is necessary to identify and quantify the fit with the strategic buyer in order for the seller to share in the value of the merger.
## 2007-2010 CHEMICAL INDUSTRY SELECTED TRANSACTIONS

<table>
<thead>
<tr>
<th>DATE</th>
<th>ACQUIRER</th>
<th>TARGET</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feb-10</td>
<td>Sherwin-Williams</td>
<td>Industrial Coatings Business of Arch Chemicals</td>
</tr>
<tr>
<td>Jan-10</td>
<td>Arkema</td>
<td>Dow Chemical’s Acrylic Acid &amp; Esthers Business / Specialty Latex Business</td>
</tr>
<tr>
<td>Jan-10</td>
<td>Zep</td>
<td>Amrep</td>
</tr>
<tr>
<td>Nov-09</td>
<td>Ellipse Capital</td>
<td>Ward Adhesives</td>
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<tr>
<td>Nov-09</td>
<td>Dow Corning</td>
<td>Globe Specialty Materials US and Brazilian Silicon Metal Manufacturing Assets</td>
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<tr>
<td>Oct-09</td>
<td>American Securities Capital Partners</td>
<td>GenTek</td>
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<tr>
<td>Oct-09</td>
<td>Milliken Chemical</td>
<td>Rebus</td>
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<tr>
<td>Aug-09</td>
<td>GenNx360 Capital Partners</td>
<td>Clariant Corporation’s Specialty Silicones Business (SiVance, LLC)</td>
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<td>Aug-09</td>
<td>Honeywell</td>
<td>RMG Group</td>
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<tr>
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<td>Altana</td>
<td>Water Ink Technologies</td>
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<td>Praxair</td>
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<td>May-09</td>
<td>Clariant</td>
<td>XL Performance Chemicals</td>
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<td>Dow Chemical Company</td>
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<td>Bayer AG</td>
<td>Polyurethane Systems House of Neochimiki</td>
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<td>Venture Tape Corp (3M)</td>
<td>Compac Corp.’s Pressure Sensitive Adhesives Assets</td>
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<td>Karochemie</td>
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<td>Akzo Nobel NV</td>
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<td>Flint Group</td>
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<td>Arch Chemicals</td>
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<td>Yara International ASA</td>
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<td>Superior Silica Sands</td>
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<td>Arysta LifeScience Corp (Olympus capital Holdings Asia)</td>
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<td>GE Plastics</td>
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<td>Vesta</td>
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<td>Jan-07</td>
<td>Court Square Capital</td>
<td>MacDermid Incorporated</td>
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</table>
Grace Matthews’ chemical investment banking practice is global in scope and is well-known for its strong track record of successful chemical industry transactions dating back to the early 1990s. We have direct ties to chemical industry leaders worldwide, and have completed transactions with such companies as Akzo Nobel, 3M, DuPont, Sherwin-Williams, PPG Industries, Ashland, Ceradyne, DSM, ICI, Borregaard, Air Products, Landec Corporation, The Home Depot, Hexion Specialty Chemicals, Atofina Chemicals, Brush Engineered Materials, Becker Industrial Coatings, RPM International, Courtaulds, Domino Sugar, and Chr. Hansen Laboratories.

Grace Matthews’ three main practice areas are: sell-side transactions (private companies, divestitures for large multinational corporations and private equity held businesses); buy-side projects (typically for major multi-nationals); and financing, where we raise debt and/or equity capital to support private equity sponsored management buy-outs or recapitalizations.

CONTACT INFORMATION

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info@gracematthews.com

John Beagle Managing Director
A founder of Grace Matthews, John leads the company’s chemical practice, providing strategic planning and direct transaction management. John has been the lead investment banker on over 50 engagements in the chemical industry, representing major multinational corporations, private equity firms, and privately-held businesses. John earned a B.S. in Materials Science and Engineering and an M.B.A., both from Cornell University.

Benjamin Scharff Director
Ben has advised clients on mergers, acquisitions, and financings for more than 15 years. Ben’s practice areas include paints and coatings, construction products, and other specialty chemicals. Ben’s client base has included well-known chemical firms and private equity groups, as well as privately-held businesses. Ben graduated from University of Wisconsin – Madison with a degree in Business and Economics.

Thomas C. Osborne Senior Executive, Coatings
Tom joined Grace Matthews in 2008 and focuses on new business development and strategic planning. Previously, Tom had a distinguished career in the global chemical industry, serving as CEO of The Tnemec Company and ICI Paints North America/The Glidden Company, as well as in other senior management level positions.

Andrew Hinz Vice President
Andy joined Grace Matthews in 2007 and specializes in sell-side transactions, buyer searches, leveraged finance, and new business development. His transaction experience includes basic materials, direct mail/printing, industrial equipment and financial services. Previously, Andy was an Equity Research Analyst with Robert W. Baird & Co. Andy holds the Chartered Financial Analyst (CFA) designation and received a B.B.A. from the University of Wisconsin – Eau Claire.

Kevin Yttre Vice President
Kevin joined Grace Matthews in 2008. A chemical engineer, Kevin held a number of engineering and management positions with ICI’s Uniqema specialty chemicals business in the U.S. and Europe before joining Grace Matthews. Kevin holds an M.B.A. from the Harvard Business School and a B.S. degree with Highest Distinction, in Chemical Engineering from the University of Wisconsin – Madison.

Trent Myers Vice President
An employee of Grace Matthews since its inception, Trent has over 20 years experience in mergers & acquisitions, leveraged finance, and quantitative analysis. Trent has been involved in over 100 transactions involving chemicals, coatings and adhesives, and basic materials. Trent earned a B.A. from University of Georgia, an M.A. from the University of Virginia and an M.B.A. from the University of Wisconsin – Madison.

Andrea Wolf Associate
Andrea joined Grace Matthews in 2005, and focuses on sell-side engagements, buyer searches, leveraged finance, and new business development. Andrea has completed transactions in a number of industries including chemicals, food ingredients, construction products, and general manufacturing. Andrea holds a B.A. in Economics and Finance and an M.A. in Economics, both from the University of Wisconsin – Milwaukee.
SELECT GRACE MATTHEWS CHEMICAL TRANSACTIONS

**LORD**
has sold its Resilient Floor Coatings Business to AkzoNobel
Grace Matthews, Inc. advised LORD Corporation on this transaction

**ASHLAND**
has acquired
Grace Matthews, Inc. advised Ashland on this transaction

**columbia paint coatings**
merged with SHERWIN-WILLIAMS.
Grace Matthews, Inc. advised Columbia Paint & Coatings on this transaction

**Beckers Industrial**
has acquired the stock of Specialty Coatings Company, Inc.
Grace Matthews, Inc. advised Specialty Coatings Company on this transaction

**RoundTable**
has acquired a majority interest in VESTA
Grace Matthews, Inc. advised Vesta on this transaction

**AKZO NOBEL**
has acquired Chemcraft International, Inc.
Grace Matthews, Inc. advised Akzo Nobel nv on this transaction

**ColorMatrix**
has been recapitalized by Andax Group
Grace Matthews, Inc. advised ColorMatrix Corporation on this transaction

**3M**
has acquired NorthStar Chemicals, Inc.
Grace Matthews, Inc. advised NorthStar Chemicals, Inc. on this transaction

**RAABE Corporation**
has been acquired by Quest/Julon
Grace Matthews, Inc. advised Raabe Corporation on this transaction

**LAMPERC**
has sold its specialty chemical subsidiary to Lubrizol
Grace Matthews, Inc. advised Landec Corporation on this transaction

**ceradyne, inc.**
has acquired Minco
Grace Matthews, Inc. advised Minco on this transaction

**3M**
has acquired The Flood
Grace Matthews, Inc. advised Akzo Nobel nv on this transaction

**LUBRIZOL**
has sold the assets of Lubrizol Performance to Delft Instruments
Grace Matthews, Inc. advised Lubrizol Corporation on this transaction

**Facilitator Capital**
has sold the stock of CERAC to Williams
Grace Matthews, Inc. advised the shareholders of CERAC, Inc. on this transaction

**HEXION**
has acquired the assets of Pacific Epoxy Polymers, Inc.
Grace Matthews, Inc. advised Pacific Epoxy Polymers, Inc. on this transaction

**AIR PRODUCTS**
has licensed exclusive fields of Intelimer technology from Landec
Grace Matthews, Inc. advised Landec Corporation on this transaction

**GSI General Materials, LLC**
has been acquired by a subsidiary of White Cap
Grace Matthews, Inc. advised GSI General Materials, LLC on this transaction

**Borregaard**
has sold its U.S. fine chemicals subsidiary, Borregaard Synthesis, Inc., to PCI Synthesis
Grace Matthews, Inc. advised Borregaard on this transaction

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