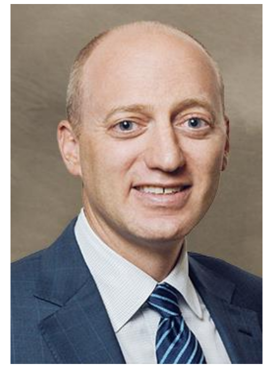
Agenda and Summary of Speeches

Young & Partners 30th Annual Senior Chemical Executive Conference
"Strategic, Financial and Shareholder Issues"

November 29, 2017
The Yale Club at 50 Vanderbilt Avenue - New York City

11:30 a.m.	**Registration**
12:00 p.m.	**Welcoming Comments and Luncheon**
12:30 p.m.	**Luncheon Keynote Speakers and Fireside Chat**
	"Private Equity and Chemicals: What Drives Success" Sam Feinstein, Partner, Private Equity, *Apollo Management* Seth Meisel, Senior Managing Director, Private Equity, *Blackstone*
	A Fireside Chat with Apollo and Blackstone Moderator: Peter Young, President and Managing Director, *Young & Partners*
1:30 p.m.	**The Anatomy of a Spin-off** Guillermo Novo, CEO, *Versum Materials, Inc.*
2:00 p.m.	**M&A and Financial Trends – The Death of Conventional Wisdom** Peter Young, President and Managing Director, *Young & Partners*
2:30 p.m.	**The Outlook for the Chemical Industry** Joseph Chang, Global Editor, *ICIS Chemical Business* Robert Westervelt, Editor-in-Chief, *IHS Chemical Week* Peter Young, President and Managing Director, *Young & Partners*
3:15 p.m.	**Break**
3:30 p.m.	**The Global Chemical Industry Market and Supply Outlook** Adrian Beale, Head of Specialty Chemicals, *IHS Markit*
4:00 p.m.	**The Geopolitical Crisis in North Asia – Are We Heading For War?** Dennis C. Wilder, Professor, Asian Studies, *Georgetown University*
4:30 p.m.	**Speaker Roundtable** Moderator: Peter Young, President and Managing Director, *Young & Partners* Participants: Conference Speakers
5:15 p.m.	**Networking Cocktail Reception**

Private Equity and Chemicals: What Drives Success



SETH MEISEL
SENIOR MANAGING DIRECTOR, PRIVATE EQUITY
THE BLACKSTONE GROUP

Blackstone has invested in chemicals across a range of transaction types, styles and through different points in the chemical cycles. We make investments when we discover an opportunity to bring capital to drive transformational change, find the right time in the cycle, invest behind an idea, or to pursue a roll-up strategy.

These investments tend to have three stages. The first is setting up the company. A number of our acquisitions are carve-outs that required work to get up and running on a standalone basis. The second is implementing the changes that we believe are necessary for improvement. The third is the exit.

These investment opportunities do not materialize because we have found some undiscovered situation, but rather because we identify a situation in flux where we are uniquely suited to drive a better outcome. We typically prefer to build companies and use debt to amplify the returns. Most often these opportunities come to us from management teams who have the value creation strategy, but need support in terms of resources.

We are currently working on a deal that we feel embodies that philosophy. The Rhodia Acetow business is a global leader in producing acetate tow for cigarette filters. We announced the purchase of the business from Solvay in December 2016 and then subsequently announced a joint venture with Celanese's acetate tow business in June 2017. We did not approach this by deciding that we wanted to invest in acetate tow, but by understanding that the sector was in flux. Solvay, on one hand, wanted to exit the business while the management of the Rhodia Acetow subsidiary along with Celanese, thought that there would be benefits from consolidation given the natural slow growth of the industry. This was a transaction that these companies could have done without us. Solvay, however, was unwilling to take on the anti-trust risk that would have lengthened the time-of-close and Celanese was reluctant to invest capital in what would have been a non-core business. We took on risk by completing the first purchase from Solvay without being assured of the second transaction.

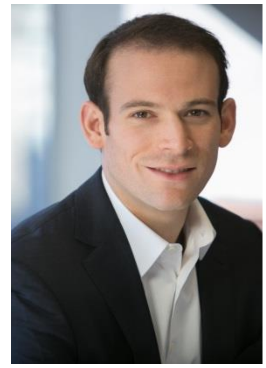
We are seeing a trend towards focused businesses and away from conglomerates. This is where we are finding a lot of our opportunities by helping companies improve their portfolios.

We will also invest behind cycle plays, where we identify what we think is a favorable time to purchase an asset. We do not think that we can predict the bottom or the top of the cycle, but we can identify where the market is relative to the historical average and what catalysts could exist for cyclical turns. In my past role at Bain Capital, I helped lead the investment in Trinseo. This investment was predicated on a strengthening styrenics market.

Finally, we pursue roll up strategies. We tend to see these strategies applied to specialty chemical businesses rather than commodities, particularly where there are strong niche positions. However, we would pursue a roll up in a commodity space if we felt that that specific market could benefit from consolidation.

Perhaps we will see a new category of $10B+ deals in the future which, as one of the largest private equity funds, we are uniquely capable of executing.

Private Equity and Chemicals: What Drives Success



SAM FEINSTEIN
PARTNER, PRIVATE EQUITY
APOLLO GLOBAL MANAGEMENT, LLC

While we target global chemical opportunities, all chemical investments are evaluated by the team in New York. We feel the industry is so globally interconnected that having the institutional knowledge and relationships residing in one office and team is the right approach. Apollo focuses on nine different industries of which chemicals is one. We have purchased a number of chemical businesses that run the gamut of commodity to specialty.

It has been eight years since the last recession. Default rates are at very low levels. It makes us a little worried as a 5+ year ownership period requires us to be mindful of where the overall economy is headed. Our firm places emphasis on downside scenarios and appropriate capitalizations that will withstand different environments. It is difficult to assume that, given where valuations are today, that one will be able to exit at the valuation that one has to pay to buy something today. While valuations for the different subsectors in chemicals are at different levels, they are all high when compared to historical averages. When you look at where companies are trading today versus the 5 or 10 year average, there is concern about how long that will last.

We bucket our investments into three different categories: buyouts, carve-outs and distressed for control. We believe our competitive edge comes from our willingness to embrace complexity, our ability to privately place debt in challenging markets and from the scale of our capital. We have been very disciplined in our deployment of capital.

Our success in the chemicals industry is grounded in five key principles. First, we are realistic about where in the cycle the target is. Second, we prudently capitalize businesses to withstand earnings and cash flow volatility. Third, we expect the unexpected and prepare for unlikely scenarios. Fourth, we create a culture of operational excellence to differentiate our businesses in highly competitive industries like chemicals. Finally, we believe strong management teams are essential to creating value.

One of the more complex deals we completed was the purchase of OM Group. We had studied OM Group for years, but we had trouble making the valuation work. What created the opportunity for us was a partnership with Platform Specialty Products. Platform was extremely acquisitive and there were pieces of OM Group that were very attractive to them. The partnership allowed us to jointly purchase OM Group and then split the portfolio in a way that would allow Platform to keep the pieces that they wanted. This partnership allowed us to pay a premium to the public valuation, yet also enabled Apollo to get a better entry price by leveraging the synergies that Platform was expecting. These types of partnership opportunities are very difficult to get done. There are a number of issues related to tax structuring, liability sharing, legal documentation sequencing, operating covenants, etc. that have to be overcome. Embracing this kind of complexity is a trademark of Apollo.

A Fireside Chat with Seth Meisel and Sam Feinstein

PETER YOUNG, PRESIDENT AND MANAGING DIRECTOR, YOUNG & PARTNERS
SAM FEINSTEIN, PARTNER, APOLLO GLOBAL MANAGEMENT, LLC
SETH MEISEL, SENIOR MANAGING DIRECTOR, THE BLACKSTONE GROUP

Young: Could you both comment on how you ended up in private equity and at your respective firms?

Feinstein: I worked in the Private Equity coverage group at Morgan Stanley immediately after college and very quickly realized that private equity were doing was more exciting to me than what I was doing at Morgan Stanley. At the time I was living in California where I had grown up, but I knew I wanted to come out to New York. I was very attracted to the flexibility at Apollo and the exposure one could get early on. For example, I had the opportunity to work on LyondellBasell, a distressed debt deal, early in my career.

Meisel: I grew up in New Jersey and went to Princeton where I studied economics. With that degree, you could either do Management Consulting or Investment Banking. I went into consulting and, after a few years, I realized that I was giving people great advice without ever knowing if they followeI ended up giving advice to some of the original private equity firms and realized that that was where I really wanted to be. I ended up at Bain Capital where I worked for 16 years before moving over to Blackstone.

Young: Unlike most other private equity firms, neither Apollo nor Blackstone has shied away from investing in commodity chemicals. Could you comment on how your firms are able to be comfortable investing in that sector of chemicals?

Feinstein: We believe appreciation of where you are in the cycle is key to investing in the commodity space. You can never know whether you are at the top or the bottom, but you can run scenarios that simulate a variety of outcomes. We have been able to get comfortable that, under a variety of scenarios, the return outcomes will be acceptable to us. This, of course, puts pressure on the entry price.

Meisel: The public markets, when things are bad, think things will always be bad and vice versa. If you approach opportunities with a longer term view at a time when the opportunity is below the cycle average then, with the right capital structure, you can invest. Sometime you can find situations where you can identify a specific dynamic that will change the environment. With Trinseo, a new technology emerged that would, over a long period of time, reduce the supply of byproduct styrene monomer eventually push the price upwards. That thesis ended up proving out to be true and we made a great return on our investment.

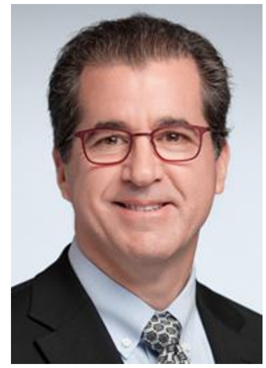
Young: How do you approach introducing creative solutions that gives you a competitive advantage?

Feinstein: Relationship building and creative structuring has allowed us to execute corporate partnerships. For example, Platform could have purchased OM Group on their own, but there were pieces that they did not want. What they needed was a partner who would take the pieces they did not want. A different example is the deal we did for Taminco, a European headquartered chemical company, which was for sale at a time when the European debt markets were weak. We took a global approach and arranged the debt financing in the USA, where the debt markets were stronger with lower interest rates and greater execution certainty.

Meisel: We have conversations with companies about optimizing their portfolios all the time. Sometimes, our insights are met with praise and other times with derision. Often, these conversations are the beginnings of the relationships that end up turning into deals.

The Anatomy of a Spin-Off

GUILLERMO NOVO
PRESIDENT & CHIEF EXECUTIVE OFFICER
VERSUM MATERIALS, INC.



We recently celebrated our first year as an independent public company. We were hidden within Air Products, an industrial gases company, and most of the investors in Air Products did not know anything about our business. Air Products management was not comfortable discussing any problems associated with the business, often leaning on the crutch of cyclicality. Our share price has appreciated ~71% since the spin-off. We believe that our success is a function of our business model which has embraced the concentration in our cost structure while diversifying our portfolio of products.

For historical context, Air Products was under activist pressure and a new CEO was brought in to change the strategy and culture. The Materials Technologies segment had two components, Performance Materials and Electronic Materials. Industrials Gases is a very asset intensive business with local distribution hubs. Our business is about products and technology on a global scale. We were about 70% of the R&D costs at Air Products and a business that corporate management never expressed any real interest in. All of the inbound capital was spent on the industrial gases business, even though Electronic Materials was much more profitable.

The priority for Air Products was to maximize shareholder value for Air Products shareholders. We pursued a dual path process, but our low tax base would require a high price if sold in order to be more attractive than a spin-off. The Materials team focused on running the business and executing the separation from Air Products. Air Products corporate focused on the sale. As the head of the business, I had to focus on both as I had to run the business, but also work with qualified potential buyers. In March 2016 we announced that half of the business that we were going to spin-off would be instead sold to Evonik for $3.8 billion. We then pivoted to marketing a "Pure Play Electronic Materials" business.

Among the multiple tasks that I had to focus on during this process, managing our people was absolutely critical. The company had historically been very stable and announcing this kind of ownership change created a lot of agitation. As a lot of our business is in Europe and Asia, I had to travel all over the world assuring customers and employees that we were committed to the business. As a management team, we decided to divide and conquer, separating business activities (delivering results, positioning, etc.) from administration activities (governance, system/processes, controls, cost structures, etc.).

The sale process was particularly challenging for me. We kept the process very quiet as word leaking out would have been very harmful towards our efforts to keep people motivated. After the actual announcement of the sale, I had to keep the Performance Materials business performing. Being on the acquired side of the process in my past roles was particularly helpful for me as I communicated the benefits of the deal to the employees.

Finally, I had never been at the forefront of investor relations. This was an industry that no one knew about and a business that was hidden in the Air Products portfolio. Building confidence in our ability to run the business as well building relationships with the investment community was a considerable effort.

M&A and Financial Trends – The Death of Conventional Wisdom

PETER YOUNG
PRESIDENT AND MANAGING DIRECTOR
YOUNG & PARTNERS

The best investment banking advice and execution comes from hiring highly skilled senior bankers who have extensive experience, directly manage projects rather than delegating management to less experienced staff, have no conflicts of interest, have extensive industry knowledge, and are armed with the right information about what is actually going on in the market. The combination of an experienced senior banker working with bad information will often result in bad advice and a negative outcome.

For this reason, as head of Young & Partners, for the past 21 plus years (and during my tenure as the head of chemicals at three major firms), I have directed internal teams that have conducted highly precise and proprietary R&D on the financial markets, M&A activity and financing.

The following are some of today's conventional wisdom opinions in the investment banking community, what our analyses indicate that can be very different, and the implications of these differences for management.

A Few Conventional Wisdom Views of Others

- The M&A market is hitting historic highs this year on all fronts
- It is a sellers' M&A market and valuations are exceptionally high, making it a good time to sell and paramount that one bids high in order to win
- Private equity firms are well funded and are major players in the M&A market as buyers, so backing them or including many of them as potential buyers when you are selling is critical
- IPOs are a viable, attractive liquidity alternative for private equity and corporate owners, making IPOs an important alternative to consider and dual track divestitures (simultaneous sale and IPO tracks to create a "competitive environment") a viable option

Young & Partners' View of Reality

- The M&A market is strong this year, but the number of deals is flat to down compared to a few years ago. The closing of just three mega deals (ChemChina/Syngenta, Sherwin Williams/Valspar, and Dow/DuPont) has driven the total dollar amount through the third quarter to historic highs. However, without those couple of mega deals, the dollar volume has been solid, but not spectacular.
- The chemical M&A market is not at high valuations across the board. It is actually a collection of many market segments moving in different directions. It is a seller's market in specialty chemicals with high valuations and volumes, but it is quite the opposite in commodity chemicals. The Asian market is also following a different drum beat, with unusually high levels of activity and heavy consolidation, particularly in China.
- Private equity firms are well funded and can still borrow at low interest rates, but they are struggling to complete M&A deals and have been struggling for a number of years. Reluctant to acquire Asian or commodity chemical companies, they are left to the specialty chemical market in the West competing against strategics.
- On the selling side, private equity firms have no problems selling pure play specialty businesses to strategic and sometimes to financial buyers for great prices, but they are struggling to sell commodity and combination businesses. Many divestitures by private equity firms are to other private equity firms.
- IPOs are not easy to do in the West and rarely attractive. Since the challenging Covestro IPO in 2015, there were no Western chemical company IPOs until this past quarter when PQ and Venator both went public. However, both were challenging to execute.
- There have been a high number of IPOs in the last two years, but they have been dominated by Asian companies and, for the most part, by Chinese companies in what is an overheated Chinese stock market. Almost all are very small.

- However, there have been a few spin-offs recently, spurred by their tax advantages, weak IPO market and the high public market valuations. But a spin-off is not a sale for cash or shares of the buyer.

M&A Trends –Through Third Quarter 2017

- The M&A market in dollar terms increased from the 2012 trough to the 2015 peak, from $22 billion in 2012, to $31 billion in 2013, $49 billion in 2014, and $65 billion in 2015.
- All of that changed in 2016. The pace slowed considerably and only $42 billion worth of deals were completed.
- This changed dramatically in 2017 as $149.0 billion worth of deals have closed in the First Three Quarters of 2017. This surge was driven by three mega deals (>$5 billion), Dow/Dupont, ChemChina/Syngenta, and Sherwin Williams/Valspar. Those three alone were $113.6 billion. Without them, the total would be $35.4 billion, a slightly higher pace versus 2016.
- In terms of number of deals, the First Three Quarters were flat compared to last year, with 67 deals completed (89 on an annualized basis) compared to 95 deals for all of 2016.
- In terms of the location of M&A targets, Asia/ROW dominated in the First Three Quarters, accounting for 46.3% of deals completed worldwide. This dominance has been true for the last few years.
- Many of the Asian deals are consolidation transactions in China as the Chinese government has encouraged mergers to reduce the number of competitors. But if Asian targets are 46.3% of the market, that means that all of the rest of the world is squeezed into the remaining 53.7%.
- Life has certainly become difficult for private equity firms trying to buy chemical businesses. In the first three quarters they only represented 6.0% of the number of acquisitions and 2.9% of the dollar volume.
- Commodity and specialty chemicals have been on very different M&A cycles. Specialties are hot and commodities are not.
- Looking forward, the value of deals announced but not closed as of September 30, 2017 was massive at $153.2 billion (37 deals, but it has come down significantly from $272.3 billion as of the end of 2016). The Bayer/Monsanto, Huntsman/Clariant, Praxair/Linde, and Potash/Agrium deals are a few examples.
- The Huntsman/Clariant deal was terminated in late October under pressure from Clariant shareholders. The others are moving forward, but are under heavy anti-trust review.
- Clearly not all of these announced deals will close. None are expected to close by the end of the year.

Equity Financing Trends – Through Third Quarter 2017

- The chemical equity issuance market was fairly weak in dollar terms in the First Three Quarters of 2017, but strong in terms of numbers of offerings.
- $11.6 billion of equity was issued from 68 offerings. This compares to $23.8 billion of equity issued in 2016 as a result of 71 equity offerings.
- The totals continue to be dominated by Asian companies issuing in the Asian public markets for both IPOs and secondary offerings.
- In terms of IPOs, we have already passed the record number of IPOs for a year that was set last year when 25 IPOs were completed, all by Asian companies.
- 35 IPOs have been completed just in the First Three Quarters of 2017 alone. Almost all were Asian companies and have been very small. As a result, the total dollar volume was only $3.5 billion.
- However, in the third quarter there were two western chemical IPOs, PQ and Venator Materials PLC.
- There has been a long drought with regard to western IPOs. These were the first western chemical IPOs since the Covestro IPO in 2015.
- Both IPOs were challenging to execute.

Implications for Management

- It is important that you challenge what investment bankers say is true about the M&A and financial markets/valuations and be suspicious of advice that would tend to create more investment banking activity and fees.
- Insist on the combination of very senior advice from investment bankers who have extensive experience are willing to personally run your project and also have highly accurate data on what is happening that is accurate, consistent and strategic.

- Be wary of those who tell you that selling a commodity business now will result in a high valuation, that including a large number of private equity firms as potential buyers if you are selling a specialty chemical business makes sense, that the size of the non-Asian M&A market is large and robust, and that pursuing an IPO if you are not in China or a dual track sale/IPO makes sense.

The Outlook for the Chemical Industry

ROB WESTERVELT
EDITOR IN CHIEF
IHS CHEMICAL WEEK

IHS Markit is projecting 3.2% Real Global GDP growth for 2018 and that the global economic expansion has staying power.

North America investment and production in base chemicals is accelerating and will continue to do so until 2020. A lot of this supply will exceed domestic demand requirements and will have to be exported. Ethane remains a very competitive feedstock, supporting further North American investment. Nearly 13 million metric tons of ethylene will be added by 2022, mostly in the Gulf Coast.

Organic investment is declining amid energy uncertainty. This is particularly true in the Middle East and China. It is possible that companies are diverting investment dollars towards acquisitions because targeted M&A can provide producers with the opportunity to grow capacity and margins through cost savings and growth synergies.

Eurozone economic sentiment is at a 16-year high. The Eurozone economy is expected to grow at 2.4% this year and 2.1% in 2019. Dow, Borealis, Ineos and LyondellBasell are all considering Greenfield investments there.

Growth in China is decelerating, but is still a key market driver. Growth in China in 2017 should be ~6.8%, 2018 should be ~6.5% and 2019 should be ~6.2%. China has moved away from the broad growth model. There are government mandates around the reduction of energy consumption and stricter emission controls. This is benefitting the larger state-owned enterprises and small and mid-sized businesses are struggling to keep up with new standards.

The Outlook for the Chemical Industry

JOSEPH CHANG
GLOBAL EDITOR
ICIS CHEMICAL BUSINESS

The Global Manufacturing Purchasing Managers Index has accelerated significantly in the past few months. China, while still positive, has been a laggard. There was a synchronized global economic recovery, with both Brazil and Russia coming out of their recessions in 2016.

Hurricane Harvey had a massive impact on production in the Gulf Coast. ~47% of ethylene capacity in the United States was shut down. However, most of the operations were back online by October. There was a spike in petrochemical pricing due to Harvey that is having global ripple effects. The last major hurricane, Rita, resulted in a two year gap between actual pricing and normalized pricing.

The election of President Trump has seen the withdrawal from the Trans-Pacific Partnership, and tariffs on imports of softwood lumber, Bombardier jets from Canada and Chinese aluminum foil. On the other hand, we have not seen a trade war with China, a withdrawal from NAFTA nor tariffs on imports of steel, aluminum sheet or solar panels. The US chemical industry is a significant net exporter, particularly to Latin America.

There is a large amount of polyethylene capacity projected to come online through 2019. Most of this will be exported as the US market cannot absorb the additional supply. The shale gas revolution has made margins very attractive for US polyethylene manufacturers.

Most of the coal/methanol-to-olefins polyethylene capacity that was being built in China has been delayed to after 2020, primarily due to environmental concerns and lower capital returns. We see China's polyethylene deficit increasing through 2025. China's crackdown on air pollution has resulted in a number of chemical plants being shut down, which is causing some markets to tighten. If China's air quality goals are not met, the government could increase the scope of production capacity shutdowns.

There are very few propylene projects being considered as the capital costs to build in the US are not competitive with the rest of the world. The spread between propylene and propane has narrowed significantly since 2014. The spread between polypropylene and propylene has also shrunk. China is nearing self-sufficiency in polypropylene.

EBITDA margins of major US polyolefins manufacturers peaked in 2014 due to the effect of shale gas. Margins have come off since then, but are still strong. In cyclical business, the question is how sustainable are these margins will be. Because of the peak in 2014, the share prices of the companies involved fell significantly in 2014 after the crude oil price drop. But they are now approaching all-time highs.

The Outlook for the Chemical Industry

PETER YOUNG
PRESIDENT AND MANAGING DIRECTOR
YOUNG & PARTNERS

Economic/Financial

- We believe that the future is strong for the chemical industry as a whole, but there are risks to the industry that are economic, political and geopolitical.
- There are a number of very reasonable scenarios for what will happen in an uncertain Trump, Populist, Nationalist, ISIS, North Korea, China world. But the range is wide.
- The scenarios range from trade wars coupled potentially with military escalation or war to a steady, but slow economic growth environment with painful, but manageable geopolitical events and skirmishes.
- We believe that, barring a significant downturn in the global economic/financial environment, the chemical industry will have a stable 2018.
- Growth will continue to be hard to come by and certain specific markets will continue to suffer where there is a sector specific weakness (oil industry and certain emerging markets, for example), but overall demand and capacity utilization will be steady.
- Even though there is significant excess capacity in China, capacity utilization has been reasonable elsewhere. However, there will be a period of overcapacity in ethylene and ethylene derivatives in the U.S. in 2018 as many of the new and expanded plants come on stream, but that will not last forever and some plants are being postponed or cancelled.

Stock Market

- The stock market has been favoring the chemical industry due to the industry's strong earnings fundamentals and, as a result, the industry has been trading at a premium to the overall market. However, their relative valuation has weakened recently.
- It is unclear where the industry valuation is heading given the overall uncertainty and volatility in the economic and financial markets.
- The U.S. equity markets have performed well, particularly after the Presidential election results, but the European and emerging markets have had mixed results.
- In the near-term, the global equity markets will continue to be unpredictable, driven by the long list of economic, financial and geopolitical stresses.
- However, over time we believe that on a global equity basis the flow of funds trend will continue to drive investors to the U.S. and partially the European equity markets as long as the alternative investments continue to be less attractive.
- If there is a significant downturn in the global economic and financial conditions and/or additional increases in interest rates, we would expect the earnings and the valuations of industrial companies, including chemicals, to suffer.

M&A

- Assuming no significant weakening of the global economic/financial environment, Young & Partners believes that the number of deals in 2018 will be similar to slightly down compared to 2017, but the dollar volume has and will jump significantly, driven by the completion of a small number of mega deals.
- Asia will continue to dominate with regard to the location of businesses sold.
- In specialty chemicals, valuations and deal volumes will continue to be strong in 2018. In contrast, commodity chemical M&A valuations and deal volumes will continue to be soft.
- Overall, the need to grow, pressure to consolidate, and the availability of cash will continue to be the M&A driver for strategic buyers.

Debt Financing

- Investor demand for investment grade debt has been very strong and will continue to be strong.
- But volume will be driven heavily by issuer needs rather than investor demand, with M&A related financing driving volume. The announced mega deals that use debt may help to offset the loss of last year's refinancing driven volume.
- High yield debt issuance will continue to be healthy, but modest. Higher interest rates are having an effect on bond fund returns.

Equity Financing

- The recent surge in equity issuance has been driven by Asian issuers. Otherwise, equity financing volume would be modest given the market's historic bias against the chemical sector and the chemical sector's limited need for equity capital.
- Equity issuance, both secondary and IPO related, will continue to be dominated by Asian issuers. We expect that there will continue to be a strong number of IPOs, but they will be almost entirely Asian and very small. However, there has been a recent weakening of the Chinese IPO and equity markets that may not last long.
- Chinese and other Asian companies will continue to seek liquidity and funding on the Asian stock market exchanges. Western IPOs will continue to be dormant.

The Global Chemical Industry Market and Supply Outlook

ADRIAN BEALE

VICE PRESIDENT, SPECIALTY CHEMICALS
IHS MARKIT LTD.

IHS sees the chemical industry value chain comprising of Base Chemicals, Chemical Intermediates and Formulated Products/Performance Materials.

The US economy in on a solid growth path with the US Federal Reserve leading central banks in raising interest rates. Consumer spending continues to drive US economic growth supported by rising employment, real incomes, and household wealth.

We expect the crude oil markets to return to surplus in 2018. High pricing will encourage increased incremental production particularly in the US. OPEC will likely continue to restrict its output through the end of 2018. There is no shortage of geopolitical risks to oil supplies. We expect that oil will be back to $100/barrel by 2027. Lower service sector costs and improvements in project design, builds and operation have lowered the breakeven oil prices needed to justify new projects since 2014. Nigeria, Libya and the United States have increased oil production since 2016, while OPEC and Russia have decreased.

Chemical demand is projected to grow slightly higher than GDP. Historically, demand has grown higher than GDP but as chemical markets mature, the spread narrows. Chemical investment drivers for a sustainable competitive advantage include securing energy & feedstock advantage, leveraging of current technology to build world-scale, investing with proximity to local markets and/or access to trade routes and building to leverage an upstream and/or downstream integrated position. The cyclical nature of profitability in petrochemical markets is mostly driven by “surprises” in energy markets, economic contractions/stimulus and alignment of new capacity with fundamental demand growth.

The worldwide market for consumption of specialty chemicals was ~$556 billion in 2016. Nutraceutical Ingredients, while not a large sector, is the fastest growing sector within specialty chemicals. Electronic chemicals is one of the largest markets and is growing nicely. Paper chemicals and Printing Inks are markets experiencing anemic growth. On a regional basis, North America, Western Europe and Japan have very high consumption of specialty chemicals per capita, whereas China’s consumption is relatively low indicating significant room to grow. China, while growing rapidly, lacks the expertise in specialty chemicals. As a result, two trends have emerged with Western company investment in China and Chinese acquisition of Western companies.

The Geopolitical Crisis in North Asia – Are We Heading For War?

DENNIS WILDER

ASSISTANT PROFESSOR
GEORGETOWN UNIVERSITY

When President Obama turned over the presidency to President Trump, he told him his biggest problem was not going to be the deficit, congress or fake news. It was going to be North Korea. He implicitly admitted that he and past presidents had tried and failed to stop North Korea from nuclear proliferation. The leader of North Korea is hell bent on creating a nuclear tipped inter-continental ballistic missile (ICBM) force that can strike targets like New York or Washington D.C.

There are four countries in the world that could strike the United States with an ICBM, the United Kingdom, France, China and Russia. We have de-targeting agreements with the Russians and Chinese. The UK and France are not of concern. North Korea is the only country close to this capability and control is a challenge.

On May 14, 2017, the HS-12 intermediate-range ballistic missile (IRBM) was launched in a test flight. This is not a modern missile by US standards. As it was unclear how the US and Japan would react, the missile was lofted straight up in the air to a distance that shows if it had traveled at a normal trajectory it could have hit Guam. This range is misleading as the weight of a real nuclear weapon versus that of this test launch would limit how far the missile could travel.

On July 4, 2017, the HS-14 (ICBM class weapon) test flight took place. The nose-cone design of this missile was indicative of its capacity to house a thermo-nuclear weapon. This missile was also lofted straight up in the air.

On November 28, 2017, another test flight was conducted and the missile was lofted even higher than the previous test. This missile, without any weaponized package, could hit Washington D.C. However, North Korea has yet to prove that they have perfected the technology required to allow the missile to withstand the pressures of travelling that far and maintaining detonation capability.

The motivation behind these tests revolves around North Korea's desire for leverage as a nuclear power in international relations. Since Kim Jong-un has come to power, he has sunk a South Korean submarine, brutally executed his uncle and assassinated his half-brother using VX nerve agent. These actions are indicative of Kim Jong-un's goal to reunite the Korean peninsula under his control.

The administration has shifted to a strategy of "maximum pressure." If enough countries put enough pressure on North Korea, Kim Jong-un will have to choose between survival of his regime and nuclear proliferation. If we cannot get Kim to negotiate, military options include taking out his nuclear capability with tomahawk missiles, a pre-emptive strike similar to the Shayrat missile strike in April 2017 or, if his location could be pinpointed, he could be targeted personally. However, all of these options pose a massive risk to South Korea as North Korea has the capacity to level Seoul with the artillery weapons they have placed along the border. Another option is deterrence and containment, in which our missile defense capabilities are developed to neutralize any threat from North Korea. However, the reliability of this option has not been tested in the real world. Furthermore, this option would not necessarily protect the Japanese and South Koreans who might choose to develop nuclear capability themselves as a defense measure.

The GDP per person at purchasing-power parity in North Korea is abysmal. His people are going to have access to the media surrounding the Winter Olympics in PyeongChang while living in abject poverty. The best solution to stability on the Korean Peninsula may be revolution in North Korea.