

THE OLIVER WYMAN

RISK JOURNAL

PERSPECTIVES ON THE RISKS THAT WILL
DETERMINE YOUR COMPANY'S FUTURE

INTRODUCTION

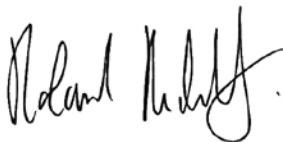
Risk management lies at the heart of Oliver Wyman. We have a long history of encouraging our clients to raise risk management needs to the top of their strategic agenda. In today's volatile environment, risk management is no longer something that companies can treat as a support function that is nice to have. Instead, good risk management practices need to be integrated into all of the key decision-making processes in companies and ultimately must determine the shape of their business models.

The 3rd edition of the *Oliver Wyman Risk Journal* brings together our latest thinking by exploring both the macro trends and the micro topics which are driving business performance. Five years after the Lehman crisis, we are seeing signs that the developed world has begun to regain confidence. Now, however, it is the emerging markets that seem vulnerable as they come to the end of a protracted period of growth fueled in large part by cheap money from the West. Meanwhile, new challenges and opportunities in the global economy are being driven by North America's shift from its role as a major importer of energy products to an exporter of cheap natural gas.

Our report starts with a discussion of the emerging risks that form the backdrop to this new risk management landscape. We then probe how our clients are reshaping their business models in reaction to some of these trends. Next, we take a look at some of the topical issues in risk management and what companies are doing tactically to react to short-term challenges. Finally, we examine how these developments are redefining entire industries, ranging from the oil and gas sector to consumer products.

In each article, our authors offer practical advice on how companies can cope with risks that are rewriting the rules for businesses. Our goal is to inform and to provoke a re-examination of how your organization can manage risks to become even more strategically and commercially successful.

We hope you enjoy reading these perspectives and that this publication sparks an ongoing and vigorous debate around these themes.



Roland Rechtsteiner
Head of Oil & Gas Practice



Barrie Wilkinson
Co-Head of the Finance & Risk Practice
in Europe, Middle East, and Africa



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WHEN RISKS COLLIDE

MORE FREQUENT “100-YEAR STORMS” AND RISING FISCAL DEFICITS THREATEN FUTURE GLOBAL PROSPERITY

JOHN DRZIK

Business leaders, together with political leaders and scientists, must give priority to addressing climate change-related risks

Two storms – environmental and economic – are on a collision course. The world’s exposure to natural catastrophes is rising, but our ability to deal with these shocks is decreasing because of the weakened fiscal positions of many governments. (See Exhibit 1 on pages 6 and 7.)

Economic losses from severe weather events worldwide have soared to \$1.4 trillion in the past 10 years, up from \$387 billion in the 1980s, according to the World Economic Forum’s *Global Risks 2013* report. More frequent “100-year” storms due to climate change are one reason these costs are climbing. The migration of people to disaster-prone areas is compounding the problem. More than 1 billion people live in low-lying coastal areas, especially in Asia. In England, new construction in the Thames Gateway flood plain accounts for 11 percent of overall new construction. In the United States, the population of hurricane-prone Florida has jumped six-fold over the past 60 years.

The portion of natural disaster relief costs shouldered by cash-strapped governments and international agencies has also been escalating. When Hurricane Diane struck New Jersey in 1955, government bore only 6 percent of the repair costs. By contrast, government picked up 69 percent of the aid required in 2008 when Hurricane Ike ripped from Texas through the eastern Midwest to Canada, according to Wharton’s Risk Management and Decision Processes Center. People increasingly expect governments to supply financial aid in an extreme weather event, creating a huge unfunded liability for society as more people migrate to disaster-prone areas.

Unfortunately, the weak fiscal position and significant debt burden of many countries means that they will be less and less able

to respond to growing disaster relief costs, or to make the infrastructure investments needed to help mitigate environmental risks. There are many sources of pressure on government budgets. Each time our scarce financial resources are allocated to manage one set of pressures, our resilience for countering the next one is depleted – much like a weakened immune system. As a result, the fiscal weakness of the public sector is amplifying environmental risks as well as other vulnerabilities.

The percentage of natural disaster relief costs paid by the United States government has increased by 11.5 times since 1955

What can be done? Business leaders, together with political leaders and scientists, must give priority to addressing climate change-related risks. Here are three ideas for meeting the challenge:

1. CREATE MORE SUSTAINABLE PUBLIC SECTOR PROGRAMS FOR DISASTER RELIEF

Governments underwrite the risk of natural catastrophes, much as insurance companies do. They should draw on the full set of tools available in the private sector to build a more disciplined approach to risk management and risk financing. Improved quantification of natural catastrophe risks would help governments develop targeted counterincentives to discourage people from moving into disaster-prone areas and to determine whether sufficient funds have been allocated to match existing

exposures. Disaster relief programs could become more sustainable by charging individuals accurate actuarial rates for government insurance or at a minimum by being more transparent about the budget implications of implicit disaster relief promises. The focus on long-term funding will likely stimulate the creation of pooling mechanisms that better balance natural catastrophe risks between the government and the private insurance markets.

2. DESIGN PUBLIC/PRIVATE SOLUTIONS FOR STRATEGIC INFRASTRUCTURE INVESTMENT

A lot of private sector money is sitting on the sidelines. For example, less than 1 percent of pension funds' \$71 trillion in assets globally is allocated directly to infrastructure investments. Public and private stakeholders must collaborate on solutions that enable countries to marshal resources for critical infrastructure to respond to disasters before they strike and to coordinate assistance quickly at the point of shock by better sharing the risks involved. A recent Marsh & McLennan Companies survey of senior infrastructure industry leaders showed that 60 percent believe there is sufficient cash available to invest in environmentally-sound infrastructure. The trouble: the lack of transparent models to guide sustainable infrastructure financing and development.

3. SHARPEN PRIVATE-SECTOR FOCUS ON THE BROADER RISKS OF EXTREME WEATHER EVENTS

Most companies use insurance to mitigate the cost of property damage caused by natural catastrophes. They should also consider the wider strategic and operational implications of more frequent natural catastrophes – for example, the benefits of supply chain diversification. Many players in the global technology industry are still reeling from massive cutbacks in semiconductor production after the hurricane and earthquakes in Japan and Thailand. Locations for major operational centers should be carefully considered to balance the cost savings from concentrating operations with the benefits of limiting the risk of business interruption by spreading operations across geographic regions.

Just as with health issues, the sooner colliding risks are addressed, the easier and less expensive it is to prevent their dangerous repercussions. We should get started now.

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John Drzik is the CEO of the Oliver Wyman Group, a subsidiary of Marsh & McLennan Companies, which contributed to the World Economic Forum's *Global Risks 2013* report.
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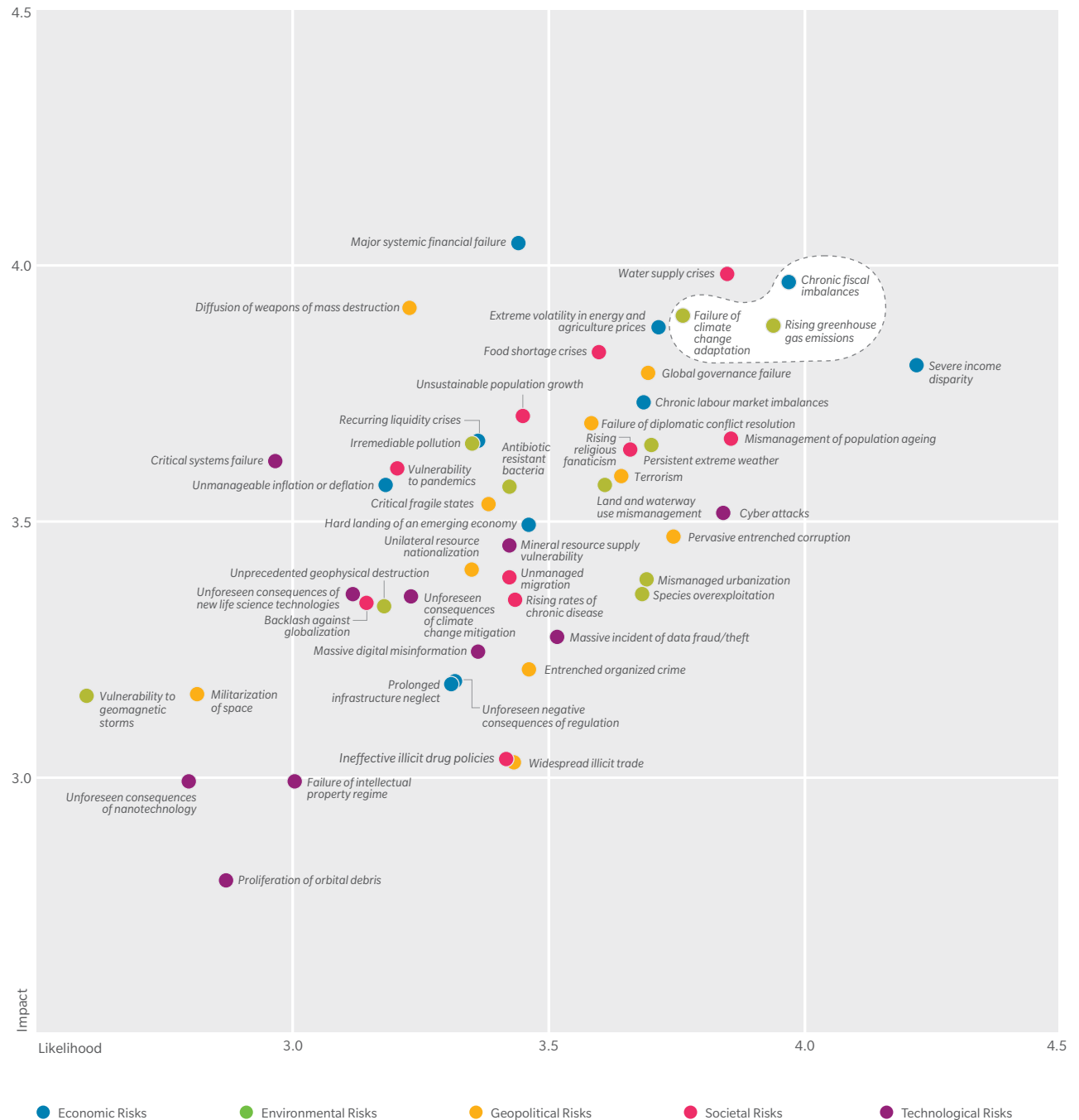


EXHIBIT 1: GLOBAL RISKS LANDSCAPE 2013

THE POTENTIAL IMPACT AND LIKELIHOOD OF GLOBAL RISKS OVER THE NEXT TEN YEARS

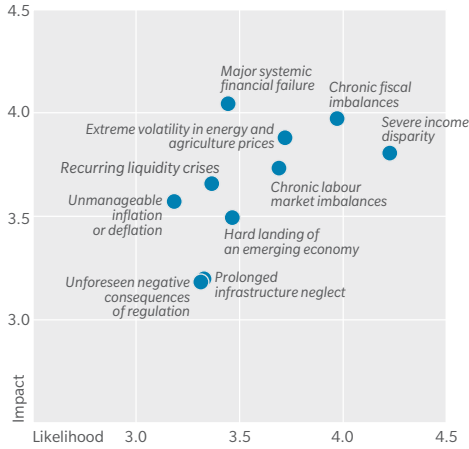
For the *Global Risks 2013* report (published by the World Economic Forum in collaboration with a group of four partner organizations, including Oliver Wyman), 1,006 respondents were asked to gauge the likelihood and potential impact of 50 risks on a scale of one to five. These pages summarize the results.

On the left, the full gamut of risks. Note that respondents think chronic fiscal imbalances, rising greenhouse gas emissions, and a failure of climate change adaptation stand out from the crowd.

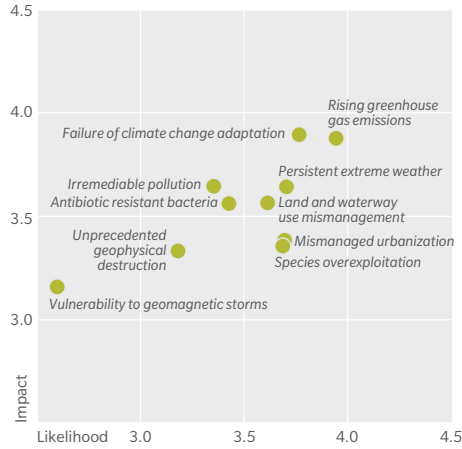


GLOBAL RISKS BY CATEGORY

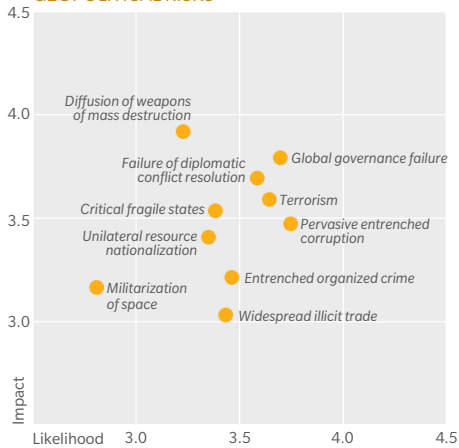
ECONOMIC RISKS



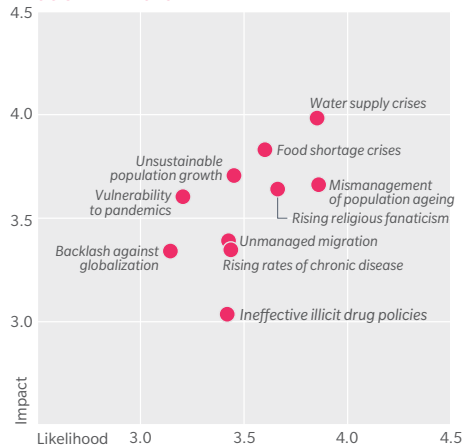
ENVIRONMENTAL RISKS



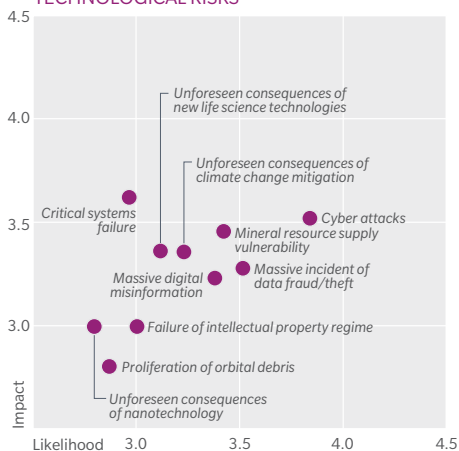
GEOPOLITICAL RISKS



SOCIETAL RISKS



TECHNOLOGICAL RISKS



Source: Global Risks 2013: Eighth edition, World Economic Forum and partners, including Oliver Wyman





THE FINANCIAL CRISIS OF 2015

BACK TO THE FUTURE

BARRIE WILKINSON

In 2011 at the World Economic Forum in Davos, Oliver Wyman published *The Financial Crisis of 2015: An Avoidable History*. This report contained a six-page “virtual history,” which described a potential crisis scenario that might unfold over the coming four years. The report was viewed as contrarian. Many voices at the 2011 Davos event were already claiming that the financial crisis was behind us and that the sovereign debt crisis would be confined to a small number of peripheral countries.

Our report called on banks to make more extensive use of scenario analysis and stress testing in addition to statistical modeling techniques – the scenario in our report being one such scenario they should consider.

We are now more than halfway through the scenario’s projected period, so we thought it might be interesting to compare it with actual events and to update it, given what we know today.

The scenario was based on three interrelated trends:

1. Increased risks flowing into the shadow banking sector as a result of the regulatory squeeze on banks

The Eurozone banking system has retrenched and the assets of the shadow banking system have grown by \$6 trillion to fill the void left behind by the banks

2. The formation of a commodity bubble that pops when the Chinese economy slows
3. An expansion of the sovereign debt crisis to include larger Western sovereigns as well as some commodity-rich emerging market economies

Finally, our scenario described how loose monetary policy, low interest rates, and quantitative easing (QE) would amplify the scale of the risks caused by the three trends, leading to larger losses when policymakers eventually were forced to start tightening again (the dreaded QExit).

Below, we look at each of these areas in turn: what we said, what has happened since, and what may happen next.

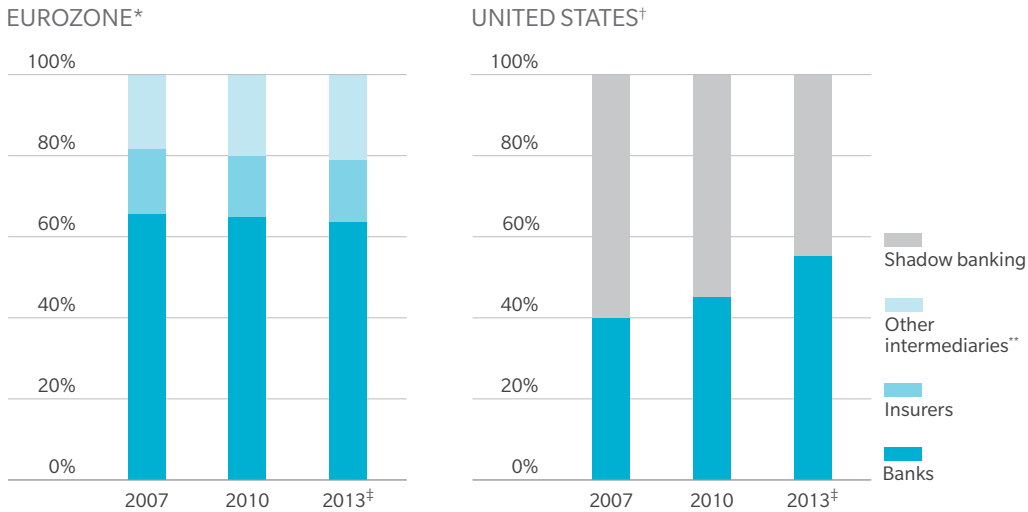
SHADOW BANKING

WHAT WE SAID

“Talent began shifting into the shadow banking sector. During the low interest rate environment, ... investors were desperate for alternative investments with additional yield. Assets under management in the shadow banking sector grew rapidly. ... New types of specialist loan funds disintermediated the highly regulated banking sector by matching

borrowers and investors directly. These funds tapped into the long-term liquidity pools of pension funds and insurance companies. ... Credit discipline was poor. Even at this early stage, the pattern was familiar, but regulators did not intervene. Because the asset flows were global and did not have banks at their center, no single regulatory body felt responsible.”

EXHIBIT 1: EVOLUTION OF SHADOW BANKING PRE- AND POST-CRISIS



Source: Oliver Wyman analysis

* Money market funds have been excluded from the Oliver Wyman definition of shadow banking on the basis that they have low tolerance for taking credit risk and maturity mismatch

† Estimates based on bank liabilities and net shadow banking liabilities. MMFs excluded due to their limited risk appetite

‡ 2013 estimate extrapolated from 2012 data

**“Other intermediaries” are aggregates prepared specifically for the study of shadow banking

WHAT HAS HAPPENED SINCE

The evolution of shadow banking has taken on very different forms in the Eurozone and the United States during recent times. In line with our predictions, the Eurozone banking system has retrenched and the assets of the shadow banking system have grown from \$20 trillion to \$26 trillion to fill the void left behind by the banks. In the United States, however, the banking system has actually continued to grow and has taken market share from the shadow banking system, with the shadow banks having shrunk to \$12 trillion, from \$15 trillion.

One possible explanation of these contrasting dynamics is the fact that the US banking system was properly re-capitalized after the crisis in response to government-led stress tests, whereas the Eurozone policy makers have focused more

on targeting capital-to-risk-weighted-assets ratios without forcing banks to raise physical capital. The latter approach naturally leads banks to shed assets since raising capital is unpopular with shareholders.

WHAT HAPPENS NEXT?

There are several new initiatives underway in Europe which may at some point lead to an improved capital situation for European banks. There are plans for a banking union and a new supervisory mandate for the European Central Bank. The ECB has also launched an asset quality review to look at the overall health of bank balance sheets. More broadly, any assessment of bank capital adequacy should take into account the fact that we will at some point see a reversal of loose monetary policy conditions, which could lead to further impairment of



bank loan and bond portfolios. If the banks in Europe remain poorly capitalized and tightly regulated, then the shadow banking

system will continue to take share from the banks, and this could create systemic threats that go unregulated.

COMMODITIES BUBBLE

WHAT WE SAID

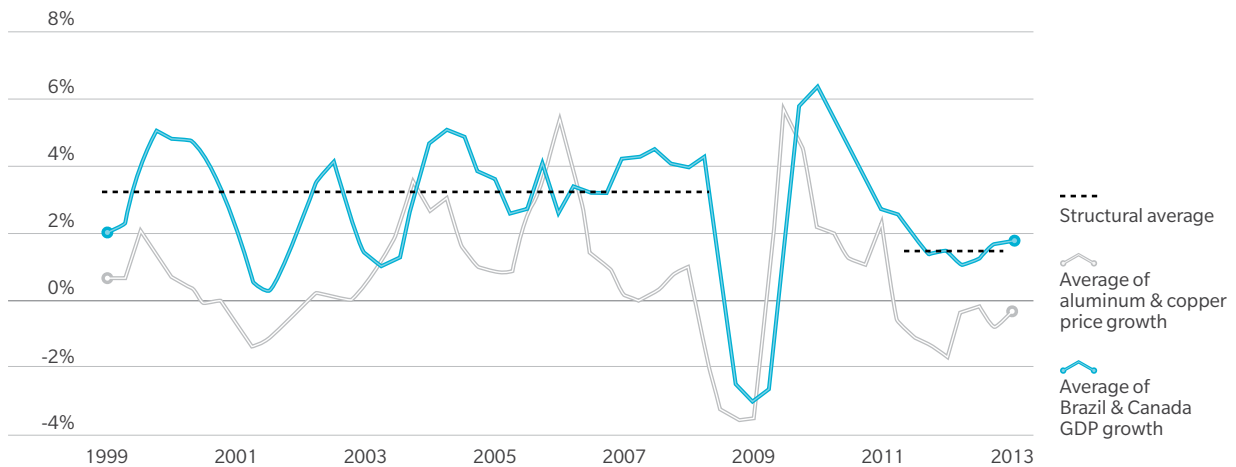
“Commodities prices had acted as a sponge to soak up the excess global money supply, and commodity-rich emerging economies such as Brazil and Russia were the main beneficiaries. High commodity prices created strong incentives for these emerging economies to launch expensive development projects to dig more commodities out of the ground, creating a massive oversupply of commodities relative to the demand coming from the real economy ... the governments of commodity-rich economies started spending beyond their means ... Once the Chinese economy began to slow, investors quickly realized that the demand for

commodities was unsustainable. Combined with the massive oversupply that had built up during the boom, this led to a collapse of commodity prices. Having borrowed to finance expensive development projects, the commodity-rich countries in Latin America and Africa and some of the world’s leading mining companies were suddenly the focus of a new debt crisis ...”

WHAT HAS HAPPENED SINCE

Our prediction of a boom in commodities prices followed by a subsequent collapse has played out. As predicted, slowing growth in China has proven to be the main trigger for the recent price collapse,

EXHIBIT 2: SELECT COMMODITY PRICES (1999-2013)



Source: Oxford Economics – Quarterly year-on-year real GDP growth; Datastream – Quarterly year-on-year base metal price growth (standardized to same scale)

combined with recent worries about the advent of tighter monetary policy conditions. As our models predicted, the GDP growth of commodity-producing countries has reacted badly to the slump in commodity prices. Below, we show how the average of the GDP growth rates of Brazil and Canada has closely followed the fall in average aluminum and copper prices with a time lag of one quarter.

WHAT HAPPENS NEXT?

According to our report, the natural next step following the bursting of the commodity bubble will be big problems for any countries that have become reliant on the continued growth of commodity prices. As our chart shows, the recent poor performance of commodity prices means that Brazil and Canada can expect GDP

growth of 1.5 percent and below for the foreseeable future. This will come as a big shock to these countries, which had become accustomed to growth in the range of 3 to 6 percent. The post-crisis rebound for these economies proved to be short-lived, and these countries will now need to go through some major structural adjustments. In terms of direct impact, recent riots in South Africa, for example, are the direct result of nonviable mines being shut down; more broadly, civil unrest is spreading across these commodity-rich nations. Thankfully, none of these commodity-based economies have begun to contract yet. However, experience shows that there is no such thing as a soft landing for commodity-rich economies when the commodity cycle turns. So the worst is probably still to come. Medium and long-term creditors of these nations should beware.

SOVEREIGN DEBT

WHAT WE SAID

“The final phase of the crisis saw the US, UK, and European debt mountains emerge as the ultimate source of global systemic risk ... Their high debts, combined with increasing refinancing costs, made it apparent that the debt burden of many developed world sovereigns was unserviceable. It was judgment day for sovereigns. Those sovereigns that were highly indebted and needed to roll over large amounts of short-term debt were forced to either restructure their debts or accept bailout money from other healthier sovereigns. The final irony in the tale was that the large sovereign exposures that the banking system had built up as a result of the new liquidity buffer requirements left

the banking system, once again, sitting on the edge of the abyss.”

WHAT HAS HAPPENED SINCE

The above was perhaps our most pessimistic prediction, and in the near term, the risk of a major sovereign default looks remote. Sovereign risk in the Eurozone did flare up for a couple of years after we wrote our report, but several mitigating factors have since been put in place with the advent of the Long-Term Refinancing Operation (LTRO) facility from the ECB, the recent move to bail-in rather than bail-out bank creditors, and the improved understanding of banks' capital needs derived from stress testing initiatives (some of which Oliver Wyman has led).

WHAT MIGHT HAPPEN NEXT?

While the near-term risk of default for major sovereigns has subsided, the debt burden of the world’s largest sovereigns will continue to create a major drag on global economic growth as governments continue to tighten their belts.

Meanwhile, the debt of many large nations continues to expand to very high levels, and with yields now starting to rise, the cost of refinancing this debt may become unsustainable. As the recent problems in Portugal have demonstrated, the Eurozone troubles can resurface again, and new threats continue to arise due to political upheaval in emerging markets, as characterized by the recent events in Egypt. The other ticking time bomb is the balance sheets of the major central banks which have stepped in to take over the role of financial intermediation and maturity transformation, as the markets continue to lack faith in the ability of commercial banks to play these roles. The assets of central banks now consist of trillions of dollars of long-term high-risk bonds,

If the banks in Europe remain poorly capitalized and tightly regulated, a growing shadow banking system could create systemic threats

while their liabilities are in large part dominated by overnight deposits. At the same time, their capital levels are wafer thin. These balance sheets are therefore not unlike the structured investment vehicles (SIV) that exploded spectacularly during the subprime crisis as asset prices collapsed and short-term investors fled.

The asset purchases and loans extended by central banks during the crisis may ultimately lead to credit losses, damaging their capital bases. Central banks are of course in a unique position to recapitalize themselves by monetizing their losses. But this does not always lead to a favorable outcome.

WHAT NEXT?

As the following article (see page 14) from *The Wall Street Journal* suggests, scenario analysis and stress testing need to be dynamic. While the scenario outlined in our 2011 report has hopefully stimulated some thought during the past few years, it is important to note that prudent risk management requires the analysis of a wide suite of stress scenarios. More importantly, new scenarios need to be

created and tested over time as new threats arise. There is no place for complacency or rigid thinking in risk management. Financial markets have no master.

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Barrie Wilkinson is a partner and co-head of Oliver Wyman’s Finance & Risk practice in Europe, Middle East, and Africa.
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THE FED'S STRESS TESTS ADD RISK TO THE FINANCIAL SYSTEM

BANKS HAVE A POWERFUL INCENTIVE TO GET THE RESULTS THE FED WANTS AND IGNORE OTHER POTENTIAL DANGERS

TIL SCHUERMANN

On March 14, after the markets closed, the 29 banks that hold about three-quarters of US banking assets waited to hear if they passed or failed the Federal Reserve's annual stress tests. The results seemed reassuring. The Fed gave a passing grade to 14 and a failing grade to two, required two others to address some additional weakness by later this year, and didn't disclose its conclusions about the 11 smaller institutions.

Stress-testing got us out of the financial crisis in May 2009, and it has since become the crisis-management tool of choice in the banking industry. But how well is it serving the country?

One unquestionably positive result is that banks have built up the capabilities to see how they would fare through different crisis scenarios. They must consider a mind-bending array of outcomes and have enough capital to deal with them – from what might happen to checking accounts and mortgages, to all those loans to develop shopping malls, to the derivatives that grease the global financial system. Bank regulators now can develop their own views of those questions and, more important, of the answers given by the banks.

This is a sea change. Regulators are always at an informational disadvantage – they don't underwrite loans or structure derivatives, they just try to check up on them. Before 2009, the only advantage a supervisor had was the ability to see across all banks, comparing the answers and methodologies for reaching them. But there is no substitute for building your own models and coming to your own view. That is what the 2009 stress test did.

Since that first stress test, the financial ecosystem has seen an explosion of statistical and economic modeling. This is a positive development. I've done economic and financial modeling for two decades, including designing the Fed's quantitative assessment architecture for stress testing, which is the basis for the central bank's current process (the Comprehensive Capital Analysis and Review). Stress-testing has led to innovative thinking about risk assessment.

But there is another side to this. As the Fed's models have become more and more important in deciding the fate of the biggest banks, those banks have focused more and more on trying to mimic the Fed's results rather than tracing out their own risk profiles. This poses a real risk.

Remember that in late 2008 the largest US bank holding companies were all adequately capitalized by regulatory standards. The market had a different view: Most were trading at less than book value.

It was only by trying something new, and by disclosing enough details so the market could "check the math," that bank supervisors were able to regain the confidence of the public, and for the public to regain confidence in the banking system. Yet this "something new" – the formal stress-testing so important for the guardians of the financial system – is now inhibiting innovation among those that need guarding.

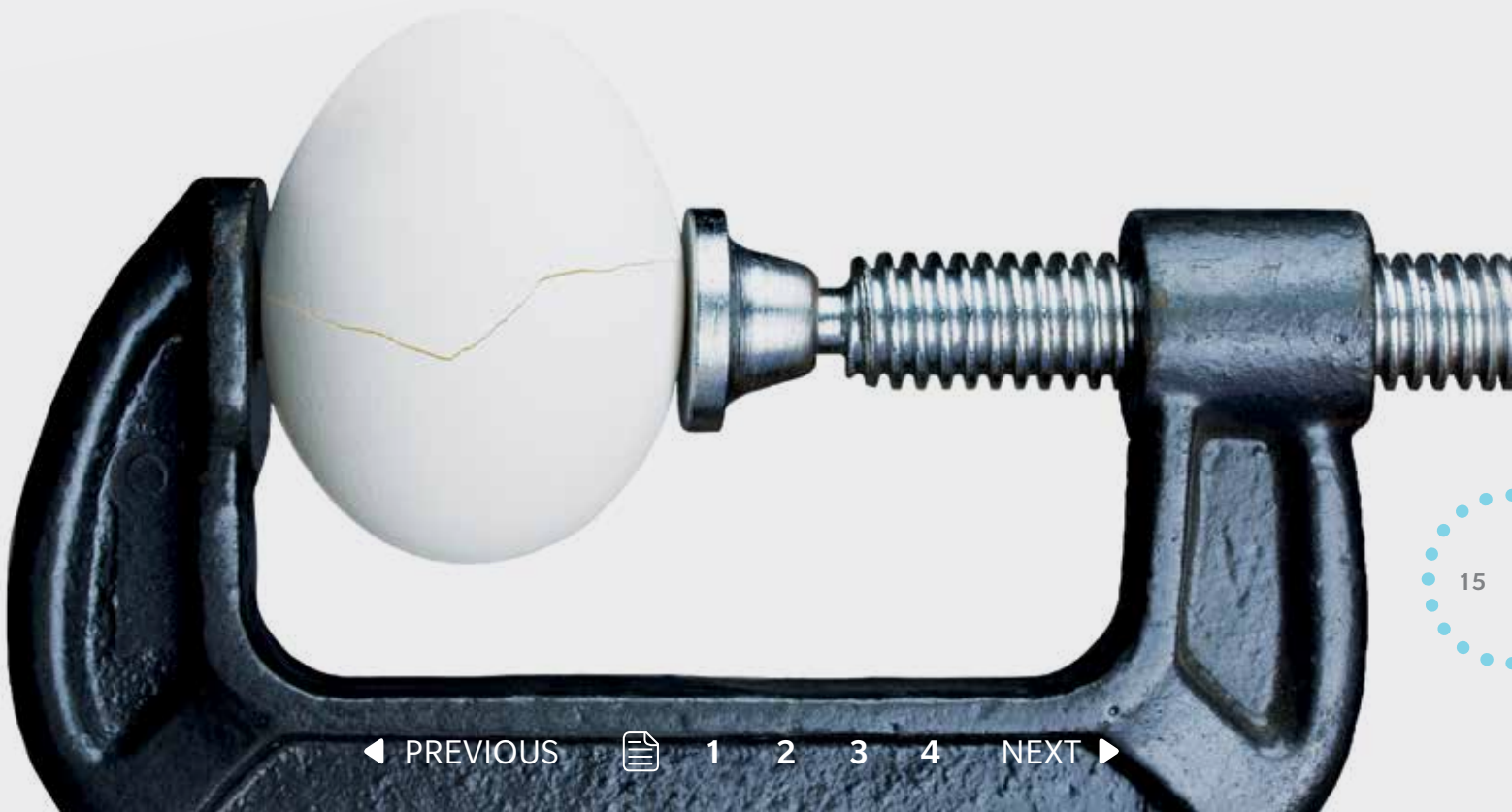
The incentives to get close to the Fed’s numbers are powerful enough to stifle genuine creativity, imagination and innovation by risk managers and their modelers. Deviating from standard industry practice is now increasingly viewed with suspicion and often discouraged by bank regulators.

I understand this suspicion from my own days at the Fed: The modeling machinery built for the first stress test was in no small part designed to have an independent view on the output of “innovative” but dangerously flawed bank risk models, such as those for mortgage losses. But if everybody uses the same scenario (which they do) and works hard to get the same numbers (and they are trying), then we have a very narrowly specialized risk machine that is inflexible and unresponsive to unexpected shocks. That is, shocks that weren’t previously subject to a stress-test.

The danger is that the financial system and its regulators are moving to a narrow risk-model gene pool that is highly vulnerable to the next financial virus. By discouraging innovation in risk models, we risk sowing the seeds of our next systemic crisis.

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Til Schuermann, a former senior vice president at the Federal Reserve Bank of New York, is a partner in Oliver Wyman’s Financial Services practice.
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SUSTAINABLE POLICIES FOR SUSTAINABLE ENERGY

COUNTRIES NEED SECURE,
AFFORDABLE, AND CLEAN ENERGY

JOHN DRZIK

Sustainable energy needs sustainable policy. By 2030, the United Nations hopes there will be universal access to modern energy services, a doubling of the share of renewable energy sources in the global energy mix, and a doubling of the global rate of improvement in energy efficiency. These are ambitious goals. But few, if any, countries have figured out how to establish the policies and regulations that will foster truly sustainable energy systems that can provide the secure, affordable, and sustainable energy that these goals will require.

Research conducted by the World Energy Council with Oliver Wyman shows that most countries focus on just one of the three dimensions of an energy trilemma that exists at the heart of sustainable energy systems. Nearly half (59) of 129 countries ranked by the World Energy Council/Oliver Wyman Energy Sustainability Index are within the top 25 countries of the world on one dimension, indicating the degree to which their energy is either secure, affordable, or environmentally sustainable. But only 14 countries perform strongly across two of these dimensions. Only five are leaders across all three. (See the world's top 25 sustainable energy systems on page 20.)

Policymakers face a challenge in trying to form policies that will improve their countries' performance across all three of these dimensions, especially since no form of energy is strong on all three. Fossil fuels continue to beat renewable forms of energy in terms of both affordability and reliability. Solar and wind power are much cleaner, but still operate intermittently and continue to be more expensive than conventional energy.

RECONCILING CONFLICTING AGENDAS

As a result, policymakers struggle to reconcile the often conflicting agendas of the energy trilemma in deciding which forms of energy development and usage to encourage. Energy sustainability targets can also conflict with economic growth goals, complicating the policy development process. Further, radical change in energy supply, such as that unleashed by the technological revolution underway in horizontal drilling, threatens governments' commitment to sustainable energy.

These various challenges are shifting energy policies in ways that have been hard to predict. The resulting uncertainty around energy policy has created a logjam, slowing investment in developing new energy sources, updating aging infrastructure, and building the new plants and networks necessary for a sustainable energy system.

Accelerating the transition to a more sustainable energy infrastructure requires action from both policymakers and energy industry executives. Each is dependent on the other to move forward. Policymakers are looking to the energy industry and institutional investors to take the risks necessary to develop the technology and infrastructure for sustainable energy systems. Meanwhile, energy executives and investors need policymakers to come up with coherent and predictable policies and regulations that justify the significant investments required.

The result of this logjam: energy systems around the world are under significant strain, the demand/supply gap is growing, billions of people could be forced to live without reliable electricity, and economic growth could be put in jeopardy. Today, 1.3 billion people live without access to electricity. This number of people could increase, since global demand for energy is expected to rise by as much as 30 percent over the next two decades, according to the International Energy Agency.

So how do we ensure that the world's energy systems become more sustainable?

The first step is for policymakers to internalize that "sustainable" energy policy should be effective across a wide spectrum of possible futures. Just as we have seen from the pressure exerted by the discovery of massive amounts of relatively inexpensive hydrocarbons in North America, policy needs to be robust across potential changes in the landscape – such as a more plentiful supply of inexpensive fossil fuels (that will challenge the commitment to more expensive clean energy sources) or a prolonged period of economic stagnation. Policymakers and industry leaders should test policy proposals prior to their adoption for their ability to work toward energy sustainability goals across all three dimensions and a variety of possible futures.

ESTABLISHING CONSISTENT GOALS

This does not mean energy policies need to be static in the face of significant changes. However, it is important for the goals of policy to be consistent and for policy evolution to be predictable, in order to encourage the long-term investments required by investors. Predictable energy policies with respect to taxes, subsidies, public/private investment partnerships, and market support

mechanisms (such as "green banks") will help to provide a clearer picture of risks and returns and encourage industry participants and financial investors to make the long-term investments which are required.

At the same time, policymakers also need to increase the consistency of sustainable energy goals, policies, and priorities across all government departments. Developing sustainable energy systems involves policies not just for the energy sector, but also for transportation, industry, and the environment – almost every aspect of a country's economy. Energy companies and institutional investors need to be assured that if a country's energy department encourages them to invest, that their assets will not be stranded after a change in transportation policy or environmental regulation.

Finally, political and business leaders need to work more closely with scientists to accelerate research on the development of additional clean energy technologies and practices by encouraging more information sharing globally. Research should also be shared on behavioral responses to energy policy changes. History shows that changes which lead to higher energy efficiency result over time in higher energy usage – a rebound effect which offsets the potential gains from actions to increase energy efficiency.

1.3 billion

The number of people who have no access to electricity

For example, after major car companies introduced more energy efficient vehicles in California, driving distance increased, offsetting the savings from fuel efficiency.

A fuller understanding of how and why the rebound effect varies across countries could help all policymakers weigh their choices more effectively.

CONCLUSION

Developing sustainable energy systems is a long-term proposition. Energy systems are made up of many highly interconnected and interdependent parts, most of which have lives measured in decades. After many years of focusing policy on one dimension of the energy trilemma of providing affordable, secure, and environmentally-sensitive energy, it's very difficult to switch and address the other dimensions. So, it's important to set a course now which is sensitive to all three dimensions.

With clearly defined, sustainable energy policies, countries will be able to attract the investments and technologies necessary to realize sustainable energy systems. Without them, they may remain locked into systems that will be expensive, and painful, to correct later.

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John Drzik is CEO of the Oliver Wyman Group. This piece is adapted from a piece first presented at the World Energy Council's World Energy Congress in Daegu, South Korea.
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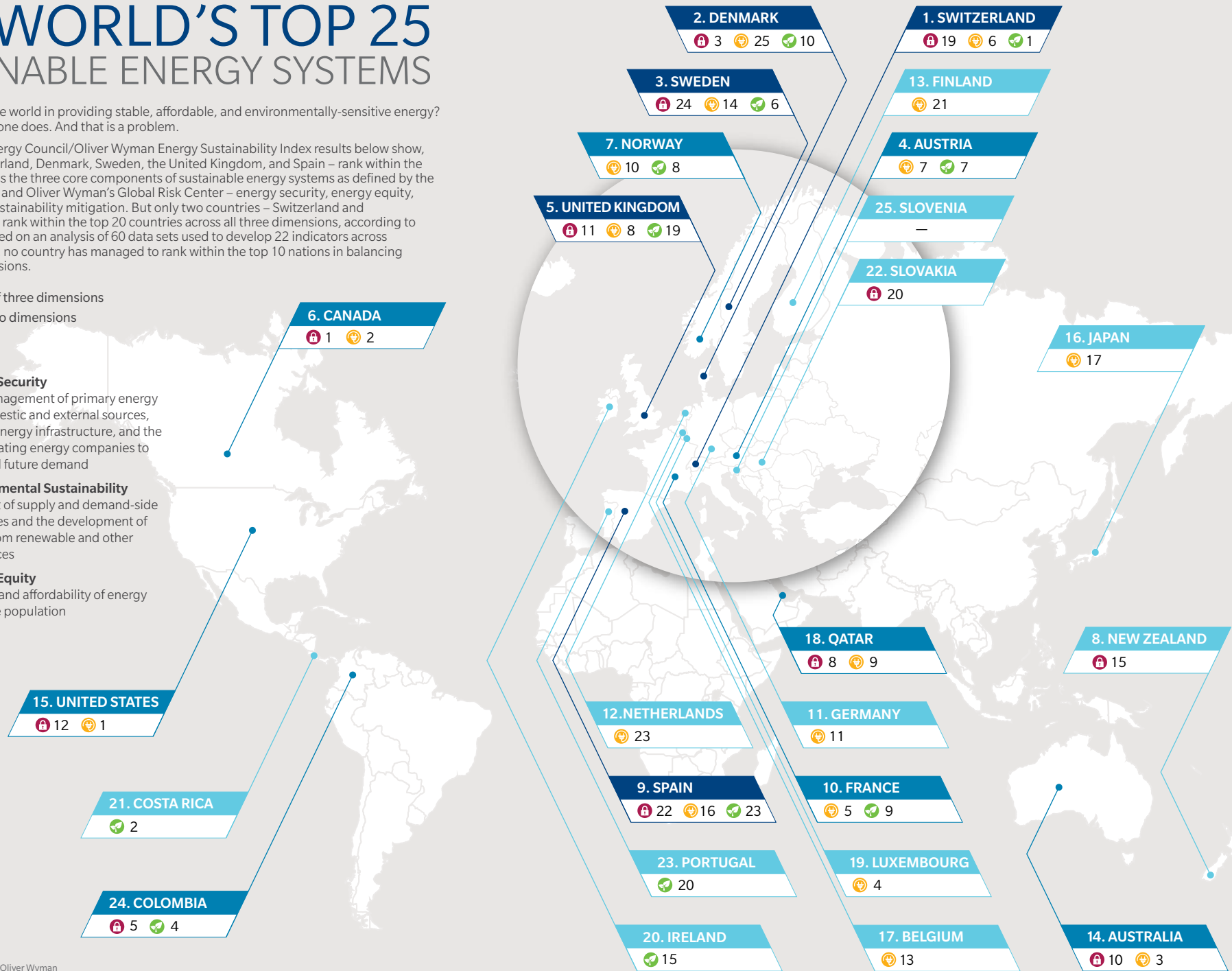
THE WORLD'S TOP 25 SUSTAINABLE ENERGY SYSTEMS

What country leads the world in providing stable, affordable, and environmentally-sensitive energy? The answer is that no one does. And that is a problem.

As the 2013 World Energy Council/Oliver Wyman Energy Sustainability Index results below show, five countries – Switzerland, Denmark, Sweden, the United Kingdom, and Spain – rank within the top 25 countries across the three core components of sustainable energy systems as defined by the World Energy Council and Oliver Wyman's Global Risk Center – energy security, energy equity, and environmental sustainability mitigation. But only two countries – Switzerland and the United Kingdom – rank within the top 20 countries across all three dimensions, according to the index which is based on an analysis of 60 data sets used to develop 22 indicators across 129 countries. To date, no country has managed to rank within the top 10 nations in balancing across all three dimensions.

- Leader in each of three dimensions
- Leader across two dimensions
- Top 25

- 🔒 **Top 25: Energy Security**
The effective management of primary energy supply from domestic and external sources, the reliability of energy infrastructure, and the ability of participating energy companies to meet current and future demand
- 🌱 **Top 25: Environmental Sustainability**
The achievement of supply and demand-side energy efficiencies and the development of energy supply from renewable and other low-carbon sources
- 💰 **Top 25: Energy Equity**
The accessibility and affordability of energy supply across the population



Source: World Energy Council/Oliver Wyman



GETTING THINGS DONE

HOW GOVERNMENTS CAN DELIVER
PUBLIC INFRASTRUCTURE PROJECTS
ON TIME AND WITHIN BUDGET

ALEXANDER FRANKE
ALEX WITTENBERG

One of the greatest potential threats to global prosperity is a lack of critical infrastructure for transportation, energy, and water and the rapid deterioration of much of what is currently in place. In both emerging and developed economies, public authorities are spending more than \$1 trillion worldwide on repairing and building new roads, ports, power grids, and other facilities that are vital to their countries' economic growth and productivity. The Organisation for Economic Co-operation and Development (OECD) estimates that countries must annually invest nearly three times this amount to close a growing gap between existing infrastructure and rapidly escalating demand.

Due to their scale, cost, and economic impact, publicly funded infrastructure

projects attract a high level of attention and scrutiny, with much of the debate often colored by political considerations. Meanwhile, cost overruns and delays have become so commonplace in publicly funded projects that they are considered a given, with the public bearing the increased burden of mismanagement.

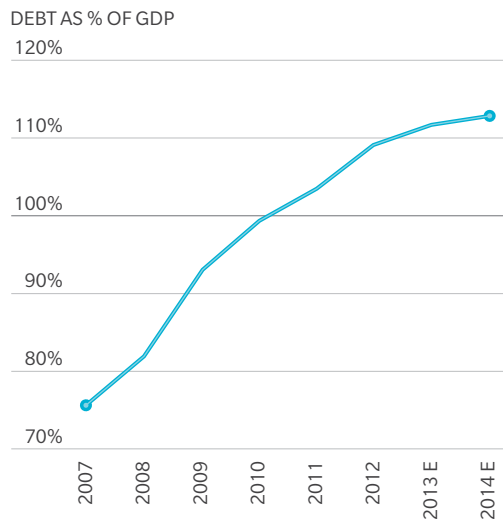
Consider: The opening of Berlin's international airport originally scheduled for October 2011 has been delayed four times at a cost of \$52.5 million every month. Sweden's Hallandsas Tunnel is not expected to be completed until 2015 – nearly two decades behind schedule. In India, about half of the country's 566 current major infrastructure projects have been set back, according to a recent report to Parliament.

EXHIBIT 1: GROWING INFRASTRUCTURE NEEDS AND FISCAL DEFICITS

THE WORLD NEEDS \$53 TRILLION OF INFRASTRUCTURE ...



... BUT RISING FISCAL DEFICITS ARE FORCING MANY PUBLIC AUTHORITIES TO WEIGH COMPETING PRIORITIES



Sources: EM-DAT, The OFDA/CRED International Disaster Database, Université catholique de Louvain – Brussels – Belgium, OECD Economic Outlook No. 92 (database)

DELAYED PROJECTS

There is a significant risk that even more publicly funded projects will fall behind, be canceled, or not even start, as countries' fiscal positions weaken and their debt burdens grow. Against a backdrop of sluggish and uneven economic growth, officials are being forced to scrutinize their public infrastructure budgets more closely and prioritize competing capital demands. (See Exhibit 1.) Otherwise, they risk confronting considerable political consequences. For example, former Ontario premier Dalton McGuinty recently resigned after making a controversial decision to terminate construction of two gas plants at a cost of \$558 million. He had been Ontario's premier for nine years.

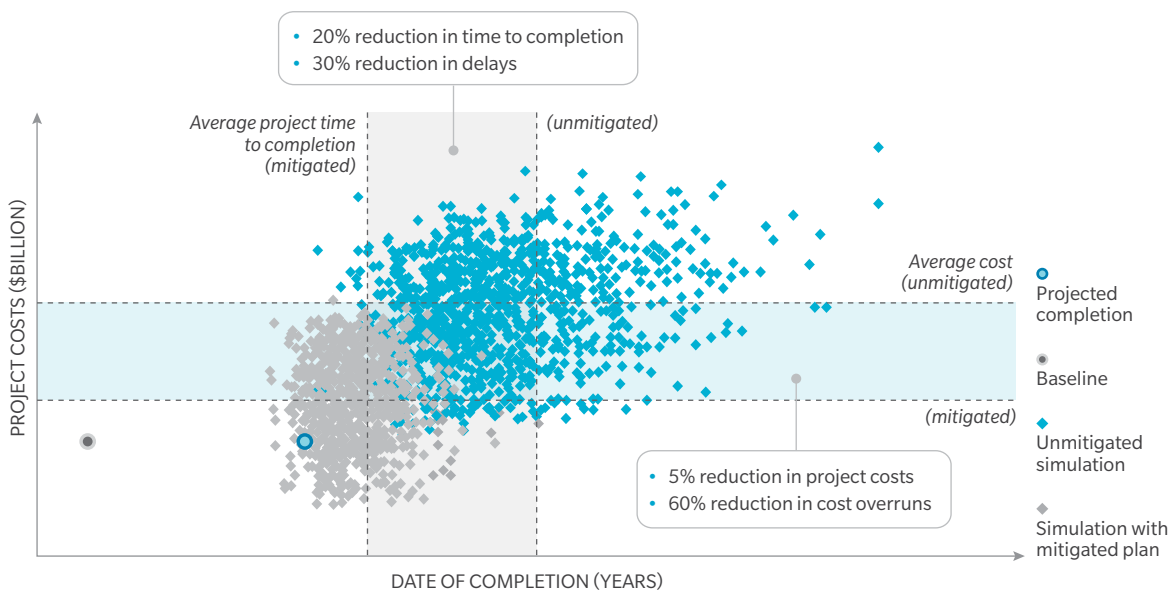
Add to this increased political trepidation over taking on the uncertainty and

responsibility associated with large, complex capital projects, and much of the necessary work may simply go undone.

So if the overriding objective of investing in infrastructure projects is to facilitate increased economic prosperity, then public authorities need to adopt a different approach.

In our experience, public authorities can reduce their project delays by as much as 40 percent by shifting their focus and resources from political considerations to operational and governance requirements. (See Exhibit 2.) The investment required to formulate these operational improvements is often less than a single percentage point of overall project costs, resulting in a return of more than 20 times in savings if combined with appropriate risk mitigation efforts.

EXHIBIT 2: FOCUSED MITIGATION EFFORTS CAN REDUCE A PROJECT'S COMPLETION TIME AND COSTS SUBSTANTIALLY



Source: Oliver Wyman analysis

If public authorities spend more time objectively examining the long-term economic benefits and operational challenges of key projects, they will discover a wealth of possibilities that are often overlooked by policymakers, but are well known in the private sector (which annually spends nearly twice as much as public authorities on large capital investment projects). To deliver infrastructure projects

on budget and on time, public authorities need to create an environment that prioritizes long-term success over short-term cost, provides access to experienced talent, defines upfront performance metrics, and offers sufficient oversight.

We examine three steps that public authorities can take to achieve this.

CREATE IN-HOUSE PROJECT AND RISK MANAGEMENT CAPABILITIES

The most immediate challenge public authorities face when seeking to conduct risk assessments and ongoing risk management for large projects is a lack of the necessary capabilities within their ranks. The management of large-scale projects is usually not the primary role of the individual ministry, department, or agency. As a result, limited institutional expertise is created over time. Where this knowledge does exist, it is often lost through changes in political leadership, migration of human capital to the private sector, or changes within the bureaucracy.

This problem is further exacerbated by the fact that many officials have limited exposure to the latest project and risk management techniques and tools, which can produce increasingly timely, accurate, and dynamic financial and quantitative analyses. Or, when these capabilities do exist, they are typically distributed throughout different teams that work in silos and do not regularly communicate with one another.

As a result, public authorities often turn to external advisers for specific risk support,

often at significant cost, and receive limited training or development. Instead, they receive only a static report, often to simply satisfy compliance requirements. Few of these advisers ever attempt to transfer the knowledge and tools that could enable public agencies to develop their own capabilities over the long term, applied to a myriad of projects.

Public authorities should demand more. Once the external adviser's contract expires, managers at the public authority often find it challenging to implement the necessary ongoing work. Efforts fall behind. Or they are abandoned. Or worse, the project continues, but relies on outdated assumptions, analysis, and assessment of market conditions.

GET MORE OUT OF EXTERNAL ADVISERS

Instead, capability building needs to be treated as an essential component of an effective risk management process. A public authority's staff must be able to fully deploy project risk assessments independently and continue overseeing

risk management efforts that can extend for months and years after the external advisers have long departed.

The first step in building this capability is to create a risk management team composed of representatives drawn from different functional areas across the public authority. This team should reflect the most relevant capabilities that already exist within the organization, and not just the engineering or technical group responsible for operational execution. Next, the risk management team should work side-by-side with the external adviser in executing a risk assessment for a major project, empowering each member of the public authority's team to deliver some portion of the final output. The goal is to deliver a joint product while ensuring effective knowledge transfer.

Working closely with a cross-functional team on risk and project management issues unlocks access to all parts of the organization. It breaks down silos and gives all team members insight and visibility into issues that are often outside of their immediate purview. This collaboration, between a diverse group of internal experts,

\$3 trillion
The amount that public authorities worldwide must spend annually on repairing and building new roads, ports, power grids, and other facilities vital to their countries' economic growth and productivity

combined with external risk management expertise, results in a more effective and thorough assessment process.

Through "learning by doing," the public authority can discover if it has the necessary capabilities to conduct future risk assessments and execute risk management activities for the projects it oversees. It can also pick up methods to include key risk considerations in other processes, such as tendering contracts or transferring risk to third parties.

QUANTIFY PROJECT COSTS AND VALUE

A significant challenge for public authorities is the ability to quantify the impact of key risks to a project's schedule and costs, and to link that information to overall economic benefit expectations. Public authorities are often able to articulate high-level, key qualitative project risks and create a detailed technical risk register (often actually completed by the project engineer). But they have a limited understanding of the impact these risks may have on

project costs and time. More important, they often overlook the dynamic nature of the interconnections between these risks and changes in the underlying economic assumptions of the project itself.

It is essential for public authorities to conduct a detailed risk analysis linking engineering plans to risks to a project's financials in order to prioritize the top risks and develop effective risk

mitigation strategies. A few common risks such as errors in project design or cost planning, unavailable construction equipment, volatile commodity prices, and contractor delivery failures can drive the majority of a project's risk exposure.

IDENTIFY TOP RISKS

Public authorities can identify top risks by benchmarking risk drivers with those of similar public or private sector projects and by simulating or stress-testing the specifics of the project at hand. By conducting these exercises, public authorities gain clear visibility into exposures to risks at key junctions of a project and the necessary

fact base for managers to develop cost-effective risk mitigation options.

Once project and public stakeholders agree upon the most important drivers of a project's value, it becomes much easier to determine, and execute, the actions necessary to mitigate the risks that potentially could have the greatest impact. Creating this consensus helps project owners to factually argue for the resources necessary to mitigate the most meaningful risks. If clearly defined potential challenges can be identified early on in a project rather than waiting until the occurrence of a disruptive event, then stakeholders may be capable of responding in a more effective and thoughtful manner.

ESTABLISH A CLEAR RISK GOVERNANCE FRAMEWORK

The governance of a public sector infrastructure project must be approached differently than a private sector project. This is primarily because of the need to satisfy the public's need for information by reducing complex technical issues and decisions to clear, concise, and digestible messages. Transparency and consistent, ongoing communication are crucial to success from a project's inception to its commissioning.

A well-defined governance framework can help to ensure that the established requirements for continuous value transparency, risk mitigation, and public disclosure are being delivered. It institutionalizes risk management principles and practices, providing an organized approach to communicating uncertainties and mitigation strategies in any public infrastructure project.

Governance efforts should also go beyond individual projects and be applied to a public authority's overall portfolio of capital spending. By applying the same tools and capabilities to all infrastructure initiatives, a public authority may anticipate reaping the financial and political benefits associated with consistently delivering on time and on budget. A successful track record will improve a public authority's ability to secure capital and support for important, long-term infrastructure investments, even as both fiscal budget constraints and public scrutiny continue to rise.

While there is no prescribed structure for risk governance, typically there are five core concepts to this type of framework, as shown in Exhibit 3 on page 29 and examined below.

1. A clearly defined authority-level risk governance framework: Most public authorities have a good sense of their mission and purpose, approval levels, and delegation of authority. But they often define their risk appetite and tolerances on an institutional, ministerial, or project level. Defining a risk appetite at the very top level of a public authority helps to improve project selection and risk mitigation priorities. It also supports communication of the necessary trade-offs between risks – which is essential to maintaining the public's trust.
2. Designated resources for risk management: Public authorities need to prioritize the management of uncertainty in large projects appropriately by committing the necessary human capital and technical resources to risk management. This typically involves deciding upon the structure of the risk management organization, its responsibilities, and its connection to project management teams.
3. Clear project-level governance and risk management processes: Public authorities need to establish a project-level risk management policy. Roles and responsibilities of cross-functional team members associated with the project need to be clearly defined, along with the timing of specific risk management activities in the context of the overall project schedule.
4. Continuous project risk assessment and quantification: Before significant investment capital is committed or political pronouncements are made, a detailed risk assessment and quantification should be developed to understand drivers of variability in outcome and to guide the project's fundamental design and tender process. Thoughtfully allocating risk within contracts at the outset can often be the simplest form of a risk mitigation strategy. Throughout the project, updating this initial assessment supports transparent and objective decision making at various stages: from tendering, to vendor selection, to operational delivery, to commissioning.
5. Integrated risk management processes: Risk management cannot reside solely within a public authority's corporate function. It needs to be institutionalized and part of a public authority's day-to-day processes and procedures. Risk should be an integral component of critical organizational processes such as strategic and business planning, budgeting and capital planning, tendering, contract management, and performance reporting.



DOING IT RIGHT

HOW A PUBLIC AUTHORITY IMPROVED ITS RISK MANAGEMENT CAPABILITIES

MARK PELLERIN

A government-owned infrastructure development company wanted to build the largest highway project in its history. But the board of directors of the public authority became concerned when the project began to suffer from delays.

To gain a clearer picture of the project’s risk exposure, the public authority conducted a comprehensive risk assessment of the highway project. Officials worked alongside an external adviser to identify and analyze all of the risks involved and to determine and evaluate various mitigation options.

At the same time, the public authority seized the opportunity to significantly enhance its risk management capabilities. First, it created a cross-functional working group of mid- to senior-level executives. This group participated in tutorials and training workshops provided by the external adviser on various risk topics, from assessment and quantification and modeling to mitigation. Then they conducted a risk assessment for another large project with limited guidance from their adviser.

To help build risk awareness throughout the organization, the external adviser next presented the group’s findings and assessment to the board. The public authority also implemented a framework for risk management and governance to guide and institutionalize the risk management principles and practices that it had learned from the experience.

As a result of these efforts, the public authority was able to reduce its project delays significantly. Just as important, a bench of four to six officials became proficient in project risk management. The public authority is now on its way to adopting a risk management and governance framework that will allow it to begin to integrate risk management into its regular day-to-day business operations.

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Mark Pellerin is a New York-based associate partner in Oliver Wyman’s Energy practice.
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EXHIBIT 3: PUBLIC INFRASTRUCTURE PROJECT RISK GOVERNANCE FRAMEWORK



PUBLIC AUTHORITY RISK GOVERNANCE

- Organization’s mission and goals
- Organization’s overall risk appetite
- Approval requirements for different projects and risks
- Delegation of authority levels for risk approval

REQUIRED RESOURCES AND INFRASTRUCTURE

- Risk management organization structure and reporting relationships
- Cross functional projects steering team
- Interface with key external stakeholders
- Key personnel and skills
- Key risk management tools

PROJECT LEVEL RISK MANAGEMENT

- Project level risk management policy
- Cross functional project management roles and responsibilities
- Role of feasibility study and risk assessment at large project onset
- Interface with external stakeholders

CONTINUOUS PROJECT RISK ASSESSMENT AND QUANTIFICATION

- Process for continuous project risk assessment and quantification
- Process for evaluation of risk mitigation options and execution
- Process for feeding dynamic project performance forecast into reporting

INTEGRATED RISK MANAGEMENT PROCESSES

- Annual strategic and business planning process
- Annual budgeting and capital planning process
- Tendering processes
- Contract management processes
- Performance reporting processes

CONCLUSION

Be it public utilities or transportation, infrastructure gaps threaten to curtail the economic development of many countries, states, and even local districts. Public authorities need to reduce chronic project delays and ballooning costs by developing their project and risk management capabilities, more precisely quantifying costs and economic value, and establishing clearer project governance and transparency frameworks.

None of this is easy. But in our experience, public authorities that tap the potential for improving the execution of infrastructure projects will significantly reduce delays and cost overruns. This allows officials to deliver infrastructure projects critical to the public and to spur economic growth.

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Alexander Franke is a Zurich-based partner in Oliver Wyman’s Energy practice.
Alex Wittenberg is a New York-based partner in Oliver Wyman’s Energy practice and head of the firm’s Global Risk Center.

RISING PUBLIC SCRUTINY OF INFRASTRUCTURE PROJECTS

RECENT PROTESTS IN BRAZIL

LARRY CRISTINI
JEFFERSON FINCH

Before Sao Paulo city tried to raise bus fares by 20 percent in June, Brazil’s president, Dilma Rousseff, enjoyed approval ratings above 70 percent. But in a few short weeks her popularity plummeted, causing pundits to question her chances for re-election in 2014, while some in her party called on former president Lula da Silva to return.

Rousseff’s troubles illustrate the complex political risks around infrastructure projects following Brazil’s demographic revolution, which has brought millions of people into the middle class over the past decade. This newly empowered group is demanding improved services at an affordable cost from government. But progress on unblocking traffic and delivering higher quality healthcare and education has been slow, and frustration has been boiling beneath the surface. This partially explains why protests broke out over a seemingly small fare increase. It also explains why protestors targeted expensive stadium projects designed in 12 cities in preparation for the 2014 World Cup, which is to be held in Brazil. The money could be better used elsewhere, say the protestors.

The Brazilian government is planning to hold more than 28 auctions to raise \$107 billion in investments for the concessions of a number of highways, railways, ports, and airports. Protests have raised the risks of delays to the country’s auction timetable for infrastructure concessions, since the government will need to do more to assure investors of their projects’ attractiveness. In reaction to some of the biggest protests in the country in two decades, a number of state and local authorities have canceled fare increases. Planned toll hikes also have been canceled on at least three federal highway concessions. The government is reworking contracts to protect companies from lost revenue, which is a positive if future auctions of concessions are to succeed, but the perceived risk has risen.



It will be difficult for the Rousseff administration to balance the needs of investors while limiting the costs to end users. But over the long term, the nature of the protestors’ demands means she will ultimately have to bite the bullet and offer more attractive terms to investors in order to expedite projects that will have a tangible impact on voters and ease the cost of doing business in Brazil. To do nothing is politically unacceptable.

There’s no turning back from investing in more infrastructure unless Brazil wishes to suffer from even lower GDP growth. In fact, Rousseff is counting on investment in the concessions having an impact on GDP growth by 2014, when she faces re-election.

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Larry Cristini is the New York-based director of corporate advisory services and **Jefferson Finch** is the New York-based analyst of Latin America at the Eurasia Group, a political risk consultant to Marsh & McLennan Companies. Oliver Wyman is a subsidiary of Marsh & McLennan Companies.

KNOW THYSELF

THE ART OF ENTERPRISE RISK MANAGEMENT

JAMIE PEARSON
ROLAND RECHTSTEINER
ALEX WITTENBERG

Companies need to adopt ERM frameworks that reflect their wide spectrum of goals and challenges

What would you think of a financial adviser who recommended a stock to you before asking about your personal investment goals? Or a banker who pitched a deal to you before even asking about your company's future plans?

Every company's risk profile is directly related to its specific ambitions. Yet, curiously, many companies often make the mistake of pursuing a standardized enterprise risk management framework, incorrectly assuming that one size fits all. This ERM methodology is typically driven by a company's industry or geography and the respective benchmarking or framework information available.

By following this tack, companies typically fail to discover the best course for managing risks that, if viewed differently, could significantly improve their financial performance. Or worse, they head down a compliance-driven path that is time-consuming and, in the end, adds minimal value to the bottom line.

The main reason that many companies concentrate their risk management efforts in the wrong area is that they often rely on a homogeneous check-the-box risk assessment framework designed in response to regional or industry-specific legislation that requires similar compliance regimens. But ERM is not meaningful if compliance is the driving objective.

For ERM to make a substantial difference, each company should adopt a framework that reflects its vastly different priorities and characteristics. For example, a startup in the technology industry grapples with different challenges than a storied software maker. In fact, from a risk management perspective, a software maker might have more in common with a consumer goods or chemical producer than with competitors in its own industry.

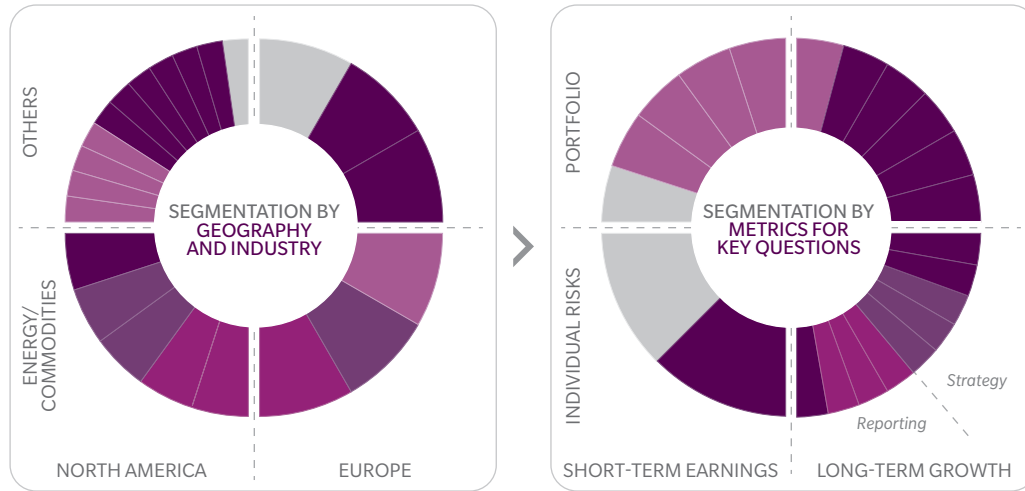
Similarly, a European energy company could best be served by implementing selected risk management applications across its enterprise: The firm could introduce ERM to improve its cash-flow modeling for more accurate forecasts, mitigate highly visible risks that are more damaging to the company's reputation, manage catastrophic risks that threaten its operations, or all of the above. (See Exhibit 1.)

ASKING THE RIGHT QUESTIONS

So how should a firm determine which ERM course is best? In our experience, companies should be asking themselves three key questions: First, is it more important to achieve short-term earnings targets or to drive long-term growth with long-term investments? Second, is the main concern individual risks that can bring down the company or the ability to manage the company's overall risk exposure? Third, what is the primary use for risk information in the company? Does it inform strategic decision making, key stakeholders, or compliance?

Management teams sometimes have difficulty reaching a consensus on these answers. But certain metrics can serve as valuable indicators. For example, most publicly owned companies with ERM focused on short-term earnings tend to have steady quarterly earnings growth of no more than 2 percent. Companies that are most concerned with managing individual risks consider regulatory and reputational risks a high priority. Meanwhile, companies with market valuations of more than \$10 billion are typically most interested in risk information that can inform their strategic decision making or, conversely, potentially bring their company down.

EXHIBIT 1: CHOOSING THE BEST ERM FRAMEWORK
 COMPANIES WITHIN THE SAME INDUSTRY OR GEOGRAPHY NEED TO ADOPT DIFFERENT ERM FRAMEWORKS BASED ON THEIR STRATEGIC CONSIDERATIONS



- Day-to-day management of identified high-impact risks
- Cash-flow modeling to provide highly accurate forecasts
- Mitigation of highly visible risks most damaging to the company's reputation
- Management of catastrophic risks to ensure continued operations
- Dynamic financial planning approach to support strategic decision making and growth

DETERMINING THE BEST ERM COURSE

Performing this analysis will give a company a clearer sense for which ERM methodology should be a focus. For example, a company most concerned about short-term earnings and individual risks might be better served by focusing on day-to-day cash-flow modeling.

By contrast, a company interested in long-term growth in line with its long-term investments should probably pay most attention to mitigating highly visible risks most damaging to the company's reputation, managing catastrophic risks, and reducing political and regulatory risks to ensure its continued operations.

CONCLUSION

Leading companies already recognize the importance of adopting risk management practices that better reflect their particular goals and challenges. This method is a more effective way for companies to evaluate which approach will unlock opportunities to increase their returns by better managing the risks across their entire enterprise, and strengthen their business models in the process.

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RISK IN THE C-SUITE

ALIGNING RISK COMMUNICATION BETWEEN THE BOARD AND MANAGEMENT

SCOTT GILBERT
BRUCE NOLOP

Developing a sustainable competitive advantage in an increasingly uncertain environment is arguably the most challenging issue facing businesses. Companies that can quickly assess if potential opportunities, adverse events, or a combination of both are in line with their appetites for risk will be able to outmaneuver competitors.

Yet such companies remain a minority. More than half (53 percent) of senior financial professionals say they have greater difficulty anticipating risks to their companies' earnings today than they did before the financial crisis, according to the results of the 2013 Risk Survey conducted by the Association for Financial Professionals (AFP) in collaboration with Oliver Wyman's Global Risk Center.

Scott Gilbert, a former chief compliance counsel of the General Electric Company, is Marsh & McLennan Companies' chief risk and compliance officer. Oliver Wyman is a subsidiary of Marsh & McLennan Companies.

components, and functions. The result is that many auto makers’ development organizations go into firefight mode, setting

up multiple and redundant task forces to contain the damage.

NEW PROCESSES FOR MEETING NEW DEMANDS

Leading automotive manufacturers have recognized the problem and have begun to adapt their development processes to current and future requirements. They are optimizing their processes, organizational structures, and tools to meet growing demands. With the help of well-organized task forces, auto makers have learned to respond to requirements not represented in the traditional process – especially those overarching software functions, diagnosis-related parameters, and, to an ever greater extent, modules and features of emerging connected-car services.

BECOMING MORE AGILE

The obvious advantage of an agile development system is that auto makers can respond much more quickly to new requirements. A flexible system not only reduces delays, but also makes it easier to control the entire process. The car is created step by step, meaning that any shortcomings in the maturity of a particular module can be recognized before the process is in its final phases. In addition, it is also possible to focus the entire development effort, because the necessary steps for each module, vehicle, and regional variant are more precisely defined – without unnecessary milestones, extra steps, or waiting time.

Furthermore, recalls and quality issues can be avoided by securing development process modules independently and using them in conjunction with platform

modules. But, above all, it is possible to downsize the development system to such an extent that it once again becomes a helpful support for engineers.

Ideally, an agile automotive development system encompasses process, organization, and tool and technology dimensions and should be elaborated in detail. Thus, designing a suitable and sustainable methodology requires thought and far-reaching analysis, whereas the implementation of such a methodology on a specific project is relatively straightforward. In most cases, improvements pay off thanks to the savings that are already achieved during the first two to three development projects.

Software companies are often able to reduce their new-product-development costs by improving their development effort, the resources deployed, and time to market. If similar efficiency improvements were to result in 20 to 30 percent savings by auto makers, that would represent hundreds of millions of dollars per new-vehicle-development project. Auto makers that shift into higher gear and radically change their mode of operations have a very good chance of racing ahead of the pack.

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How important an issue is risk communication for business leaders?

GILBERT How management communicates risk information to the board is a key issue. Board members have a responsibility to ask probing questions and to request information that will enable them to have insight into a firm's risks and how those risks are being managed. But board members often find it challenging to understand the risks within their enterprise – both those that are known and those that have yet to emerge – from information that they receive within the fairly compressed time frame of a board meeting.

One of the most effective methods we use to address this issue is to have each of the operating companies present its operations and the nature of its key risks to the compliance and risk committee of our board. This occurs periodically and is in addition to the discussion of risks that may occur in other contexts, such as during the presentation of strategic plans or budgets, or in briefings by the chief financial officer or general counsel. This practice provokes a lively dialogue between the board members and management and often generates follow-up actions to better understand or address potential risks.

NOLOP Risk management has not received as much attention as strategy from most boards and management teams. But the communication between the board and management on risk needs to be as good as it is on strategy. Enterprise risk management represented a good start at improving risk communication. But there is more room to grow.

There's a tendency for boards and management to focus on quantitative measures of risks that are easy to put into a risk report or "dashboard." But many risks that are important to the future of a company are not easily quantifiable, such as the risk of technological disruption or the risk of a blemish to a company's reputation.

Dialogue also needs to occur on positive steps that a company can take to reduce its risk exposure over the long run, such as developing new products and process improvements. Too often, the communication is around something going wrong or the default becomes "let's not have any risk at all."

Risk dialogue should distinguish between rewarded and unrewarded risks. The biggest mistake a board and management team can make is to become more focused on avoiding risk than managing risk. In fact, a board might encourage more risk taking. When the continued existence of a company comes into question, it is often related to the management team's failure to take a risk that could have helped the company to avoid a bigger risk of becoming strategically, technologically, or commercially obsolete.

Why is it difficult for companies to close the gap in risk communication?

GILBERT One key reason why communication between the board and management about risk has worked effectively here is because of our CEO's commitment to effective risk management. Risk is front and center, and is a natural part of the dialogue between management and the board on strategic and operational issues.

Our previous CEO, Brian Duperreault, declared publicly, at an investor day, that the management of risk was one of the four fundamental pillars of the firm's strategy, and Dan Glaser, our current CEO, has emphasized that, under his leadership, the firm continues its fundamental commitment to the intelligent management of risk. In this way, risk management has become a strategic imperative, right up there with long-term growth of revenue and net income.

Management of risk has become a core part of the way the business operates. When I recently drafted a communication about our new risk appetite statement, Dan said he wanted it to come from him. It's a risk officer's dream when the CEO is as committed as this to risk management.

The board also has a very important role to play in establishing and maintaining that tone at the top. A relationship of candor between board members and members of senior management about risk is key.

NOLOP Risk does not have one set definition. It varies by industry. Banking, for example, pays much more attention to balance sheet issues than a consumer product company.

Boards have also traditionally focused on acts of commission and risks that they have encountered in the past rather than on risks of omission. For example, most boards receive regular reports on compliance risk, and compliance staff have been specifically assigned to manage that function. The question now is how do you turn what has been a relatively narrow definition of risk into a broader concept that is linked into a company's strategy and operations?

How a board communicates with management on matters such as strategy and acquisitions can provide a road map for how dialogue on risks can proceed. When boards first became more involved in strategy, there were a lot of the same issues and questions. In a strategy session, does the board want three-ring binders with facts and data on strategy, or should management present a few key points to be discussed with the board members?

You learn by doing. Like most things, the more you manage risks, the better you become at identifying the salient issues and considering potential actions. And it's important to develop the capability to manage risks, because it is an area that really matters.

How detailed should risk reporting be?

GILBERT It's critical to think about the people who will be making use of the information and to provide what is most important to them. Our board, for example, includes people who come from many different professional and personal backgrounds. So their past experience informs their judgment and critical analysis. Board members will probe to see how a risk that they have encountered previously may be playing out in a different context.

One of the challenges we are currently working on is identifying the data sources that best reflect the company's risk exposure. Our board has expressed a desire to examine risk issues substantively. In response, we as a management team have stratified our enterprise risks into three tiers. The importance of the tiers is to focus executive, board, and enterprise resourcing on the right areas. We present certain metrics regularly. But we also meet with the compliance and risk committee to review in-depth analyses of particular risk issues that are of interest to the full board.

NOLOP People have different points of view about how detailed risk information should be. Some people take comfort in volumes of risk information. Others find it overwhelming.

My view is that you should not have more information than is necessary to effectively communicate a company's risk. Don't overwhelm the board just because you think it's safer. Consider whether the information is relevant. Simply receiving a lot of PowerPoint slides or Excel spreadsheets doesn't work. By itself, it's just data. The reporting should go beyond statistics. It should be qualitative.

Risk information should be actionable. It needs to be related to actions that the board should endorse or to matters that management wants the board's input on.

Ideally, a risk appetite statement of principles clarifies which areas the board should focus on. The statement may include the top 10 risks to the company. But it should also incorporate other perennial and topical risks. At the same time, some risks may not rise to the level of requiring dialogue with the board.

What is the best structure for how the board receives its risk information?

GILBERT Our risk appetite statement has created a framework for the executive committee and management to conduct a very explicit risk dialogue. The statement reflects discussions among senior leaders and our board. It covers five key areas: strategy and financial performance, financial stability, client business, people, and operating environment.

In an important way, the creation of the risk appetite statement facilitated a candid discussion as we drafted the document. The assertions contained in the document may have originated with particular individuals. But they became depersonalized once they were embodied in it. As a result, people felt more comfortable addressing and debating the declarations. They didn't have to disagree with a person. They could challenge an idea instead.

We've only just implemented our risk appetite statement. But I've already observed that it gives the board confidence that they understand the risk-taking bounds that the enterprise will live within. In many cases, the board encourages the taking of risk. The document enables us to be aligned on what that means. We decided to leave detailed tolerances and metrics out of the risk appetite statement itself, which was distributed to all employees. For some risk elements, quantitative tolerance levels are established and are the basis for operations. In other cases, we are developing them or quantitative measures are unnecessary.

The risk appetite statement allows us to orient our behavior efficiently. For example, we can eliminate potential acquisition opportunities that don't comport with our risk appetite because fundamentally the fit isn't there. That saves a lot of unnecessary due diligence expense.

NOLOP It's important to have someone who is effectively the control tower to direct traffic. A risk or strategy committee is better than an audit committee for this purpose in part because a risk committee can more clearly address risks that are qualitative as well as quantitative. Locating risk management in the audit committee may imply that risk is always something that shows up in a financial statement. Moreover, the audit committee already has many functions that it performs, possibly making it hard to give sufficient focus to this critical function.

In terms of where the traffic should be directed, my view is that there should be a full board oversight review of all of the risks and a committee review in advance. The committee review may be conducted not only by the risk committee. For example, a corporate responsibility committee may examine reputation issues. The compensation committee may be best suited to evaluate if the company is incentivizing the wrong behavior or developing people with the talent to reduce certain risks.

Finally, management may seek specific input into a decision that involves risk. This helps achieve alignment between management and the board about the way that the risk appetite principles are being applied.



HIDDEN DRAGONS

THE PERILS OF ESTABLISHING A PRESENCE IN ASIA

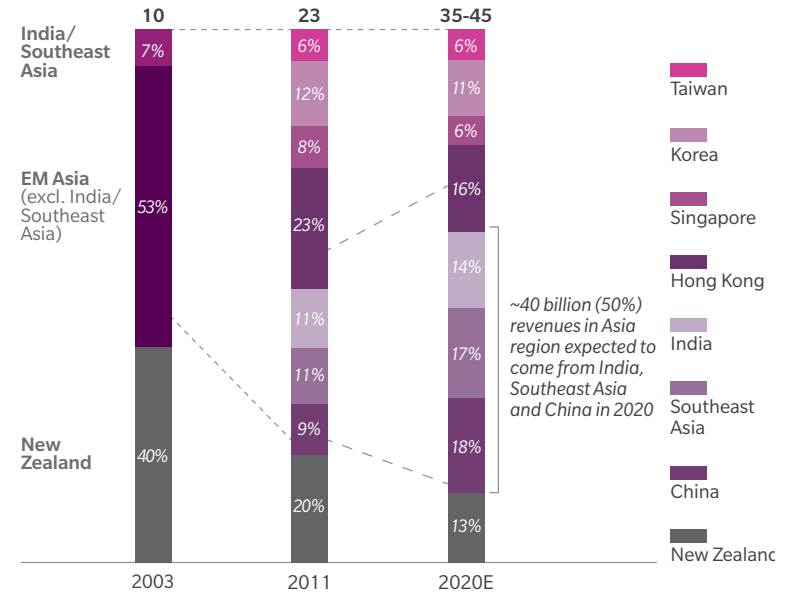
CHRIS EVANS
CHRISTIAN PEDERSEN

Strong credit growth, deepening fixed-income markets, and world-leading GDP growth continue to present a wholesale banking opportunity in Asia. (See Exhibit 1.) As increasing global trade drives international corporations to seek banks with local capabilities, many also see establishing a presence in Asia as a requirement for retaining their international clients. Accordingly, the number of foreign banks active in Asia rose from 111 to 183 between 1995 and 2009.

With capital markets liberalizing in China, we believe international banks will chase this opportunity. But they will need to overcome significant hurdles to achieve profitable scale.

Complexities in managing operations over several regions, increasing capital and liquidity requirements, and idiosyncratic regulatory hurdles have reduced profits for many of the largest foreign players. Standard Chartered and HSBC are the notable exceptions, where their long-established local branches and targeted client bases have given them returns on equity on a par with some local banks.

EXHIBIT 1: ASIA REGION REVENUE GROWTH
FICC AND EQUITIES ACCESSIBLE REVENUE (\$BILLION)



Source: Oliver Wyman proprietary data and analysis

Many banks have scaled back their operations in response to these challenges. Most that remain are subjecting their Asia expansion plans to rigorous reviews, often instigated by boards of directors seeking comfort with the risks in the region. We outline some of these risks below.

STRATEGIC RISKS

LIKE A BULL IN A CHINA SHOP

Large revenue pools, continued credit growth, and high stakeholder expectations have led to new entrants pursuing ambitious top-line growth targets. However, the true cost of attaining volume takes time to understand and requires granular assessment of target markets, segments, and products. Chasing volume ahead of price or risk-return in a region where returns

on equity are already in single digits is a dangerous strategy. Early compliance with new Basel regulations may already be putting many international banks at a pricing disadvantage. The most profitable institutions over the past few years have recognized the importance of picking their target clients and offering a narrow range of products. Institutions with ill-defined value propositions run a high risk of chasing unsustainable growth ambitions.

THE MONEY TREE

The current liquidity-rich environment means many banks have neglected to plan for the longer-term funding requirements of Basel 3 liquidity rules. Wholesale banks will find it especially difficult to raise stable local currency funding if they lack a partnership with a local bank, strong retail branch network, or competitive transaction banking platform. The current reliance on short-term, large corporate “hot” deposits is an unsustainable funding strategy beyond 2015.

PLANNING FOR RISK

Planning for local risk requirements has been considered a secondary part of expansion by some, with new entrants relying on existing global risk management capabilities in initial growth stages and overestimating their ability to attract, train, and retain strong local talent. New entrants must quickly choose between building local capabilities and infrastructure or relying on existing group expertise. The right choice depends on three factors:

1. Availability of risk staff: The availability of local talent varies markedly by region. In China and Indonesia, for example, risk expertise is far harder to find than in

more international centers, such as Hong Kong and Singapore. Balancing the mix of local and group talent is essential for maintaining an institution’s risk culture. We have observed many banks struggling with this challenge. New entrants typically underestimate the costs of both relocating seasoned risk employees and of acquiring scarce local talent.

2. Regulatory pressure on the location of risk functions: The location of risk function staff historically has been a decision banks were free to make for themselves. Regulators now seem to prefer local ownership of risk assessment, especially in China, India, and Singapore. Many banks risk being caught short if regulators push for full “subsidiary” capabilities in foreign branches.
3. Risk limit ownership: Managing group level risk appetite to accommodate emerging-market growth targets can lead to friction if not explicitly considered as part of a risk strategy. Growth can be put at risk if responsibility for limits remains at the group level, where executives may be unfamiliar with the magnitude of Asian credit risk exposure sizes, and the processes for reviewing limits may not be sufficiently dynamic to adapt to Asia’s rapidly evolving markets.

IMPLEMENTATION RISKS

REGULATORY RISK

Early involvement of compliance and risk is essential for managing idiosyncratic regulatory requirements, especially for core banking systems. Local reporting and system approval processes vary greatly

between jurisdictions and can create large operational risks. Banks that do not take into account local regulatory requirements in their system design may require manual work-arounds, suffer delays, and even lose their banking licenses. (See Exhibit 2.)

EXHIBIT 2: ONE SIZE DOES NOT FIT ALL GROUP SYSTEMS CANNOT SIMPLY BE ROLLED OUT IN EACH ASIAN REGION



- Chinese regulator (CBRC) requires prenotification and full documentation for any changes to banking systems to be submitted for approval at least one month prior to any changes being made
- This affects not only new platforms but any proposed changes to group systems servicing Chinese business



- Indian regulator (RBI) requires >150 regulatory reports to be submitted monthly
- Overall number still varies, regularly causing significant manual work-arounds and operational risks if new or expanded group platforms are not flexible enough to support requirements

CULTURAL RISK

On-boarding new employees can present a significant cultural integration risk, particularly when local hiring practices and industry work ethics differ from international banks' expectations. While these risks may be within the group's risk appetite, Asian regulators take small operational risk compliance events more seriously than most

other regulators, which means banks can underestimate the risk they present.

Those looking to avoid this risk by capturing business remotely will face significant challenges because local knowledge and contacts in these markets are key. Institutions without a local presence face a serious risk of adverse selection in the deals they acquire.

FINANCIAL RISKS

THE CHICKEN OR THE EGG

Ex-post or ex-ante development of a local risk function is a question new entrants still wrestle with. Many banks hope their initially small presence will enable them to pass under the local regulator's radar. However, this brings its own risks, as local analysis and forecasting capabilities may not be

developed in time to prevent a buildup of excessive credit or concentration risks in an unfamiliar region. For example, many banks assume operating in various Asian countries will bring diversification benefits without understanding the potential negative ramifications of a Chinese downturn on their portfolio of risk exposures.

SAME BUT DIFFERENT

A lack of long-run historical loss data in most institutions means that group risk models are often used in Asia with little or no tailoring for Asian business

or legal frameworks. However, Chinese and Singaporean regulators are refusing to approve some models that have been approved in “home” regions. We expect that the requirement for local calibration or new models will increase.

CONCLUSION

There is a strong temptation to expand in Asia. But it is difficult to do so profitably. Before taking the plunge, banks should have good answers to the following questions:

1. Why will we succeed?
2. What is our long-term sustainable funding plan?
3. Have we planned sufficiently for local regulatory system requirements?
4. Can our local risk functions manage idiosyncratic regulatory requirements and provide local risk analysis?
5. What are the main risks we will face in each country, and how are they correlated with our existing business?

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ADDING FUEL TO THE FIRE

NORTH AMERICA'S HYDROCARBON
BOOM IS CHANGING EVERYTHING

STEVEN MEERSMAN
MARK PELLERIN
ROLAND RECHTSTEINER

What if the gasoline that you put in your car came from natural gas instead of crude oil? Or what if your office was heated by coal instead of natural gas?

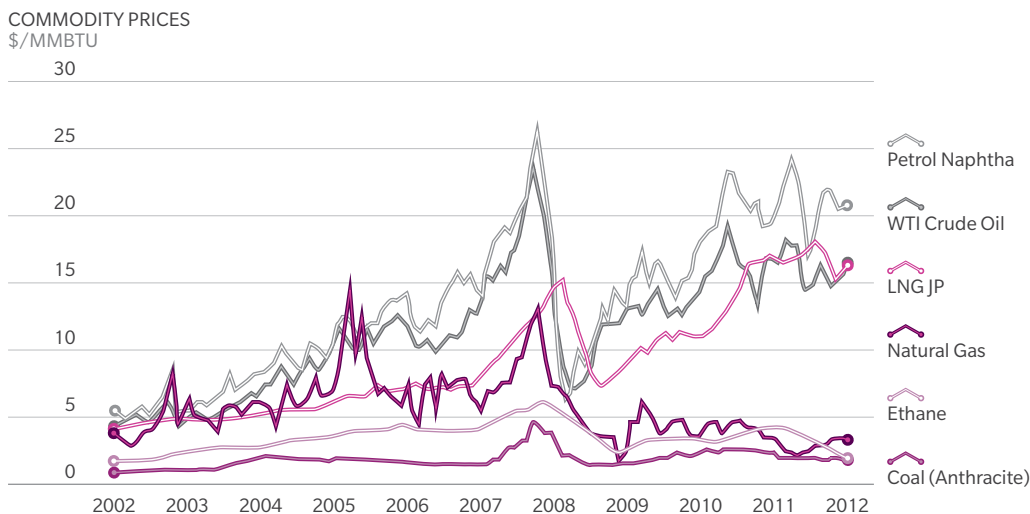
Scarce resources and a lack of technology have long made those scenarios a distant possibility. But driven by the recent hydrocarbon boom in North America, they are now nearly a reality. The growing oversupply of natural gas and coal, typically used as fuel for power generation, combined with growing demand globally for transportation fuel is expanding the price differences between light hydrocarbons such as natural gas and heavier products such as crude oil and coal.

As a result, trade-offs that once made no sense are suddenly economical. The geographic dislocation between areas of demand growth and growing production is also shifting the balance of power to energy consumers who now have a plethora of options.

Prices of stationary fuels such as coal and gas, which are typically produced and consumed locally, have fallen because of sluggish growth in demand in North America. Despite a lack of demand, natural gas supplies have skyrocketed in the past five years as a byproduct of domestic oil production. By contrast, transportation fuel prices are rising because of increased demand for gasoline and fuel exports from the United States to developing regions such as Africa and Latin America. (See Exhibit 1.)

Widening energy price spreads are beginning to rewrite the rules for many industries. More companies are now probing new possibilities provided by both cheaper natural gas and the valuable components within it. In the near future, petrochemical plants that traditionally have relied on naphtha as an input for the creation of polymers will likely switch to cheaper natural gas component inputs

EXHIBIT 1: THE PRICES OF HYDROCARBONS HAVE BEEN DIVERGING OVER THE PAST 10 YEARS
 PRICES OF KEY ENERGY COMMODITIES ON ENERGY EQUIVALENT BASIS (2002-2012)



Sources: Datastream, EIA, Oliver Wyman analysis

such as propane and ethane, which will cut their costs by about \$500 per ton. That's why, for example, several Asian importers and traders have recently closed long-term off-take contracts with Houston-based Enterprise Products and other midstream companies to transport liquefied petroleum gas across the world to Japanese petrochemical plants.

POWER SHIFTS TO THE CONSUMER

A growing imbalance in regional growth rates of energy supply, refining capacity, and consumption is also contributing to the shift in the balance of power toward the consumer, who can source from whichever region or producer that can deliver the least costly fuel. This evolution of the fundamental market structure is underway not only in classic transportation fuels, but also in alternative fuels, the plastics supply chain, power generation, and heating.

For instance, declining demand for fuel in Europe has led to the shutdown of significant refining capacity there. The expected expansion of Russian diesel exports to Europe may exacerbate the situation for European refiners. A similar glut is building up in Asia and the Middle East, which are adding capacity faster than demand is growing.

Simultaneously, integrated energy majors are also refocusing on exploration and production of crude oil and natural gas. Record production increases in the US of one million barrels per day have been added in 2012 and 2013, leading some experts like the US Energy Information Administration to forecast that the US will be oil import independent by 2035.

NEW ENERGY ECONOMICS

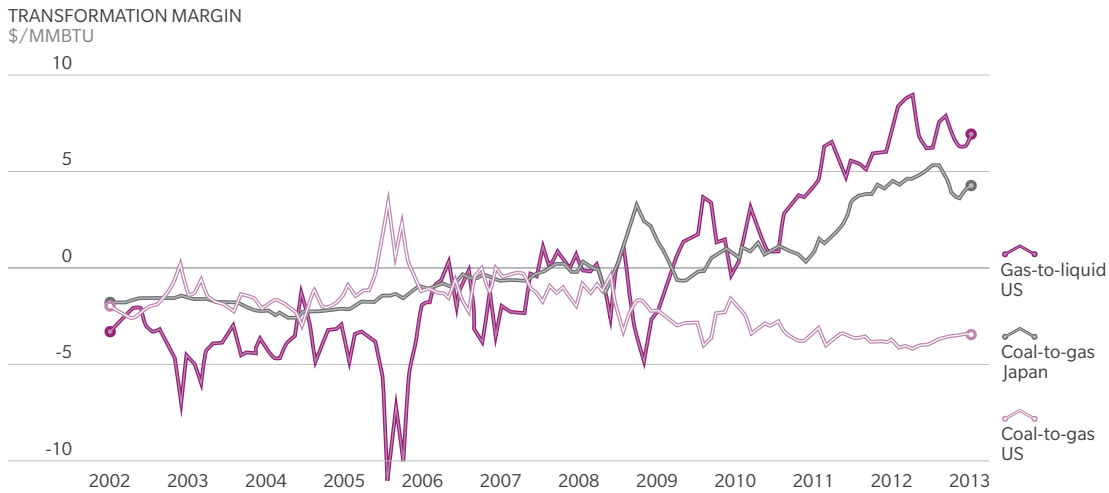
New energy economics will enable some companies to make huge profits in the future by investing in plants that convert natural gas or coal into liquid fuels. Such prospects seemed impractical until as recently as 2009. (See Exhibits 2 and 3.)

Now, however, we estimate that converting gas to liquids in the United States could have yielded net profits of \$5 per British thermal unit in the first six months of 2013. That's nearly 150 percent of the cost of the natural gas feedstock at \$3.5 per million British thermal units. Some energy companies such as South Africa's SASOL and Australia's Linc Energy have recognized this opportunity and are investing billions of dollars in developing technologies to supply gasoline and diesel made from natural gas, which is available in the United States at rock-bottom prices.

Newly economical trade-offs
will rewrite the rules
for many industries

Converting coal to gas also will be an increasingly profitable business in locations such as China, which pays \$10 per MMBTU or more for liquefied natural gas imports, even though this prospect has actually become less economical in the United States, where natural gas prices have fallen faster than coal prices due to record coal exports.

EXHIBIT 2: THE RELATIVE COST OF ENERGY HAS DIVERGED FOR CRUDE, NATURAL GAS, AND COAL (2002-2012)
 SINCE THE HYDROCARBON BOOM, GAS-TO-LIQUID AND COAL-TO-GAS CONVERSIONS MAKE ECONOMIC SENSE



Sources: Bloomberg and Oliver Wyman analysis

These price differences will persist as a global imbalance between supply and demand is projected to continue for the foreseeable future. Demand for fuel in the Southern Hemisphere is projected to continue to grow for a number of years – which will continue to drive the expansion of American hydrocarbon production.

Without a material increase in natural gas consumption in the US, growing supply will continue to depress natural gas prices. Exports of natural gas are routinely discussed as a possible mechanism to ease this oversupply. Currently planned LNG exports are not

likely to cause significant domestic natural gas price increases in the next five years, according to a Department of Energy-commissioned study by Oliver Wyman’s NERA Consulting. (See *Why the US Economy Will Benefit from LNG Exports* on page 89 for more about this study.)

Another large consumer of natural gas is power generation operators. But total demand for power in the US is expected to stay flat. The potential for near-term switching from coal-to-gas would increase natural gas demand by at most 12 percent of current natural gas production, according to the EIA.



EXHIBIT 3: THE “NEW NORMAL” OF NORTH AMERICAN ENERGY MARKETS

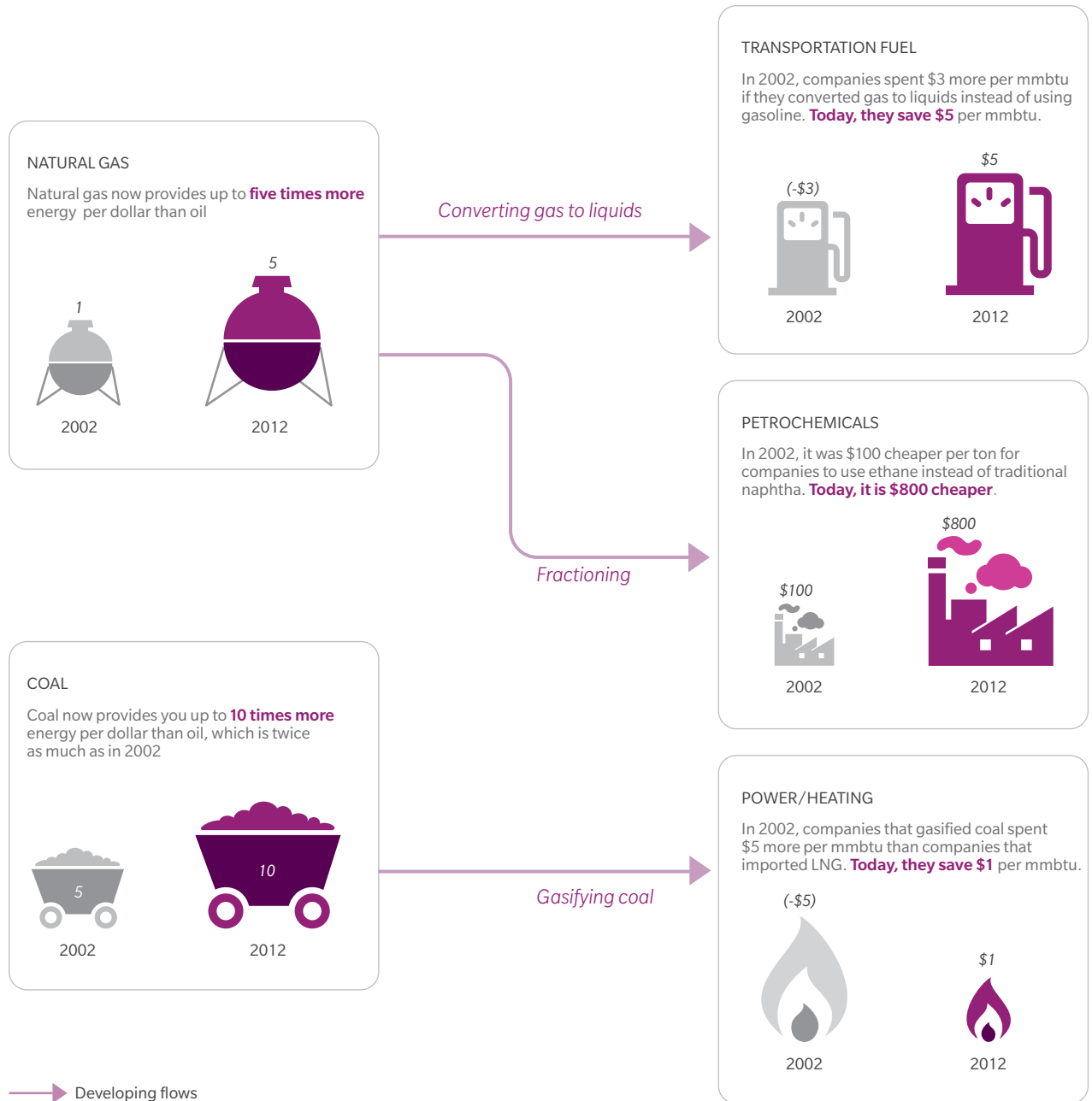
COMMODITY

The diverging price of commodities such as coal, oil, and natural gas ...

PROCESSING

CONSUMER COMMODITIES

... is creating new opportunities for fuel consumers



Source: Oliver Wyman analysis (includes operating and installation costs)

CONCLUSION

To stay competitive, companies need to get ahead of one of the largest dislocations in the history of the global energy markets. That means they must adapt their business models to rapidly evolving price dynamics as new links are forged between energy markets.

All players will have to re-examine whether their asset portfolios still suit the rapidly changing market environment. Some companies may even want to take part in the massive infrastructure build-out that will be necessary to adjust to rapidly shifting trade flows. Or they may want to integrate upstream to take advantage of these new possibilities before their competitors do.

Whatever their approach, one thing is clear: There are significant opportunities for first movers to boost their profits and to develop a competitive advantage. There is no time to waste.

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Automotive development has never been as challenging as it is today. Innovation cycles are becoming shorter. At the same time, the share of electronics and software in vehicles is increasing just as significantly as the number of variants. Against this background, decades-old development processes and tools no longer work as engineers are forced to adapt to fast-changing customer requirements.

In 2012, the world's top 17 auto makers spent more than \$65 billion on research and development. We estimate that auto maker R&D spending industrywide exceeded \$130 billion – an amount roughly equivalent to Hungary's gross domestic product.

Research and development systems have become key to auto makers remaining efficient and effective, since they will be forced to invest roughly an equal amount

Like software firms before them, auto makers are discovering that the speed of their innovation cycles needs to accelerate drastically

to develop internal combustion engines in parallel with electro-mobility. On average, R&D accounts for 4 to 5 percent of their total costs, and this share will only continue to grow. (See Exhibit 1.) Indeed, it is feasible that auto makers will need to spend 10 percent or more of their revenues on R&D sometime in the coming decades. This means R&D costs could impact more than 80 percent of the total cost structure for auto makers in the near future.

NEW CHALLENGES, OLD DEVELOPMENT SYSTEMS

But auto makers' established development systems are increasingly stretched to their limits. Sequential development projects – marked by defined milestones, quality gates, and integration points – are no longer the standard for vehicle construction. They just don't work as well as they did because, for some time now, the automotive industry has been undergoing a massive transformation that is fundamentally impacting development.

Like software firms before them, auto makers are discovering that the speed of their innovation cycles needs to accelerate drastically. Software development systems have undergone several revolutions in the past few decades, because products were

often already obsolete by the time they were ready for market. Today, vehicles' electronics and software content have increased significantly, and each has a much shorter life cycle than the automotive component. As a result, auto makers now need to develop products in shorter cycles and focus on functions to better meet quickly changing customer needs.

FAST-CHANGING CUSTOMER PREFERENCES

Consider: Customers are changing their telematics and infotainment preferences more or less monthly. These short release cycles demand a high level of agility and a

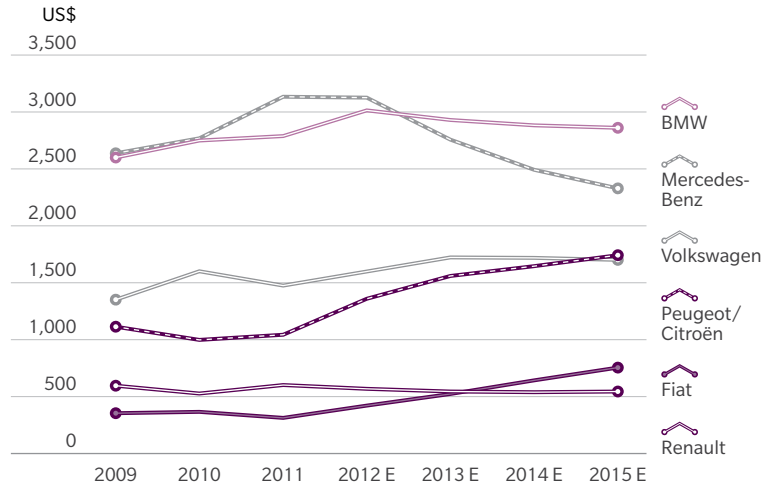
fast pace of business process development. Software companies like Apple have already adapted to these new requirements by releasing product innovations in as little time as every two weeks.

However, customer preferences are difficult to anticipate, resulting in potential misfires, such as when Microsoft introduced its Windows 8 splash screen or the online license model of the Xbox One. These mishaps posed major challenges to the research and development process of Microsoft, which needed to react on very short notice to their customers' preferences. Moreover, because of the growing internationalization of auto makers, development processes must cater to entirely different customer requirements with respect to functionality and quality

Plus, the structure of the value chain is changing. The trend toward e-mobility means that more and more new players, such as information technology, telecommunications, and mobility providers are participating in the value chain. Today, in the traditional vehicle business, suppliers often build complete vehicles for auto makers. In addition, as development projects become more complex, development-service providers must always be integrated.

At the same time, more vehicle variations are offered today as auto makers try to meet increasing customer requirements and technical possibilities. In the past, auto makers could get by with developing two or three vehicle types in parallel. Today, that number is 20 or more. The engineering effort has taken on a new dimension, given the growing number of development projects. This movement is almost the opposite of what is occurring in the consumer electronics industry.

EXHIBIT 1: R&D SPEND PER UNIT FOR SELECTED AUTO MAKERS



Sources: Company reports, Morgan Stanley, Oliver Wyman analyses
 Note: Exchange rate USD/EUR = 1.3

Apple conducts extensive research on a variety of product options before it develops and produces only one version of hardware – leaving the software flexible enough to be customized via apps.

STRETCHED TO THE LIMITS

As a consequence of the highly complex product portfolio, auto makers' development systems, with their clearly structured and comprehensively documented development processes, are frequently stretched to their limits. Today, exceptions are becoming the rule, and immature projects manage to get past specified milestones. Individual developers and engineers are finding it more and more difficult to locate their contribution on the comprehensive, overarching development road map.

They're also having trouble recognizing dependencies between milestones,

components, and functions. The result is that many auto makers’ development organizations go into firefight mode, setting

up multiple and redundant task forces to contain the damage.

NEW PROCESSES FOR MEETING NEW DEMANDS

Leading automotive manufacturers have recognized the problem and have begun to adapt their development processes to current and future requirements. They are optimizing their processes, organizational structures, and tools to meet growing demands. With the help of well-organized task forces, auto makers have learned to respond to requirements not represented in the traditional process – especially those overarching software functions, diagnosis-related parameters, and, to an ever greater extent, modules and features of emerging connected-car services.

BECOMING MORE AGILE

The obvious advantage of an agile development system is that auto makers can respond much more quickly to new requirements. A flexible system not only reduces delays, but also makes it easier to control the entire process. The car is created step by step, meaning that any shortcomings in the maturity of a particular module can be recognized before the process is in its final phases. In addition, it is also possible to focus the entire development effort, because the necessary steps for each module, vehicle, and regional variant are more precisely defined – without unnecessary milestones, extra steps, or waiting time.

Furthermore, recalls and quality issues can be avoided by securing development process modules independently and using them in conjunction with platform

modules. But, above all, it is possible to downsize the development system to such an extent that it once again becomes a helpful support for engineers.

Ideally, an agile automotive development system encompasses process, organization, and tool and technology dimensions and should be elaborated in detail. Thus, designing a suitable and sustainable methodology requires thought and far-reaching analysis, whereas the implementation of such a methodology on a specific project is relatively straightforward. In most cases, improvements pay off thanks to the savings that are already achieved during the first two to three development projects.

Software companies are often able to reduce their new-product-development costs by improving their development effort, the resources deployed, and time to market. If similar efficiency improvements were to result in 20 to 30 percent savings by auto makers, that would represent hundreds of millions of dollars per new-vehicle-development project. Auto makers that shift into higher gear and radically change their mode of operations have a very good chance of racing ahead of the pack.

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Juergen Reiner, Ph.D., is a Munich-based partner in Oliver Wyman’s Automotive practice.
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THE WAR AGAINST OVER-THE-COUNTER DERIVATIVES

AN ONSLAUGHT OF BANKING REGULATIONS IS DRIVING UP THE COST OF OTC DERIVATIVES TO A PROHIBITIVE LEVEL

BARRIE WILKINSON

Regulators clamping down is bad news for banks' profits and the economy

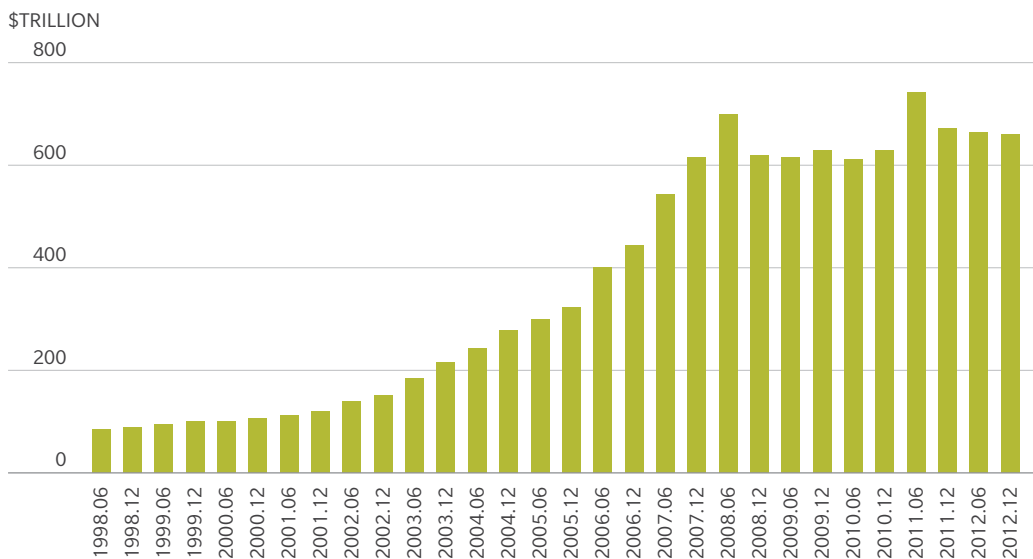
Derivatives are useful instruments for managing risk. They allow companies to hedge certain types of financial risk, such as their exposure to foreign exchange rates or commodities prices, in the same way that they might enter into an insurance contract to protect themselves from nonfinancial risks, such as theft or floods. If used in this way, derivatives reduce the risks of economic factors and promote economic stability.

However, the explosion of derivatives usage that occurred at the turn of the century (see Exhibit 1) was not driven only by increased hedging needs. Too often, derivatives were used as a way of gaining exposure to certain risk assets for the sake of speculation – and in many cases, as a way to arbitrage bank capital rules with a view toward improving the banks’ return on capital. Rather than mitigating underlying risks, the speculative use of derivatives amplified them.

Following the financial crisis, regulators have been keen to limit the systemic threat posed by derivatives. Their attention has fallen on over-the-counter (OTC) derivatives. Unlike the standardized contracts traded on exchanges, OTC derivatives are bespoke contracts offered mainly by banks and tailored to the needs of bank customers. They often lack the simplicity, liquidity, and transparency of exchange-traded contracts, and potentially allow banks to take on large risks that remain opaque to regulators. And, because many of these contracts are between banks, they increase the potential for contagion during periods of stress, thus increasing systemic risk.

To discourage OTC derivative trading, regulators are driving up its cost. OTC derivatives will attract prohibitive capital costs from new risk-weighted assets requirements plus increased funding costs from new margin requirements.

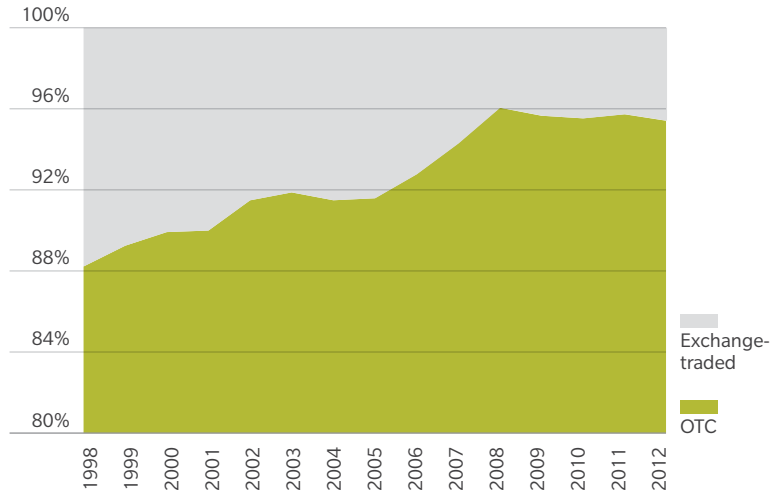
EXHIBIT 1: THE EXPLOSION IN DERIVATIVES VOLUMES
TOTAL DERIVATIVES OUTSTANDING



Source: BIS Quarterly Review, June 2013

This increased cost is in part intended to incentivize banks to conduct more of their derivatives activity on exchanges using standardized contracts that are centrally cleared. As can be seen in Exhibit 2, the outstanding amount of OTC derivatives currently dwarfs the exchange-traded market, so there will be major challenges ahead in migrating the OTC volumes to a centrally cleared format. The increased price transparency that comes from standardizing the contracts and moving them onto an exchange will also be a major blow for bank profits. Many bankers fear that regulators won't be happy until they have wiped out OTC derivatives entirely, but we are still a long way from accomplishing that.

EXHIBIT 2: OTC VS. EXCHANGE-TRADED DERIVATIVES



Source: BIS Quarterly Review, June 2013

INCREASING SAFETY AT A COST

The regulatory concerns are legitimate, and the new measures will probably lead to a safer banking system. However, there is a risk that if regulators go too far to stamp out OTC derivatives, the increased safety will come at too great a cost.

Banks will attempt to pass on the increased costs of OTC derivatives to their customers. This will either eat into customers' profits or force companies to leave risks unhedged (assuming the standardized solutions using exchange-traded instruments prove inadequate). Limiting a company's ability to manage its risks could lead to it canceling plans to expand or even cause the company to fail. Just as regulations that force banks to reduce their lending activities can lead to reduced economic growth, so might OTC derivatives regulations that limit companies' ability to hedge their risks.

Such protests are likely to fall initially on deaf ears, with regulators assuming them to be driven by the self-interest of banks that rely on these products to enhance their risk-return profile. Support for these products therefore will need to come from the corporate sector.

Politicians will need to hear about the energy project that got canceled because the local energy company couldn't properly manage the risks without the use of OTC derivatives. Investors might also start warning that the increased earnings volatility of companies that can no longer properly hedge their risks makes them less attractive as investment opportunities. Rating agencies might start to downgrade sovereign and municipal governments and municipalities that are also currently big users of the OTC market. All of this will increase the drag on the economy.

However, before such voices are heard, the regulatory pendulum is likely to continue swinging in the direction of stamping out OTC derivatives. That may increase systemic safety. But safety does not come for free.

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Barrie Wilkinson is a London-based partner and co-head of Oliver Wyman's Finance & Risk practice in Europe, Middle East, and Africa.





CONTROLLING VOLATILITY

WHY INSURERS EXIST AND WHAT THAT MEANS FOR
THE FUTURE EVOLUTION OF THE INDUSTRY

JAN-HENDRIK ERASMUS

The first recorded instance of insurance took place in China in the third millennium B.C. Merchants traveling treacherous river rapids would redistribute their wares across many vessels to limit the loss should any of the vessels capsize.

This arrangement allowed the merchants to achieve widely expected outcomes, which were certainly more predictable than 100 percent of goods or zero percent of goods.

The earliest identifiable case of insurance conducted as a separate business was also marine insurance. By 1574, there were 30 sworn brokers in London who produced policies underwritten by London merchants. Although this developing insurance market in London was subject to competition in the 17th century from shipping centers such as Amsterdam, Edward Lloyd's coffee house became recognized as the place for obtaining marine insurance, and this is where the Lloyd's of London that we know today began.

Marine was only the start. Fire insurance, life insurance, pensions and annuities, protection against hailstorms, livestock disease, plate glass window protection for shopkeepers, fidelity insurance (protecting businesses against fraud by staff), personal accident insurance, protection against burglary, and motor insurance: all were being offered by commercial businesses before the 20th century.

PROVIDING CERTAIN OUTCOMES

To manage their customers' uncertainty, insurers must be good at managing their own risks, and they have spent at least 300 or so years figuring out how to combine individual exposures into risk portfolios with predictable outcomes. They have developed many sophisticated practices, but the core value

300

The number of years that insurers have been combining individual exposures into risk portfolios with predictable outcomes

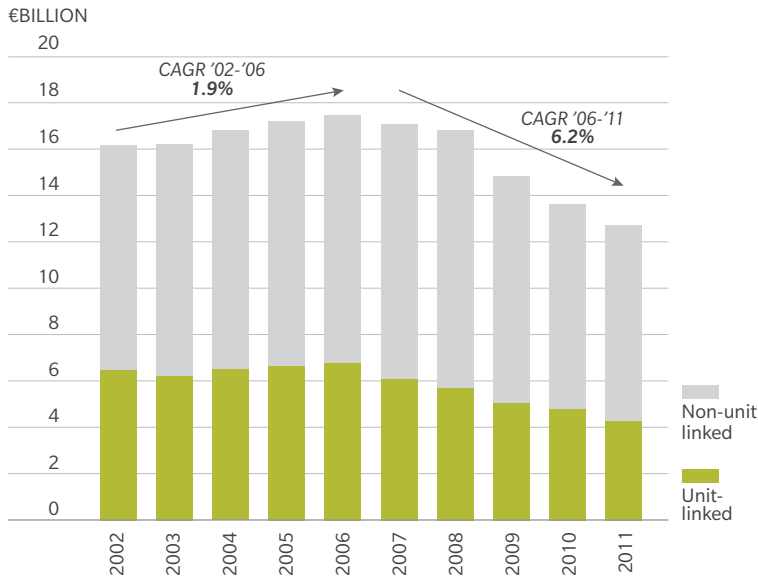
add remains taking a collection of uncertain outcomes resulting from events such as hurricanes and combining them in a way that provides certainty to clients and relative certainty to the insurer itself.

As early examples illustrate, the primary role of insurers is to provide customers with certain outcomes in place of uncertain ones. How much will you lose from car theft tomorrow? Either nothing or the value of your car, depending on whether or not your car is stolen. With car insurance, you know that, either way, your loss will be the insurance premium. The same goes for your house burning down, your becoming ill, your retirement income collapsing because of low returns on investments, and for a host of other insurable events. With insurance, you know how much these unpredictable events are going to cost you: namely, the cost of the policy.

Five categories of insurance are sold in Europe today:

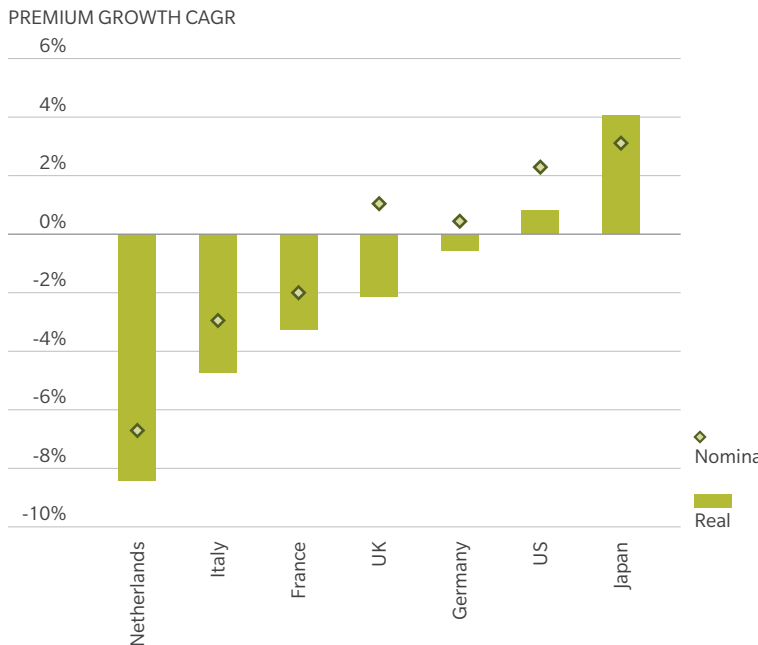
1. Non-life, where the insurer is protecting the customer against a loss of property
2. Life risk, where the insurer is protecting the customer against the financial consequences of unexpected death or related events such as critical illness

EXHIBIT 1: HISTORICAL GROSS PREMIUMS OF INDIVIDUAL LIFE IN THE NETHERLANDS



Source: DNB

EXHIBIT 2: LIFE PREMIUM GROWTH 2009-2011



Sources: Axco, Oliver Wyman analysis

- Life savings with guarantees, where the insurer is allowing the customer to either save for retirement or draw down an income during retirement on guaranteed terms. The guarantee is crucial as it reduces the volatility of potential customer outcomes.
- Life savings without guarantees, also called “pure” unit-linked or “defined contribution.” Although popular as a savings vehicle, this class of product does not reduce the volatility of customer outcomes.
- Health insurance, where the insurer is protecting the customer against the costs associated with unexpected healthcare requirements

Insurers have no structural competitive advantage in providing life savings without guarantees, and we believe that volumes will quickly be eroded as alternative providers innovate and become more cost efficient. This trend is already visible in the Netherlands, where individual life savings product volumes have fallen each year since 2006.

However, products that do not help customers manage risk explicitly remain a substantial part of new insurance business. In 2011 in the UK, for example, such products accounted for over 60 percent of the total premium income of \$428 billion.

It follows that less than 40 percent of the written premiums in 2011 were in relation to products with volatility management for customers at the heart of their design.

In the 60 percent of insurers’ business that requires little to no specialist insurance risk, they face fierce competition from noninsurers such as asset managers and



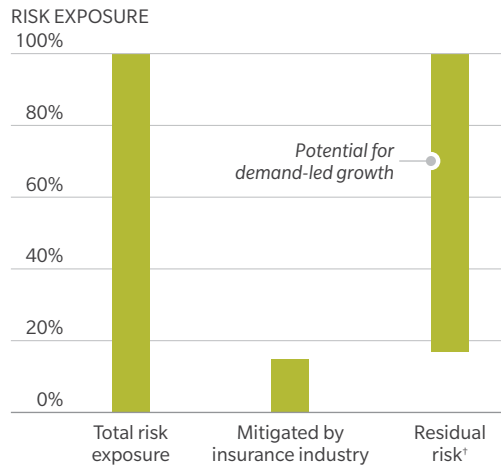
banks. The regulations and tax advantages that once protected life insurers in many European markets have been eliminated. Platform providers, asset managers, and banks are capturing new business flow from insurers and putting pressure on margins.

With real premium growth in most European markets negative in recent years, as shown in Exhibit 2, and more efficient non-insurance competitors, victory in this battle should not be a strategic priority for the majority of insurers.

But there is good news, too. Our analysis indicates that fewer than 20 percent of the risks that customers are exposed to today are currently insured. (See Exhibit 3.)

This means there is potential for demand-led growth. Insurers that focus all their efforts on retaining their pure savings business, probably via a combination of cost reduction and technology-led

EXHIBIT 3: GLOBAL BREAKDOWN OF MITIGATED AND UNMITIGATED RISKS*



Source: Oliver Wyman estimate
 * Including all enterprises and private households
 † Retained or partially mitigated via capital markets or state provision

process improvements, may miss the big opportunity to increase the amount of risk protection they provide.

CONCLUSION

We expect that over the next 10 years, insurers will be able to grow their core risk-related business in the following areas:

- Health insurance: for example, covering new diseases, epidemics, secondary risks of treatment, and biometric coverage
- Protection against death: for example, increasing access to life coverage and its flexibility
- Protection against living longer than expected: for example, providing access to longevity coverage without a bundled savings component
- Property: for example, responding to new patterns in vehicle ownership and linking property protection to property management

Capturing such opportunities will require insurers to be innovative both in their product development and their marketing. If they instead devote themselves exclusively to defending current positions, not only will many fail to win that battle, they will miss the growth opportunities that play to their strengths.

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Jan-Hendrik Erasmus is a London-based partner in Oliver Wyman’s Insurance practice.



MANAGING HUMAN CAPITAL RISK

PLANNING TODAY FOR TOMORROW'S WORKFORCE

ORLANDO ASHFORD

Shifting demographics, globalization, and technology are significantly changing the mix and location of the talent available to firms. Despite high levels of unemployment, employers are struggling to find employees with the skills they need.

In this context, senior management needs to consider whether they will be able to find, attract, and retain the talent needed to execute their business strategies.

Recent Mercer research shows that while talent is a primary source of competitive advantage, many business leaders still consider the lack of adequate talent pipelines a critical business challenge. Sixty percent of 1,268 organizations surveyed in 65 countries are investing more in talent by devoting more resources to strategic workforce planning initiatives such as recruitment, rewards, and retention. Yet more than half (62 percent) of respondents consider their workforce plans to be only “somewhat effective” in meeting immediate and long-term human capital needs. Worse, the majority (54 percent) have plans in place that extend only one year or have no plan at all.

Organizations without well-developed workforce plans face serious business risks. Consider: oil and gas companies are delaying major exploration and production projects because they do not have enough of the right workers. Utilities are spending as long as a decade to train some employees for critical jobs. Healthcare providers remain in constant search of nurses and technicians, who are even more difficult to retain.

62%

organizations that consider their workforce plans to be only “somewhat effective”

To mitigate such risks, companies must identify gaps between their current workforce and their future needs under multiple business scenarios. Then they must work out how to fill these gaps, taking into account the quantity, quality, and location of critical talent. At the same time, firms must hone their human capital initiatives by comparing the cost of the initiatives with their effect on the firm’s financial performance.

The task may seem daunting. But it is not all or nothing. Workforce planning expertise can build over years, with management deciding on the direction of its development as its value accrues and as labor market conditions evolve.

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Orlando Ashford is president of the Talent business at Mercer, like Oliver Wyman, a subsidiary of Marsh & McLennan Companies.
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DIGITAL RISKS

EXPONENTIAL GROWTH, EXPONENTIAL THREATS?

WOLFGANG BAURIEDEL
LESLIE CHACKO

“Any time we have to come out and publicly apologize for an incident, we lose face, and eventually our customers lose trust in our service.” These are words from a senior executive at a large high tech firm. But the sentiment is becoming increasingly common.

service provider Evernote was hacked, resulting in 50 million users receiving requests to change their passwords. The month before, the personal information for 250,000 Twitter users was stolen. The incidents go on and on. (See Exhibit 1.)

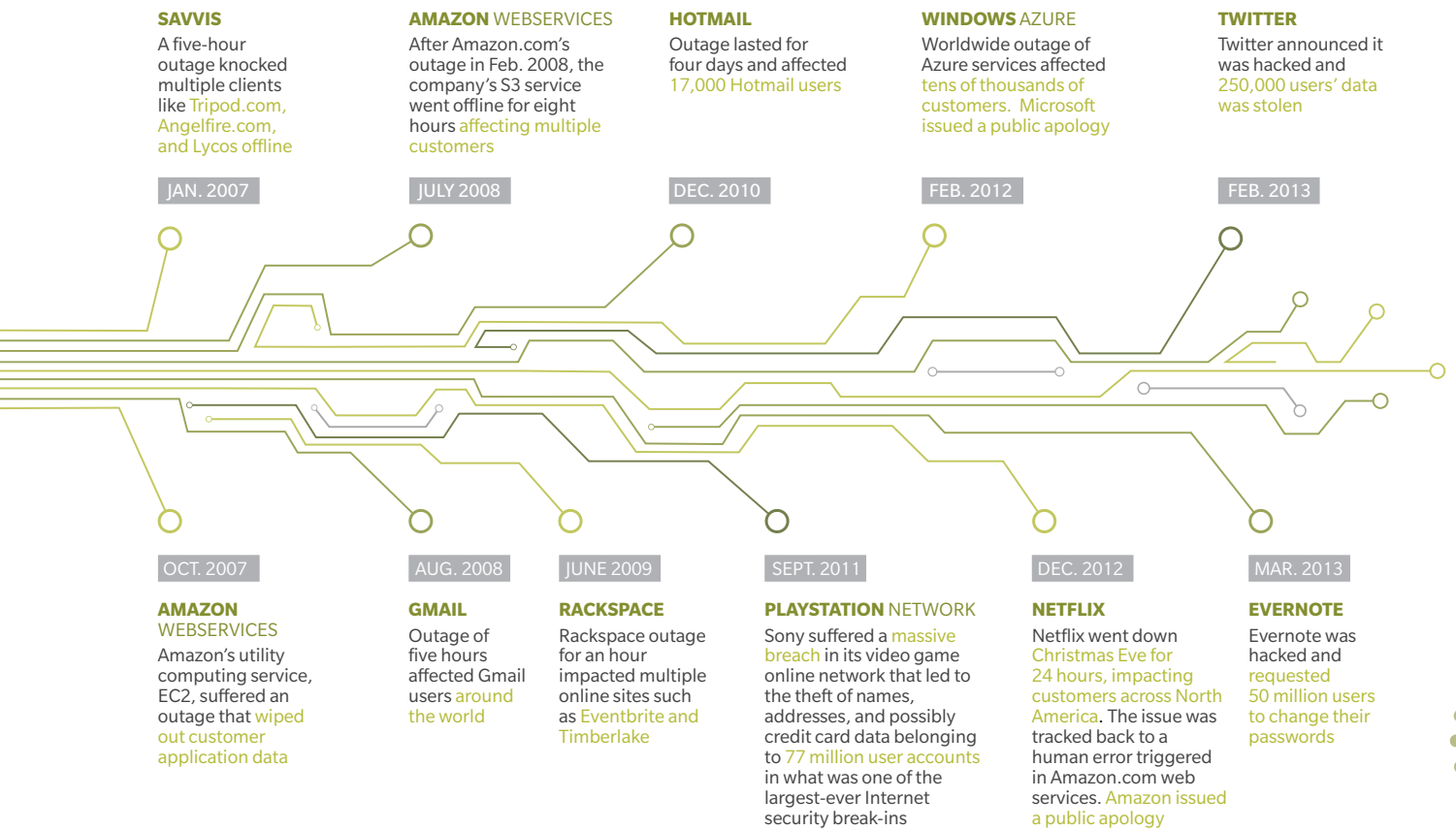
In the past 18 months, there have been a number of service outages due to underlying vulnerabilities and external information technology platform compromises involving large online service providers.

RELYING MORE ON DIGITAL SERVICES

Nevertheless, the world continues to become more reliant on digital services at a rapidly accelerating pace. People are using digital services across devices ranging from PCs to tablets to gaming consoles to mobile devices for a growing number of purposes, such as account management,

Each of these incidents resulted in substantial economic and reputational harm for both the online service providers and their customers. They also had substantial legal and financial consequences. In March, online

EXHIBIT 1: MAJOR INFORMATION BREACHES AND SERVICE OUTAGES INVOLVING LARGE ONLINE SERVICE PROVIDERS



ordering, billing, and content delivery. Regardless of platform, these devices represent a low-cost, pervasive, highly available, flexible, and agile alternative for both consumers and enterprise clients.

Unfortunately, platforms and processes are often not robust and mature enough to support rapidly growing volume. The more people adopt and rely on digital services, the more important it is that the underlying platforms and processes be capable of delivering the level of performance, security, reliability, and availability that consumers have come to expect.

Most organizations that provide digital services today have risk and audit groups responsible for identifying, prioritizing, and mitigating risks that could impact these services. Over the years, these groups have become increasingly influential in protecting the legal, financial, and reputational aspects of the business.

However, most risk and audit teams' existing risk management approaches often fall short for three main reasons. First, the teams that assess the underlying complex platforms often lack the relevant technology and process expertise to identify vulnerabilities and root causes leading to service interruptions. Second, when these teams examine the operational aspects of the platforms, they do not use a clear and consistent platform and process assessment framework with maturity criteria for what is considered operationally "nascent" versus "best practice." Finally, the identification, analysis, and prioritization of risks are mostly qualitative in nature because there is scarce quantitative data that evaluates the external impact of digital risks under multiple scenarios.

So what can be done? In our experience, online service providers that take a much

The world continues to become more reliant on digital services. Unfortunately, the platforms and processes are often not robust enough to support the rapidly growing volume

more holistic view on risk, starting with a detailed risk assessment of their platforms and ending with recommendations that are prioritized based on the quantified impact of each risk, are much more successful at determining if they are facing \$5 million or \$500 million in potential risk exposure. They also have the opportunity to reduce their expected revenue and liability losses by 35 to 50 percent.

These leaders in digital risk management have developed much better control than their competitors over their exposure to the escalating risks in digital services because they follow a four-step process:

STEP 1: ASSESS PLATFORM MATURITY

Online service platforms are complex in nature and typically extend beyond the enterprise through third parties and partners. While internal vulnerabilities are comparatively better understood, external components are not. It's important for online service providers to develop a holistic view of their platforms' maturity and the associated dollar impact from their risk exposure driven by platform weaknesses. In addition, the assessment needs to identify issues across multiple areas, including process, technology, and organization.

There are typically eight key categories that are important for online service providers to review when assessing their platforms as illustrated in Exhibit 2.

Companies need to evaluate if there is a major concern for many services given underlying growth projections. Will the architecture hold? Is it designed for growth? How many processes are largely manual and cannot scale well? How well are capacity and recovery planning managed?

Reliability and robustness are also key. Do software bugs and human error trigger most customer-impacting incidents? How consistent are incident response processes?

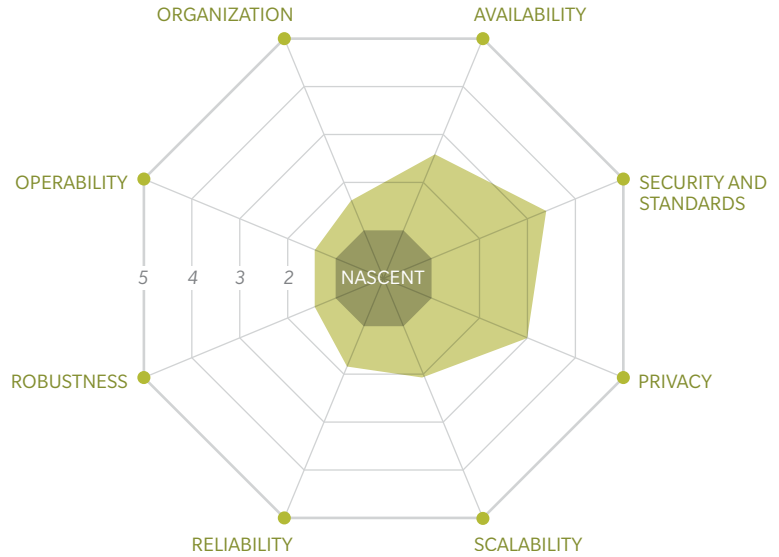
Since many platform availability issues are increasingly driven through external attacks, resulting in service outages, online service providers must also evaluate their platforms' privacy, security, and availability. (For more on the increasing complexity of cyber risks, please see the story on page 69.)

Organizational skills and set-up are also often another major source of weakness in the platform environment. For example, one client divided platform management and maintenance responsibilities between two global locations. Poor handover and collaboration, overlapping mandates, and a lack of transparency of operations led the company to tighten its controls and to consolidate its operations into a single, large footprint.

STEP 2: EXAMINE RISK EXPOSURE

Next, online service providers must put their "universe of risks" under the magnifying glass for further review and prioritization. They must understand how the shortfalls in the platform drive specific risks that impact the business from a legal, financial, and reputational perspective.

EXHIBIT 2: PLATFORM MATURITY ASSESSMENT FRAMEWORK



One way to gain a directional understanding of the inventory of risks that can impact their specific service is for companies to create a risk "heat map" that assigns a qualitative risk rating for each risk element based on its relative frequency and severity. That way, they can quickly evaluate the potential risk elements that would warrant additional investigation and risk quantification. In addition, they can draw connections between existing and new risks.

STEP 3: QUANTIFY THE SIZE OF THE RISK

Gaining a clearer picture of the size of digital risks is also crucial. Online service providers often address the wrong risk elements, costing the business time and money, and leading to little or no progress on fixing root causes. That's in large part because most risk and audit organizations use some variation of "high/medium/

low” ratings when quantifying each risk element. This rating simply does not provide the business with an idea of whether it is looking at a \$10 million problem or a \$100 million problem.

Instead, online service providers need to understand the actual size of their risk and prioritize recommendations based on facts versus qualitative guesstimates. To achieve this, they need to develop a firm grasp of both their internal client data, such as growth projections and service outage history, and external industry data, such as relevant loss data and data breach reports.

STEP 4: IDENTIFY MITIGATION ACTIONS

Finally, companies should identify and implement mitigation actions that address platform vulnerabilities and areas of risk exposure. While many online service providers attempt to do this, they often fail to prioritize actions in terms of their business value and implementation feasibility. Ideally, each mitigation action should have a return on investment attached to it through projected risk reduction. For maximum impact, mitigating actions should also be correlated and sequenced.

CONCLUSION

Successful expansion and growth of digital services relies in large part on the performance and robustness of underlying platforms. Service-impacting incidents such as outages and data breaches can have significant effects on revenue, liability costs, and overall reputation. These risks are often poorly understood and frequently lead to an after-the-fact reactive response and finger-pointing across internal functions.

Lessons learned from industries as diverse as financial services, technology, and retail point to a need to use proactive risk transparency and to manage a company’s digital service delivery. Developing a deeper understanding of the maturity of an

online service provider’s complex platform environment and the root causes of potential deficiencies in light of revenue and transaction growth forecasts significantly improves the company’s ability to reassess its risk exposures and cuts expected revenues and liability losses by as much as half. Customer satisfaction also improves, permitting executives in charge of digital expansion to sleep a little better at night.

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Wolfgang Bauriedel is a Boston-based partner and **Leslie Chacko** is a San Francisco-based senior associate in Oliver Wyman’s Consumer & Industrial Value Transformation practice.
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CYBER RISKS A NEW REALITY – AND PRIORITY

CLAUS HERBOLZHEIMER

The recent controversy around the intelligence work in several Western countries underscores the growing threat of cyber risks for governments, individuals, and companies. Like many companies, national agencies are – with tremendous capabilities and resources, as well as broad legal coverage and tolerance – accumulating user-generated data, applying algorithms, and condensing it into information. The difference is that agencies are searching for terrorists. By contrast, big digital services providers are taking the information to improve their business models and to target customers ever more precisely.

It isn't easy to address cyber threats without setting off a cascade of potential undesirable results. Technological progress and related data mining will not stop. Therefore, our capabilities to cope with cyber threats and to adjust to new rules must be integrated into our social knowledge. In the long term, the handling of data needs to become an important part of our society's education.

More immediately, companies need to make cyber risk evaluation and mitigation a higher priority not only for their own benefit, but also for the sake of their customers. Banks need to protect their systems and secure their networks and data against unauthorized access and phishing. Energy companies must safeguard their grids from blackouts induced by cyber attacks and protect smart-meter client data so that it cannot be used against their customers. Even car manufacturers must grapple with the new reality. As their cars become more

“connected” and “intelligent,” they are more at risk of hostile takeover if these interfaces are not sufficiently protected.

Cyber risks cannot be tackled in isolation since they manifest themselves on multiple levels. As a result, they need to be addressed as part of an integrated security and risk framework. Security architecture and encryption must become a fundamental part of every company's IT risk management, business continuity planning, and product design.

Even if this imposes new barriers to interoperability and cooperation with vendors and service providers, the associated costs are still cheaper than facing a potential disaster situation. The risks posed by cyber threats have the potential not only to spiral out of control in terms of costs to the bottom line; more importantly, they may present a threat to lives.

Claus Herbolzheimer, Ph.D., is a Berlin-based associate partner in Oliver Wyman's Strategic IT & Operations practice.



THE DAWN OF A NEW ORDER IN COMMODITY TRADING – ACT II

WHY INTEGRATED COMMODITY PRODUCERS
MUST BECOME MORE ACTIVE IN ASSET OPTIMIZATION
AND TRADING TO SURVIVE

ERNST FRANKL
ROLAND RECHTSTEINER
GRAHAM SHARP

Independent traders are about to force producers of commodities – especially oil, gas, minerals, and metals – through a paradigm shift

Almost every month since Baar-based commodity trader Glencore completed its \$80 billion merger with Zug-based mining giant Xstrata in May of 2013, independent commodity traders have bought about \$1 billion in assets from commodity producers. Traders are snapping up everything from zinc and coal mines to soybean crushing plants and wheat mills as the commodity-trading industry undergoes its largest transformation in 30 years. We first predicted this trend in “*The Dawn of a New Order in Commodity Trading*,” which appeared in the *Oliver Wyman Risk Journal* in 2012.

One year later, continued investments in assets and a changing funding model are still reshaping the commodity-trading industry. But what is perhaps less understood is that these deals signal that independent traders are about to force producers of commodities – especially oil, gas, minerals, and metals – through a paradigm shift.

In the near future, we predict commodity producers will need to embrace the same sophisticated trading and optimization practices developed by independent commodity traders in order to remain competitive. To optimize their returns on assets, national oil companies, miners, and other integrated commodity producers will be forced to take better advantage of the options available in their networks. This means selling their commodities through long-term contracts, but also more proactively trading the commodities they produce and selling them through a wider variety of channels.

Once these new entrants forge new markets, today’s \$38 billion commodity trading market could grow by about 40 percent. (See Exhibit 2.) But its margins will be reduced across all asset classes, sparking acquisitions and investments.

In fact, there is already a flurry of activity. As we predicted last year, no commodity trader has followed the same path as Glencore since it went public and raised \$10 billion in 2011. But independent traders such as Trafigura, Gunvor, and Noble Group have raised more than \$2 billion by issuing bonds in the past 12 months alone.

OPTIMIZING ASSETS THROUGH TRADING

Many international energy companies already recognize the importance of optimizing their assets. They have abandoned the assumption that they should only actively market their own production volumes and rely on third parties just to fill in their own supply gaps. Instead, these companies are focusing on energy trading as a lens to magnify how to maximize the value of their assets across their entire portfolios using both their own and third-party volumes, as well as all available sales channels. (See Exhibit 1.)

Energy players are doing this in part because independent traders’ earnings are increasingly calling attention to the fact that commodity producers could earn potentially billions of dollars more by broadening their options for delivering commodities to clients. Consider: Almost every day a commodity trader somewhere in the world increases the value of a cargo of liquefied natural gas worth about \$30 million by as much as 25 percent by taking advantage of what the industry refers to as “optionality.” The trader reroutes the cargo from one location to where a customer is willing to pay more for it. Or the trader earns a higher profit by customizing the cargo to a client’s needs by delivering it within a specific time frame, blending different grades of the commodity, breaking up the cargo into smaller shipments, and by accepting specific payment terms. Or

the trader offers any combination of these options – always for a fee.

While the margins that commodity traders earn from LNG cargoes are extreme, the concept holds true across all commodities. Commodity traders are earning margins ranging from 0.5 to 1 percent on average – and in some markets up to 5 percent – by making use of all of the options available in their global networks. Through these networks, they have access to extensive commodity production assets, multiple customers, and a well-oiled logistics chain that rival those of many commodity producers.

By perfecting techniques to maximize profits from commodity production assets through trading, commodity traders have been able to build up a \$38 billion commodity trading market. We estimate that this market could grow to become \$54 billion as national

oil companies and integrated commodity producers become more active in trading, especially as they forge new markets in commodities that are less actively traded, such as minerals, metals, and LNG.

Today, the majority of oil and agricultural products are broadly traded. But commodity producers continue to market most of their coal, LNG, metals, and minerals through long-term contracts. Indeed, only 20 percent of LNG and less than 20 percent of minerals are actually traded on open markets.

BENEFITS BEYOND TRADING MARGINS

But the profits realized from developing more sophisticated supply, marketing, and trading techniques far exceed the pure gross trading margins of commodity trading markets. (See Exhibit 3.)

EXHIBIT 1: HOW COMMODITY TRADERS MAXIMIZE VALUE ACROSS CHANNELS

In *The Dawn of a New Era in Commodity Trading* last year, we explained that commodity traders make their money by taking advantage of a combination of “optionalities” such as leveraging real-time information for sales and negotiations, securing access to storage facilities to supply a commodity when it is worth more, and exploiting differences in price in different regions.

But the top traders do more than just maximize these options. They also optimize them across four sales channels:

OWNED ASSET



Traders evaluate whether to use their own commodity production in their processing assets, such as refineries, or to sell it into another channel and use third-party commodities.

DOMESTIC WHOLESALE



Traders sell and buy volumes from local players in regional wholesale markets.

INTERNATIONAL TRADING



Traders look at alternatives for imports and exports and use their logistical capabilities to move volumes from nearby and faraway markets.

B2B/B2C



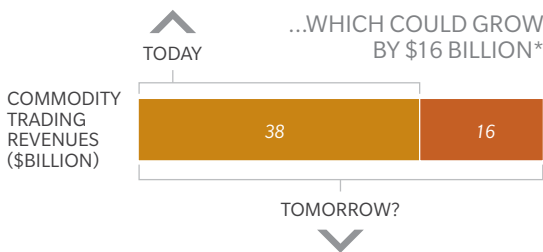
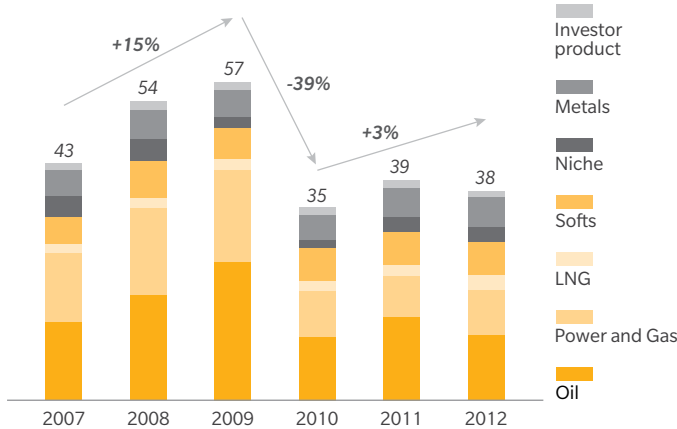
Traders sell to retail or business end-consumers on a spot basis as well as through long-term contracts.

Source: Oliver Wyman analysis

EXHIBIT 2: TODAY'S COMMODITIES-TRADING MARKETS COULD EXPAND TO BECOME \$54 BILLION IF A LARGER PROPORTION OF COMMODITIES ARE ACTIVELY TRADED

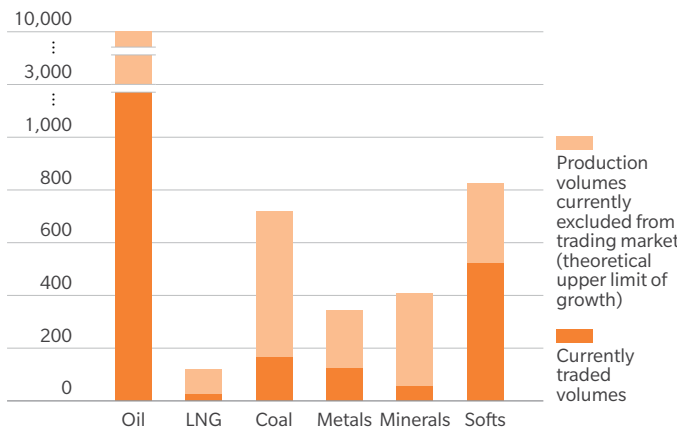
TODAY'S COMMODITIES-TRADING MARKET IS \$38 BILLION IN REVENUES...

HISTORICAL TRADING GROSS MARGINS (\$BILLION)



...AS MORE PRODUCTION VOLUMES ARE TRADED ON OPEN MARKETS

VOLUMES (MILLION TONS PER ANNUM)



Source: Oliver Wyman analysis

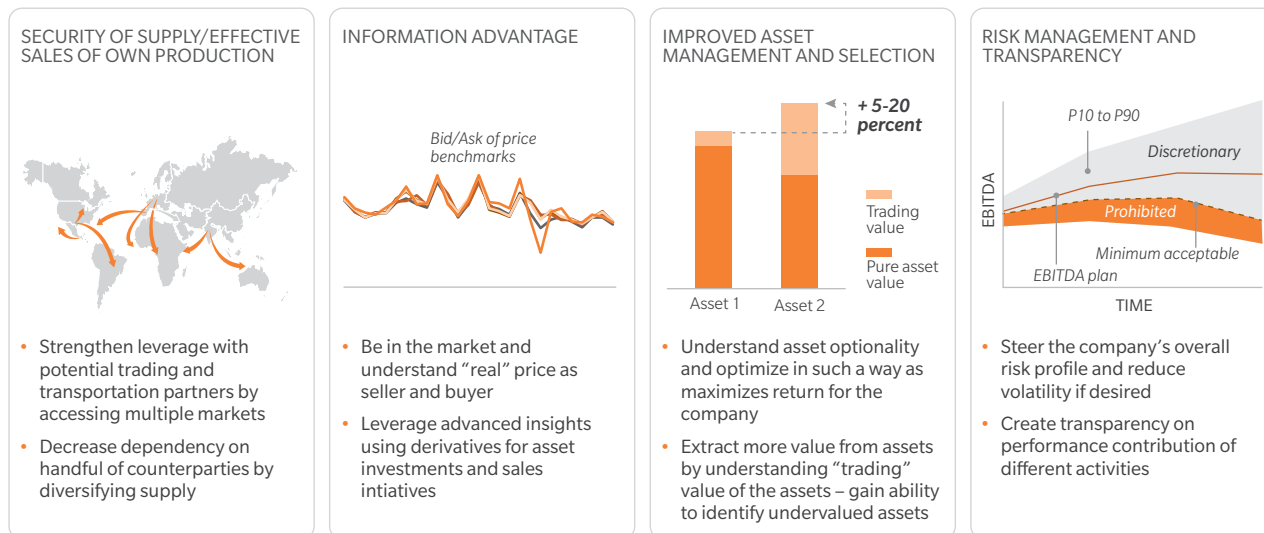
* Assumes half of currently not traded volumes become available at half the current trading margins

For starters, integrated commodity producers can reduce their dependency on a limited number of buyers by becoming active in more markets. Today, many producers of commodities that are less actively traded often have nearly exclusive contracts with one counterparty in a single region. By gaining access and managing a broader group of channels and counterparties, integrated commodity producers can reduce the risk that they will be caught short, or stuck with oversupply, in a market downturn. As a result, they can keep their systems running more smoothly. This potential competitive edge is already prompting some leading national oil companies and mining companies to consider if they should pursue the development of their own sophisticated asset-monetization strategies.

Integrated commodity producers also gain an information advantage. While many commodities now have publicly traded prices, their real price often still differs. Not all barrels of oil sell for the Brent oil price – some will sell for 2 percent less, or for 3 percent more. (The price spreads for less actively traded commodities are even greater.) Integrated commodity producers that engage in trading are able to identify and take advantage of these spreads because they have a market presence on both sides of buying and selling. Developing the ability to capture even the average 0.5 percent spread on large production volumes can more than justify the cost of setting up a small trading, or “optimization,” unit.

Just as important, integrated commodity producers that engage in trading manage their present assets better and make superior investments for the future. Trading improves the ability of leading commodity producers to identify and buy undervalued assets. Understanding the differences in valuation and using the optionality available also enables commodity producers to improve the returns from their present assets by not only balancing physical flows but also by exploiting arbitrage opportunities that exist with stored volumes.

EXHIBIT 3: BENEFITS BEYOND COMMODITY TRADING MARGINS FOR INTEGRATED COMMODITY PRODUCERS
MOTIVATIONS TO EXPAND TRADING MARKET PARTICIPATION



Source: Oliver Wyman analysis

For example, having natural gas storage gives a commodity producer a significant competitive advantage when there is greater demand during a very cold winter. Running a power plant at a lower load level can also significantly increase a company’s bottom line overall, even if it might not be optimal from an operations point of view.

Finally, trading improves an integrated commodity producer’s ability to manage risks because the transfer prices used internally between business units become more transparent. Refineries have a limited appetite for earnings volatility caused by oil price swings. Integrated commodity producers’ trading units can therefore play a valuable role by hedging feedstock crude using derivatives in order to reduce the impact of volatile prices on their refineries’ financial results. Some will even go one step further and monitor these hedge positions to capture additional value potential when it is available.

COMMODITY TRADING CHALLENGES

Why then, are many national oil companies and miners not yet participating in this increasingly lucrative playing field? Most don’t realize the magnitude of the opportunity before them. They mistakenly believe that trading activities will add little to their bottom lines, require significant working capital, and create uncertainty. They are wary of establishing a business unit in which profits can swing to losses and back in a matter of days.

Trading does require significant working capital in the form of inventories either in storage or on ships. Standard payment terms vary across region and commodity, which also ties up working capital.

Many integrated commodity producers also wrongly perceive physical trading to be a business of outright price speculation. Actually, traders often run flat books. This means they sell commodities at a market price with a buyer lined up, or “back-to-back.”

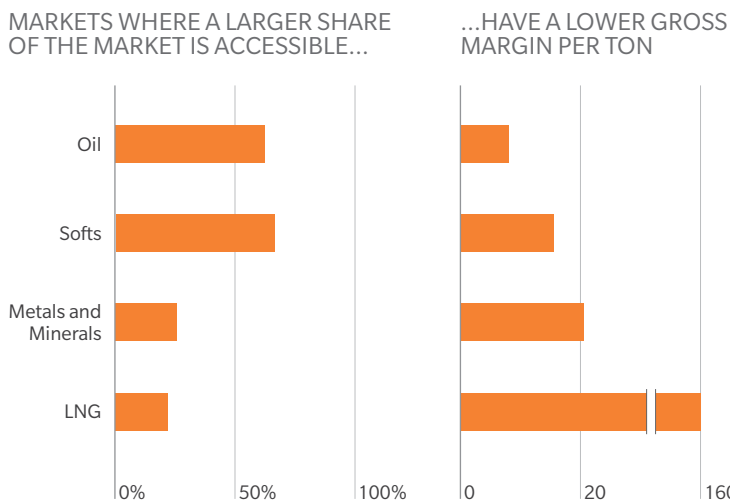
To be sure, it isn’t easy to develop sophisticated trading capabilities. Working capital allocated to an integrated commodity producer’s trading business must be governed by effective limit management. Clear communication with the firm’s top managers must be established. Attracting the right trading talent is also important, since trading is a people business.

The commodity trading team must also be included in the corporate governance setup and culture of an integrated commodity player. Commodity producers need to proactively take the lead in educating the corporation about the potential value of commodity trading. Then, they must ensure that the systems and processes are in place for traders to have close interaction and cooperation with other divisions. Traders and commodity producers’ managers must have an appreciation for each other’s capabilities and be closely coordinated. Protocols, joint performance indicators, and transparent communication all need to be established so that together, they can correctly evaluate the importance of various decisions for their company’s bottom line overall.

GREATER COMPETITION, SMALLER MARGINS

We predict that national oil companies, miners, and even large commodity consumers will have no choice but to develop more sophisticated trading capabilities to remain competitive. Indeed, we expect 5 to 10 significant new entrants across the Middle East, the former Soviet Union, and

EXHIBIT 4: ADDRESSABLE MARKET AND AVERAGE PROFITABILITY BY COMMODITY CLASS



Source: Oliver Wyman analysis

Southeast Asia to begin to develop these capabilities over the next five years. To spearhead international expansion, more national oil companies will follow the lead of companies such as Baku-based SOCAR in setting up in-house trading capabilities. At the same time, the metals and mining trading space presently dominated by two players – Glencore and Singapore-based Trafigura – will be reshaped as more miners expand their trading capabilities to grab greater returns. (See our following story, *Commodity Price Risk Management: The new front line for margin management* on page 77 for more about how leading consumer goods companies are taking advantage of volatile commodity prices.)

But as competition increases, commodity trading margins will decline. (See Exhibit 4.) As more players develop the capability to optimize the returns on their assets, they will be able to price volumes better. They will take into account the “optionality” value when buying and selling assets, or entering into long-term contracts. As that happens, the

30 percent margins that traders typically earn from trading LNG and the 5 percent margins they earn from metals and minerals could become closer to the 0.5 to 1 percent margins that a trader earns trading a ton of oil. (See Exhibit 4.) Increased competition for third-party volumes will also contribute to eroding margins.

Integrated commodity producers will need to gain access to a variety of retail assets and customers with different buying preferences so that they can obtain “shorts” if a global oversupply develops. At the same time, commodity consumers seeking to enter this increasingly competitive field will pick

up different sources of supply to balance their portfolios and effectively capitalize on different commodity supply options.

As national and regional commodity producers gain a better understanding of the opportunities that exist to optimize the returns on their assets by developing more sophisticated trading capabilities, they will become less likely to sell large shares of their production in long-term contracts. Instead of giving away the value of the optionality of a guaranteed supply of a commodity, they will try to monetize this value themselves. This will put more pressure on independent players.

THE NEW ORDER

Add it all up, and it’s clear that the rules for the commodity trading landscape are being radically rewritten globally as commodity producers and consumers become more active participants to mitigate increasing margin pressure. But independent traders will not sit still. They will continue to buy more assets and employ their trading capabilities to further increase their returns.

To remain competitive, integrated commodity producers and consumers need to take a lesson from existing traders. The large scale of many independent traders and their plans for expansion along the value chain may make it more difficult for commodity producers to enter commodity trading markets five years from now.

Those integrated commodity producers that develop the ability to optimize the returns from their assets by engaging in more sophisticated commodity trading capabilities now are less likely to be cut off from clients and will have less exposure

to potential oversupply in their markets in the future. Indeed, integrated commodity producers may develop a significant edge over the independent traders once they start to unlock the additional value in their already existing footprint.

To achieve this, integrated commodity producers may have to make investments in new capabilities and assets. But those that do will find the risks and requirements manageable and worth the effort. These companies will be able to add billions of dollars to their bottom lines and rewrite the rules for their industries in the process.

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Roland Rechtsteiner is a Zurich-based partner in Oliver Wyman’s Energy practice and global head of the Oil & Gas practice.
Graham Sharp is co-founder of Trafigura and a senior adviser to Oliver Wyman.
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COMMODITY PRICE RISK MANAGEMENT

THE NEW FRONT LINE FOR MARGIN MANAGEMENT

ERNST FRANKL
BORIS GALONSKA
JOHANNES SCHMITZ

If asked to identify the main driver of their company’s profitability, most executives would probably point to the competitiveness of their products, the strength of their strategy, or their ability to cut fixed costs. But they would be overlooking an important inflection point.

With recent price shifts in commodities ranging from corn to copper and their ongoing volatility, the front line for companies to improve their earnings is radically changing, making it impossible for companies to stick to their old playbook and remain competitive. Managing the impact of raw material costs across a company’s value chain has become a key driver of financial performance. To successfully manage the rising impact of raw material costs on margins, procurement teams must play a bigger role in managing companies’ margins, with involvement across the broader organization as a whole.

The fundamental reason for this change is that raw material costs have climbed to become many packaged consumer goods companies’ biggest expense, accounting for about half of their costs. Yet their ability to pass through price increases in a timely manner to customers is low, particularly in highly competitive mature Western markets. As a result, packaged consumer goods companies, airlines, packaging companies, construction companies, auto makers, and utilities have all become more vulnerable to rising material costs in the past few years. (See Exhibits 1 and 2.)

Indeed, commodity price swings are now considered the second-largest driver of earnings uncertainty at publicly traded companies, following macroeconomic factors, according to a survey of nearly 500 senior financial professionals conducted recently by the Association for Financial Professionals (AFP) with Oliver Wyman’s Global Risk Center.

EXHIBIT 1: COMMODITY SPEND AS A PERCENTAGE OF REVENUES FOR MAJOR INDUSTRIES

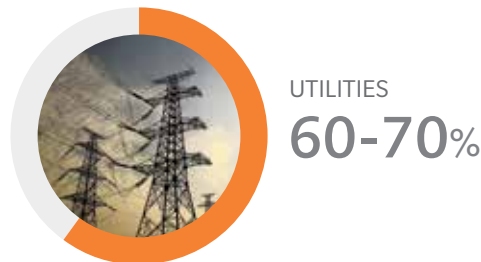
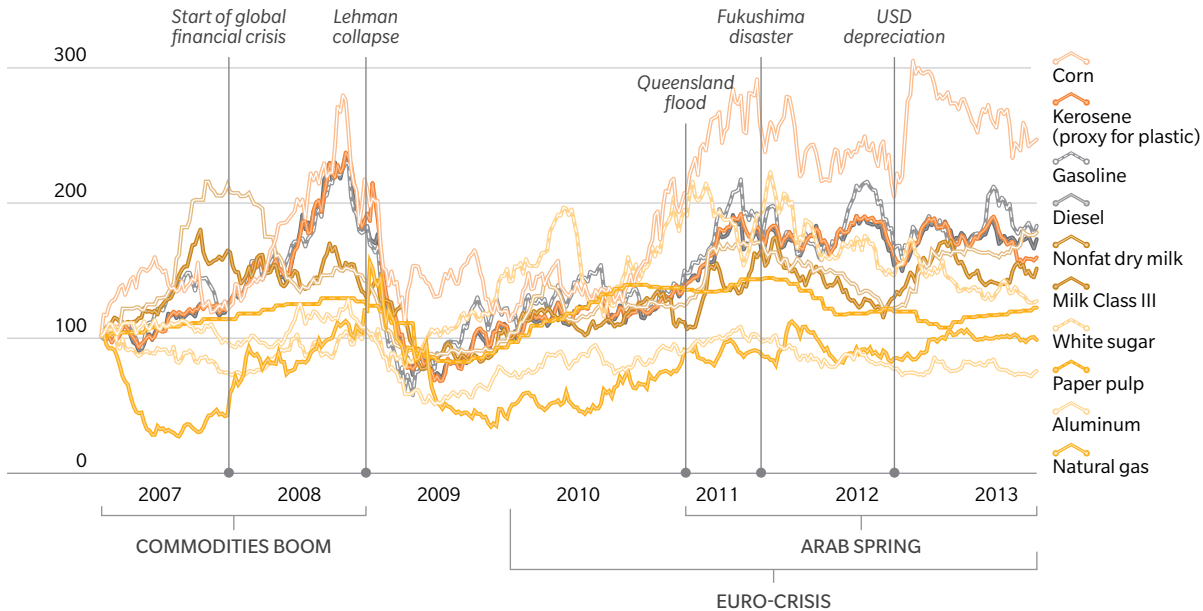


EXHIBIT 2: COMMODITY PRICE DEVELOPMENT 2006-2013 – BOOM AND CRISIS
 RELATIVE CHANGE 2006 = 100, 2013 YTD



Sources: Datastream, Oliver Wyman analysis

In a world where a 10 percent jump in raw material prices can double a company’s earnings or wipe them out, senior executives can no longer afford to continue to treat procurement as simply a division that secures supplies. To stay ahead, they need to shift their procurement mind-set toward commodity price risk management. By doing so, companies have achieved a 10 percent reduction in the earnings volatility caused by commodities.

MAKING RISK MANAGEMENT A PRIORITY

Some companies have figured this out and adapted their business models to this new reality. Companies like Tyson Foods and utilities like E.ON and RWE have long considered risk management to be at the core of their activities. In the past decade,

many major energy companies have also made commodity exposure a priority by founding and expanding trading business units which are now at the commercial heart of their business models. More recently, packaged consumer-goods companies have started to shift their stance toward commodity procurement. Indeed, some have founded trading businesses that cross all of their divisions. As a result, these companies can actively manage margins by managing their overall commodity position and risk management activities.

Across a wide variety of industries, a handful of players are gaining an edge over their competitors by adapting to a new environment in which procurement teams must be expert commodity price risk managers. That’s because these companies have gained a much deeper understanding of their commodity procurement risk exposure

and its impact on their margins. They have also developed the market intelligence to improve their management of this exposure.

As a result, these companies have more control over the impact of commodity price swings on their financial results and can even turn them into a positive. Beyond improving their margins on an absolute basis, they are able to improve the predictability of their financial results along with their perception by financial analysts.

Other companies are now following suit and building up capabilities in their procurement organizations. Meantime, leading players are preparing to broaden the scope of procurement even further. They are shifting their procurement function away from purely managing costs to a commercial function that works with sales teams to manage profitability.

A new competitive playing field is developing as all of these companies

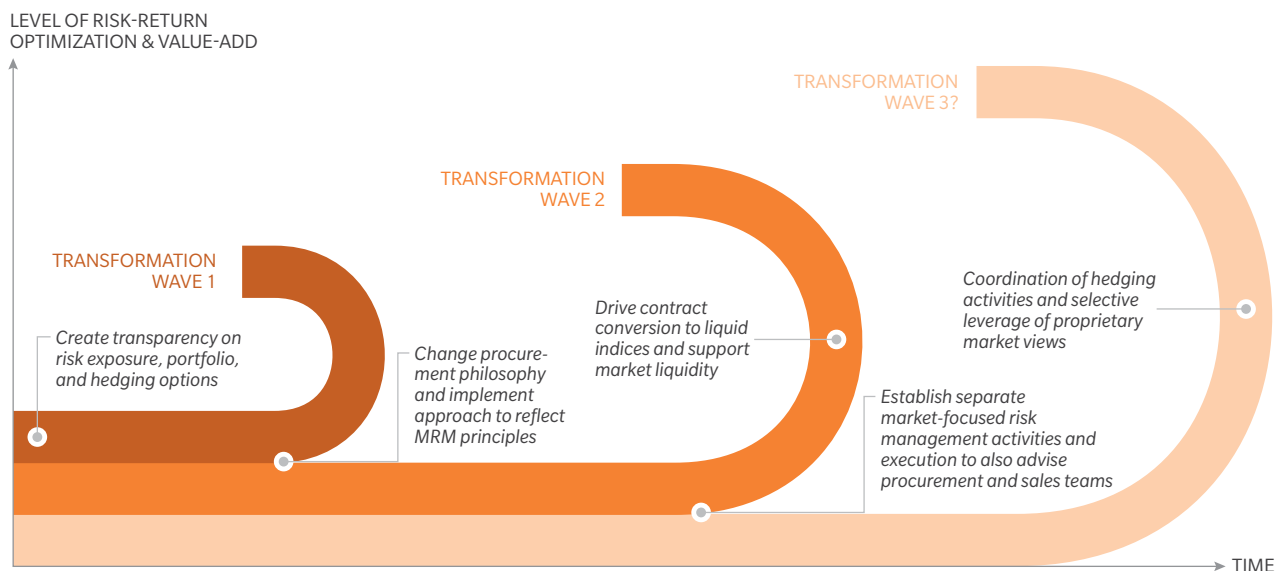
attempt to manage the impact of volatile raw material costs on their products. In response, they are providing more accurate and timely volume information across their entire organization – from treasury to manufacturing to sales. Companies are aware that in order to attain full margin control they need to go as far as training their sales force on how to cope with material-induced price changes so that they can discuss alternative contracts.

So how, in this new world, can companies turn volatile commodity prices to their advantage?

THINK ABOUT COMMODITY PRICE RISK MANAGEMENT, NOT PROCUREMENT

A shift to a focus on commodity price risk management means that you can't treat procurement as a division that simply secures supplies. Top-notch procurement

EXHIBIT 3: LEVELS OF COMMODITY PRICE RISK MANAGEMENT SOPHISTICATION



Source: Oliver Wyman analysis

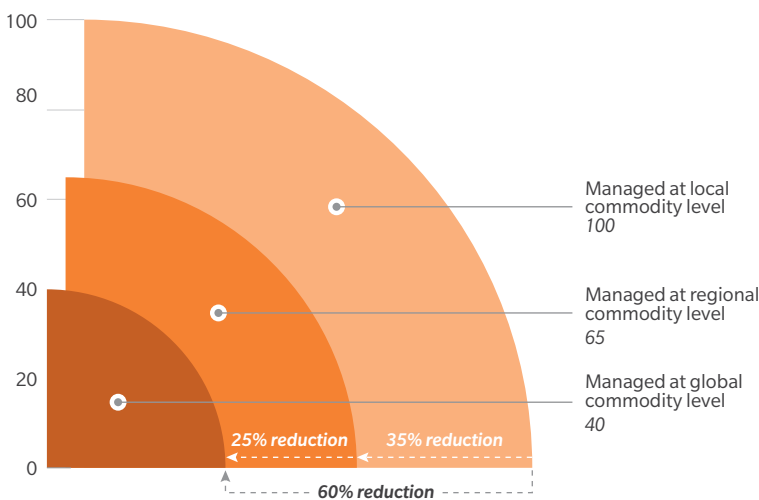
teams still source raw materials globally at the lowest cost possible, certainly. But they also use advanced risk management techniques to enable companies' contract strategies to optimize the trade-off between obtaining the lowest cost and mitigating the risk of a position. This might lead to a change in their value chain as some positions are more or less exposed to price movements. In some cases, for example, they may decide that companies should buy from their suppliers' suppliers to gain greater price certainty, even should it require an effort on their part to build relationships with new suppliers and deviate from traditional supply contracts.

To achieve this, procurement teams need to recognize that their role has evolved. Accomplishing this requires a real transformation and a risk-based culture that starts with top management setting a clear vision for how an organization will profit from volatile commodity prices. (See Exhibit 3.)

Leading companies that understand the potential of commodity price risk management set goals that require different levels of capabilities. Some set a target of creating full transparency across all of the company's commodity exposures and aligning procurement and hedging practices to match their risk appetite. More ambitious companies create a central specialized commodity risk management unit, which actively monitors commodity markets, restructures contracts, and hedges widely traded commodities. (This can sometimes entail economic or proxy hedging.) At the most sophisticated level, companies link procurement-controlled margin impact to sales activities. They may also take calculated bets to exploit potential market price movements on selected items in a controlled environment.

EXHIBIT 4: PORTFOLIO EFFECTS
 GLOBAL FOOD COMPANY EXAMPLE: REDUCING RISK EXPOSURE BY MANAGING IT AS A TOTAL PORTFOLIO VS. ADDING UP SEPARATE RISKS

ANNUAL COMMODITY PRICE RISK AS DELTA BETWEEN PLANNED COST AND 10 PERCENT WORST CASE, INDEXED



Source: Oliver Wyman analysis

FOCUS ON HOW VOLATILE COMMODITY PRICES IMPACT YOUR PROCUREMENT PORTFOLIO, NOT JUST ONE REGION OR COMMODITY

As barriers to markets have tumbled, it has become much easier for companies to source raw materials across dozens of significant commodities in multiple geographies. But at the same time, it's much more difficult to evaluate the financial impact resulting from market uncertainties. What management teams crave – and few procurement teams can provide – is the sum of the company's exposure to commodity risks across its entire portfolio. (See Exhibit 4.)



Unfortunately, many organizations have “grown” procurement organizations which rely mainly on local buyers to fulfill key roles in procurement – negotiating contracts, keeping an eye on local markets and relationships with suppliers, and managing the supply logistics. While these *physical* activities are important, the organizations often lack the oversight and the holistic *financial* picture necessary for a company in today’s environment of volatile commodity prices to manage the complete portfolio. As a result, they miss out on multiple opportunities to improve their margins by taking a more coordinated approach.

Companies skilled at identifying opportunities presented by volatile commodities tend to have centralized commodity procurement divisions with lead buyers who can develop contracting models, financial hedging, and sourcing strategies that take into account the potential impact of a company’s entire procurement portfolio across commodities

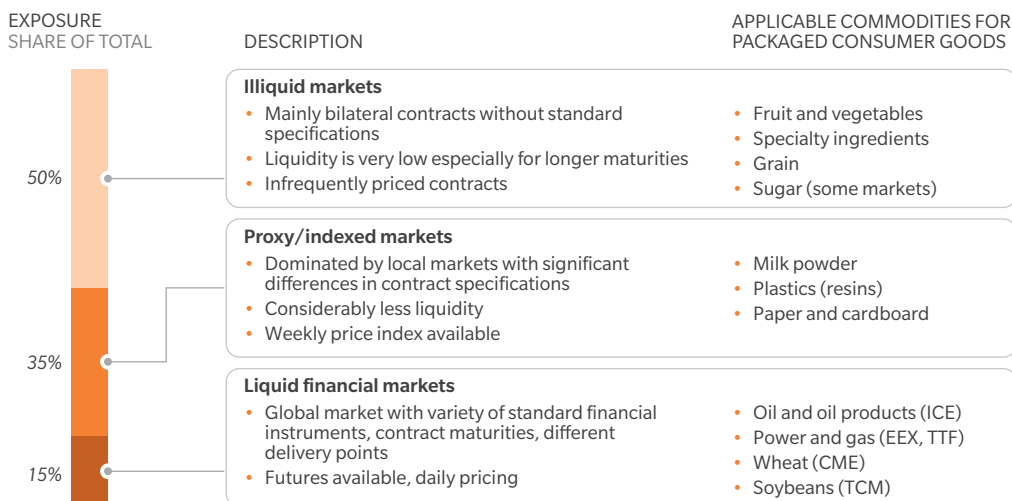
and geographies. They can nimbly take advantage of the fact that emerging markets may be able to cope with more volatile commodity prices since their sales prices can be more frequently adapted, for example.

By doing this, companies can reduce their exposure to commodity price swings by more than 60 percent, simply because they have a very different, and accurate, picture. As a result, they can avoid expensive mistakes such as overhedging without truly understanding their exposure and market dynamics.

DIRECT EFFORTS TOWARD ILLIQUID COMMODITIES, NOT JUST THOSE WIDELY TRADED

In working with companies to manage the impact of volatile commodity prices on their margins effectively, we have been struck by how often widely-traded commodities make up less than 5 to 10 percent of overall exposure.

EXHIBIT 5: TYPICAL SPLIT OF RAW MATERIAL SPEND FOR PACKAGED CONSUMER GOODS COMPANY



Source: Oliver Wyman analysis, split varies depending on production portfolio

Yet one of the the most cherished ideas in traditional procurement is that financial hedging using derivatives should be a company's first step to managing risks introduced by volatile commodity prices. This can be a mistake. Instead, it might make more sense for financial hedging to be the last step – implemented only after contracts have been restructured and changes have been made to the sourcing strategy that makes these instruments possible by linking their exposure to traded commodities.

One food company, for example, spent only 10 percent of its direct procurement budget on commodities that were traded on liquid financial markets. Forty percent of its budget was spent on commodities that were only available on semiliquid markets. There were no liquid markets for the remaining half of its commodity spend. (See Exhibit 5.)

For this company, and many others, the biggest levers to managing margins do not lie in financial hedging. Instead, they exist in effectively adapting contracts. For example, if a transparent market for a plastic does not exist, a company might price a plastics contract based on indices of widely traded raw materials used to produce the plastic. The pricing logic can also alleviate buyer's regret by introducing time lags, averaging prices across the month of purchase, or across cost-based formulas.

Adapting a company's sourcing strategy so that a company can reformulate a product and obtain raw materials from players further up the value chain can also have a huge impact. For example, one consumer goods company was able to increase its margins significantly by buying resins for plastics packaging directly from petrochemical companies rather than sourcing them through the packaging supplier. This way, they were able to contract different pricing formulas based on crude oil that could be hedged in the financial market.

INVOLVE SALES, TREASURY, AND FINANCE, NOT JUST THE PROCUREMENT DIVISION

To reach the ultimate goal of stabilizing and improving a company's margins, procurement teams need to work closely with the sales, treasury, and finance divisions.

While a procurement team will likely be the biggest driver for change, they will need input from sales and marketing to develop a perspective on how to improve a company's margins, given the company's flexibility and constraints on the customer side. Treasury needs to be involved, as they are often responsible for financial hedging. Finance is part of the process as they are responsible for midterm planning and therefore have the most natural interest in the development of the cost and margin structure and potential opportunity and threat scenarios.

To stay ahead, companies need to shift their procurement mind-set toward commodity price risk management

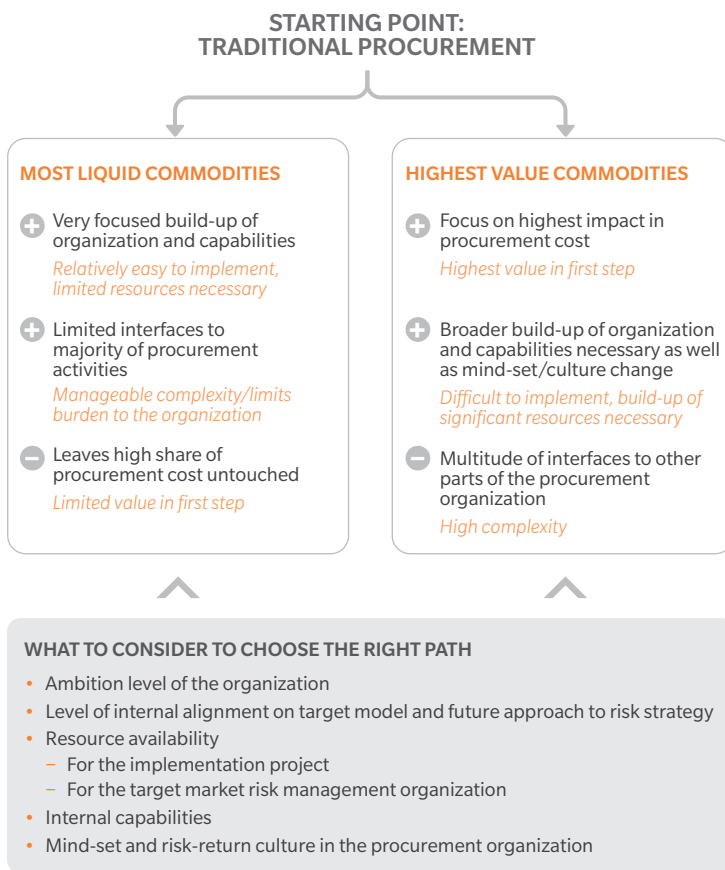
MASTER SOPHISTICATED RISK MANAGEMENT CONCEPTS, TOOLS, AND MARKET INTELLIGENCE

Companies that are capable of boosting their margins by conducting commodity risk management have models and tools that create transparency so that risk managers can nimbly evaluate options. Many also use dedicated market intelligence teams to monitor the market and collect information to stay ahead of sudden changes.

EXHIBIT 6: TRANSFORMATION PATHS
HOW TO START

Most companies operating in an environment of highly volatile commodity prices know perfectly well that they need to change their mode of operation. The problem is that the concrete actions necessary to develop the required organization, capabilities, and mind-set are less clear.

In our experience, companies that achieve some success early on in their transformation are more likely to reach their ultimate goal. They typically achieve this by taking one of two approaches. Some start with the most widely traded commodities and build a risk management function which acts similar to a trading organization within the scope of these raw materials. Others first address their biggest spend items to be sure that they have the biggest impact on the financial bottom line from the very first phase of their transformation.



A deep understanding also exists across the organization concerning the impact of commodities’ different contract structures, pricing formulas and indices, portfolio effects and correlations, risk-return terminology, and how they fit with the company’s overall risk appetite.

Ready or not, volatile commodity prices are rapidly reshaping industries. If companies fail to adapt their mode of procurement operations to engage in broader margin management, they risk experiencing rude surprises such as quarterly losses due to price spikes in the raw materials used in their products. In fact, this is already happening.

By contrast, companies that seize the opportunity created by the current upheaval to develop more sophisticated commodity price risk management capabilities are not just stabilizing their profits – they are improving them. That’s why commodity price risk management is no longer just a good idea. It’s a must.

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MANUFACTURERS TAKE ON MAINTENANCE

AIRPLANE MAKERS ARE MUSCLING INTO AIRCRAFT
MAINTENANCE, CREATING NEW RISKS FOR AIRLINES

DARRYL ROSE
CHRISTOPHER SPAFFORD

Aircraft equipment manufacturers have taken control of the maintenance aftermarket as traditional alternatives dry up. Airlines must intervene or face higher maintenance costs over the long term.

For years, third-party repair organizations, or maintenance, repair, and overhaul companies (MROs), and original equipment manufacturers (OEMs) fiercely competed for this business. But recently, major engine and component manufacturers have muscled into the aircraft maintenance market, steadily eliminating aftermarket opportunities for airlines.

In response, airlines now increasingly conduct maintenance procurement during the process of selecting aircraft equipment, according to Oliver Wyman's 2013 MRO Survey. This forces OEMs to compete against each other for large purchase and maintenance contracts lasting the life of the underlying fleet. While this trend benefits airlines, at least in the short term, it blocks independent MROs from major procurement campaigns altogether. And in the long run, as competition from independent MROs evaporates, airlines will pay higher maintenance costs.

The cost of maintenance is important. Though it represents a smaller piece of a typical airline's budget than labor and fuel, maintenance is often the largest controllable cost. With escalation on OEM materials commonly exceeding 5 percent per year, rising maintenance costs could even swing an airline from profit to loss.

For airlines, slowly enabling OEMs to control the maintenance market is like taking the family car to the local dealer for any kind of work, from major repairs to oil changes. If every car owner relies only on the dealer for maintenance, the low-cost neighborhood auto shops cannot survive, and the \$30 oil change vanishes.

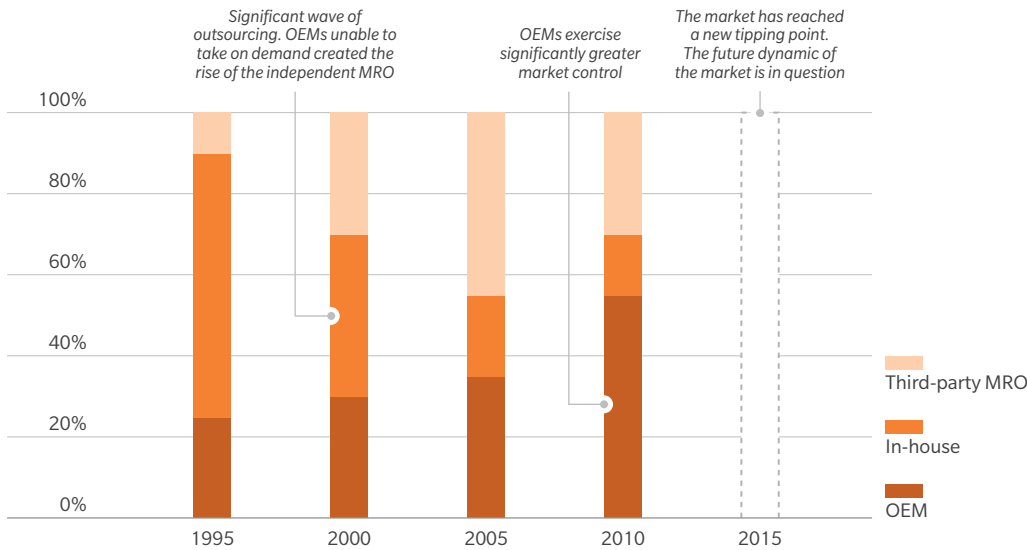
In the long run, as competition from independent MROs evaporates, airlines will pay higher maintenance costs

One example of how this dynamic boosts maintenance costs is that OEMs have largely eliminated availability of alternative parts. It used to be that airlines could buy non-OEM parts from manufacturers with a parts manufacturer approval. But now, OEMs have strategies to thwart the development of such parts, eliminating this cost reduction option from airlines' arsenals. Through additional tactics, such as controlling the dissemination of technical data needed to develop alternative repairs and releasing equipment upgrades that render established repair schemes obsolete, OEMs have shown the ability to consistently impede MRO competitors from mounting a threat to their dominant position.

FIGHTING OVER FLEETS

As a result of the growing dominance of OEMs, independent maintenance companies are left to vie for a diminishing share of work tied to mature fleets. They are fighting over fleets that OEMs have not locked up with more recent aftermarket strategies. Shorter removal intervals and heavier work scopes typical of older components are a boon to MROs today, but this market may already be endangered. Retirement of aircraft less than 25 years old has been rising, hitting 43 percent of all retirements in 2011, compared with just 21 percent in 2007. Recent retirements shrink the mature aircraft market and will harm the MROs relying on those fleets.

EXHIBIT 1: ENGINE MRO MARKET SHARE BY PROVIDER TYPE
ANNUAL COMMERCIAL AFTERMARKET SPEND



Sources: ACAS, OAG, Oliver Wyman analysis. Third-party includes major airline MROs like AFI, LHT, and SIAEC

Along with the work on aging fleets, MROs sign licensing deals with manufacturers, granting the maintenance companies a stream of work that helps keep them afloat. However, that work is generally doled out at the discretion of OEMs and often at vanishingly low margins. More than 70 percent of our MRO survey respondents indicate reaching at least one OEM partnership within the past three years. And more than 80 percent of such respondents characterize those partnerships as a licensing agreement. This is a short-term survival strategy that leaves the MROs in a subordinate position, prone to shifts in the licensor’s fulfillment strategies and to encroachments by equally hungry rivals.

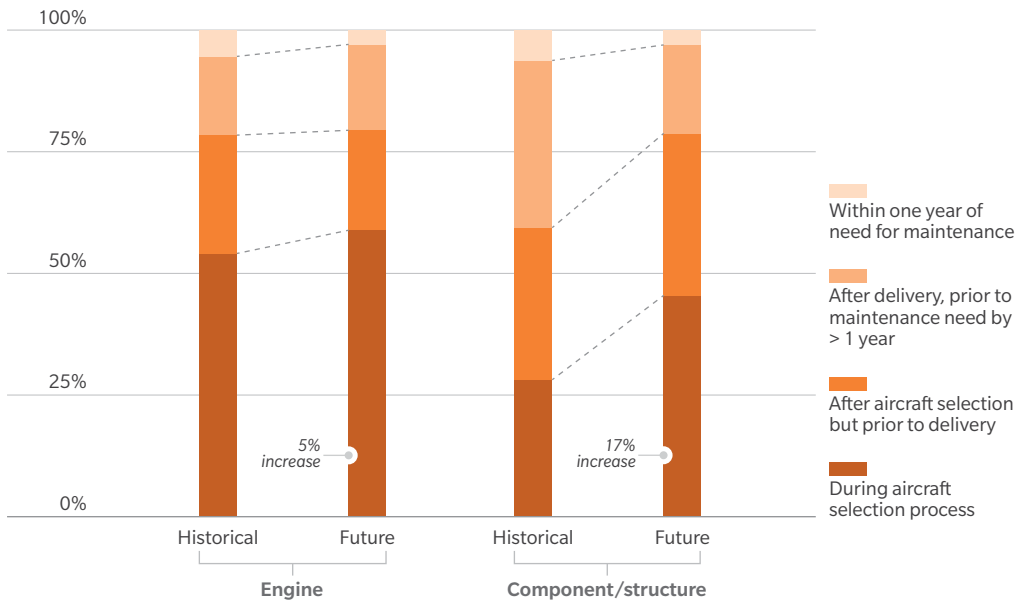
MROs seeking long-term prosperity must access the growing aftermarket for new aircraft models that OEMs dominate. Further, given the shrinking presence of viable alternatives, airlines would be wise to

invite independent maintenance companies into the bidding process.

WELCOME COMPETITION

Encouragingly, airlines do want a more robust maintenance market that includes MROs in a meaningful way. According to our survey, most airlines would welcome competition from MROs for long-term maintenance services as aircraft are purchased. And when purchasing aircraft, airline executives are giving greater consideration to maintenance cost forecasts. More than half of the airline respondents to our survey said maintenance experts lead or participate in the senior team to select new airplanes. And those selection teams are putting more weight on long-term contracts to calculate maintenance costs, rather than manufacturer forecasts.

EXHIBIT 2: AT WHAT POINT DID YOU CONDUCT THE MAINTENANCE SOURCING PROCESS?
 AIRLINE RESPONDENTS, HISTORICAL AND FUTURE



Source: Oliver Wyman MRO Survey

Another avenue for MROs to gain access to these transactions is partnering with aircraft lessors. Aircraft lessors already work with many operators at the point of aircraft acquisition. MROs could serve carriers in need of bundled services, as well as owners keen to ensure capable stewardship of their asset through its lifecycle. According to our companion survey of the aviation finance market, many lessors would support this strategy. Of lessor respondents, 70 percent indicate they already advise airlines on maintenance contracting matters. And a significant majority of our respondents also favor pairing MRO services with lease agreements for commercial (63 percent) and asset marketability (100 percent) reasons.

MROs could also consider partnerships with airframe manufacturers to gain access to the aircraft selection process. These players continue to develop their own

aftermarket service offerings, but so far with less success than their engine and component counterparts. More meaningful partnerships with maintenance companies could give airframe manufacturers a more credible and diverse presence in the aftermarket, while enabling MROs the access they need to new fleets.

There are clear challenges ahead for engine and component MROs. If left unattended, this critical piece of the industry could atrophy and put operators in a serious cost squeeze. Airlines would be well served to promote competition in the maintenance aftermarket by keeping the door open for MROs.

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Darryl Rose is a Dallas-based associate partner and **Christopher Spafford** is a Dallas-based partner in Oliver Wyman’s Aviation practice.



WHY THE US ECONOMY WILL BENEFIT FROM LNG EXPORTS

THE MACROECONOMIC IMPACTS OF LIQUEFIED
NATURAL GAS EXPORTS FROM THE UNITED STATES

W. DAVID MONTGOMERY
SUGANDHA D. TULADHAR

The United States has witnessed a significant shift in natural gas production in the past five years. Optimism about shale gas potential and accelerated recovery has created a shale gas boom. The belief that the US would continue to be a net importer of natural gas in the foreseeable future has completely changed. US shale gas production has increased rapidly due to advances in hydraulic fracturing and horizontal drilling techniques that have reduced production costs. The full-cycle cost of shale gas production dropped by about 40 to 50 percent relative to the cost of conventional natural gas extraction in 2011.

As a result, the outlook for natural gas production is more optimistic now than ever before. According to the latest *Annual Energy Outlook 2013* and Energy Information Administration projections, US natural gas production will increase by 40 percent by 2040 from its current level of 27.4 trillion cubic feet (tcf), mainly because of expected increases in shale gas production over the next two decades. Shale gas is projected to account for more than 50 percent of total US natural gas production by 2040.

NATURAL GAS FRONT AND CENTER

The shale boom has moved natural gas to center stage in energy policy debates. The potential for such a large supply of natural gas has generated interest in converting current regasification plants to liquefaction plants or even building new liquefaction plants to allow them to export liquefied natural gas to international markets. Oliver Wyman's NERA Economic Consulting, at the request of the US Department of Energy and the Office of Fossil Energy, conducted an objective and independent study to assess the potential macroeconomic impacts of LNG exports on the US economy.

NERA's study showed that rationalizations offered for prohibiting or limiting LNG exports – that overall energy prices will increase or that certain narrow sectors need to be protected – do not stand up to economic analysis. Consistent with basic free trade principles, the range of aggregate macroeconomic results from this study suggests that LNG exports have net benefits to the US economy as a whole and that trade restrictions would harm both the US economy and its trading partners.

LNG exports can only bring net economic benefits to the US economy in a global market that pays more for US natural gas than it costs to produce

The primary objective of the NERA study was to evaluate the macroeconomic impact of different levels of LNG exports based on a study conducted by the EIA. We addressed the same set of 16 scenarios for LNG exports analyzed by EIA. These scenarios incorporated different assumptions about the US natural gas supply and demand outlook and LNG export levels.

Our US natural gas outlook included a Business As Usual baseline consistent with the reference case of the AEO 2011; a High shale estimated ultimate recovery; and a Low EUR case based on AEO 2011. We also simulated macroeconomic impacts of other feasible LNG export scenarios by characterizing different international gas market conditions. To conduct this study, we combined NERA's forward-looking dynamic

computable general equilibrium model of the US economy with NERA's Global Natural Gas Model. The two models are linked through LNG export volumes and net-back prices.

We found that the US would only be able to market LNG successfully with higher global demand or lower US costs of production than in the reference cases. The market limits how high US natural gas prices can rise under pressure of LNG exports because importers will not purchase US LNG exports if the US wellhead price plus processing and transport costs rises above the cost of competing supplies.

MACROECONOMIC IMPACTS OF LNG EXPORTS ARE POSITIVE IN ALL CASES

There were net economic benefits to the US economy across all the scenarios that we examined in which the global market would take LNG exports from the US. Moreover, for every one of the market scenarios examined, net economic benefits increased as the level of LNG exports increased. In particular, scenarios with unlimited exports always had higher net economic benefits than corresponding cases with limited exports. There was no "sweet spot," and no point where any "balance" was required to gain the greatest benefits.

In all of these cases, benefits that come from export expansion would more than outweigh the costs of faster increases in natural gas production and slower growth in natural gas demand, so that LNG exports have net economic benefits in spite of higher domestic natural gas prices. This is exactly the outcome that economic theory describes when barriers to trade are removed.

Net benefits to the US would be highest if the US becomes capable of producing large quantities of natural gas from shale at low cost, if world demand for natural

The US economy is better off with unrestricted trade in natural gas than with any restrictions, because of basic international trade economics principles

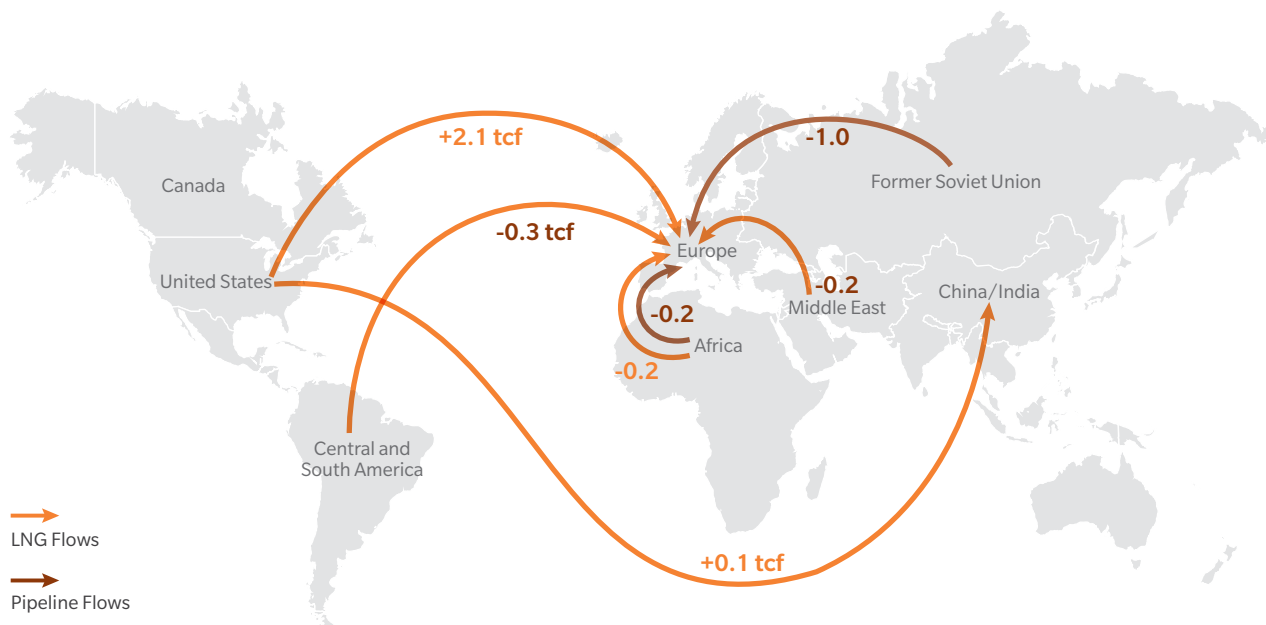
gas increases rapidly, and if LNG supplies from other regions are limited. If the promise of shale gas is not fulfilled and costs of producing natural gas in the US rise substantially, or if there are ample supplies of LNG from other regions to satisfy world demand, the US would not export LNG. (See Exhibit 1 for regional changes in LNG and pipeline flows.) Under these conditions, allowing exports of LNG would cause no change in natural gas prices and do no harm to the overall economy.

There should be nothing surprising about the conclusion that the US economy is better off with unrestricted trade in natural gas than with any restrictions, because basic international trade economics principles makes this prediction. This same conclusion is reached by all the other comprehensive studies of LNG exports, despite many differences in details of the level of exports and price impacts.

MODERATE IMPACTS ON US NATURAL GAS PRICES

US natural gas prices will increase modestly as a result of US exports of LNG. But the global market limits how high US natural gas prices can rise under pressure from LNG exports because importers will not purchase US exports if prices from the US rise above those of competing supplies. In particular, the US natural gas price does not become linked to oil prices in any of the cases examined.

EXHIBIT 1: HOW US LNG EXPORTS WILL IMPACT GLOBAL TRADE FLOWS



Source: NERA Economic Consulting analysis

Natural gas price changes attributable to LNG exports remain in a relatively narrow range across the entire range of scenarios. When the first round of export capacity is completed, LNG exports could cause domestic natural gas prices to rise from zero to \$0.33 per million cubic feet. The largest price increases that would be observed after five more years of potentially growing exports could range from \$0.22 to \$1.11 mcf. The higher end of the range is reached only under conditions of ample US supplies and low domestic natural gas prices, with smaller price increases when US supplies are more costly and domestic prices higher. The most likely range for LNG exports by 2025, even if DOE grants all of the licenses now pending, would be 2 to 4 tcf, with price increases in the US of no more than about \$0.50 mcf.

In addition, US natural gas prices will not rise to levels seen in Asian markets or in any other region that imports LNG from the US. Our analyses show that there will always be a difference of \$6 to \$8 between Asian prices and US prices, since that represents the cost of inland transportation, liquefying, shipping, and regasifying LNG to get it from the US to Japan or Korea. Even with no binding export limits, the US natural gas price will remain well below the import price in Asian markets, since Asian buyers have no incentive to buy natural gas in the US if it is not cheaper than their prevailing domestic price.



SERIOUS COMPETITIVE IMPACTS ARE LIKELY TO BE LIMITED

Economists who analyze how changes in energy costs affect energy-intensive, trade-exposed industries have reached a consensus that only narrowly defined segments of manufacturing are at risk from higher energy costs. Moreover, examination of the current competitive position of key US industries such as chemicals reveals that they will retain immense cost advantages over rivals in countries that import LNG from the US.

The reason is that just the cost of liquefying, transporting, and regasifying LNG in order to move it from the US to Asian or European chemical producers is more than the cost of natural gas to the US chemical industry. Thus even with natural gas exports, the US industry will retain a more than two to one natural gas cost advantage.

Trade benefits both exporters and importers. In Exhibit 1, we show how a high level of US

exports could affect the European market. In one scenario, market conditions led to US exports of 2.2 tcf in 2025, of which most were directed to Europe. Assuming that Russia did not respond by discounting prices, the result would be that lower cost US supplies would replace some Russian exports and trigger a drop of about \$0.50/MMBtu in European gas prices. Just the threat of competitive imports already seems to be causing Russia to reopen contracts and lower prices to Europe.

A major strategic question for companies is where in the transportation chain – gas procurement, liquefaction, shipping, regasification, or marketing – the best balance of risks and opportunities lies. When the global LNG market matures, price differentials among regions are likely to be driven down to the cost of liquefaction, transportation, and regasification due to increased competition. But the lack of export capacity and possible bottlenecks may create profit opportunities in some stages for some time – especially for companies that are able to establish a position.

CONCLUSION

In summary, the benefits that come from LNG export expansion will more than outweigh the costs of faster increases in natural gas production and slower growth in natural gas demand. LNG exports can only bring net economic benefits to the US economy in a global market that pays more for US natural gas than it costs to produce. Indeed, the global market provides a built-in safety valve. Even if the promise of shale gas is not fulfilled or ample supplies of LNG from other regions reduce demand for US exports, allowing unrestricted exports will do no harm. If foreign buyers do not want to pay as much as US natural gas users do, or enough to cover

the cost of incremental production to supply exports, LNG exports simply will not happen. This is an important risk for investors in LNG exports to assess, but for the consumer it is a built in protection against unexpected price increases.

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A BILLION DOLLAR DECISION CHARTING A NEW COURSE FOR U.S. HEALTHCARE BENEFITS

In today's complex healthcare landscape, companies really have just three basic options



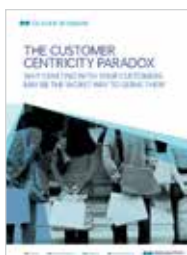
THE CLASH FOR CASH ATTRACTING CORPORATE LIQUIDITY IN ASIA PACIFIC WITHOUT A TRANSACTION BANKING FRANCHISE

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THE CUSTOMER CENTRICITY PARADOX WHY STARTING WITH YOUR CUSTOMERS MAY BE THE WORST WAY TO SERVE THEM

"Customer centricity" isn't a new idea, but retailers can get more from it by focusing on the places where better customer data means better decision making



GLOBAL BANKING FRACTURES THE IMPLICATIONS – MORGAN STANLEY AND OLIVER WYMAN WHOLESALE & INVESTMENT BANKING OUTLOOK 2013

Balkanized regulations, over-the-counter market reforms, and rising fixed costs are fracturing the global wholesale and investment banking industry



MANAGING IN AN AGE OF EARNINGS UNCERTAINTY

The 2013 AFP Risk Survey (published by the Association for Financial Professionals in collaboration with Oliver Wyman's Global Risk Center) identifies and analyzes the most significant risks to companies' earnings



MRO SURVEY 2013 THRIVE RATHER THAN SURVIVE – IT'S TIME FOR MROS TO ACT

For independent aviation maintenance, repair, and overhaul providers, the world is shrinking as original equipment manufacturers muscle into the maintenance market

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