Storns across the world of finance?

This issue of Review of Financial Markets spans much of the world, from London to Sydney. Anthony Belchambers, one of the most balanced City voices in the quest for a worthwhile Brexit, starts us off with a consideration of regulatory equivalence as a basis for UK access to the EU markets – and vice versa.

Then we turn our attention to the world of sustainable energy, and its impact on the great resource-rich nations of the world. Our guides here are Kairat Kelimbetov, Governor of the Astana International Financial Centre in Kazakhstan (and former governor of that huge Eurasian country's central bank); and Professor Alexander Van de Putte from one of Europe's very top business schools, IE Business School in Madrid. Last but far from least, Professor Elizabeth Sheedy and colleagues from Macquarie University in Australia shed light on a fascinating experiment on incentives and risk culture.

For background on our contributors, and to give your own view and join the conversation, please visit cisi.org/rfmq417. And as ever, any comments and contributions are most welcome; do get in touch.

George Littlejohn MCStI, senior adviser, CISI
Editor, Review of Financial Markets
george.littlejohn@cisi.org

THE CASE FOR POST-BREXIT SHARED EU/UK REGULATION

Anthony Belchambers, Chairman of the Legatum Financial Services Forum
belchambers@icloud.com

Back in January, in her "no bits of membership" speech, Britain's Prime Minister rejected the notion of UK membership of the single market on the basis that, while a "passport" would have maximised continued UK access to the EU market, the conditions of membership were politically unacceptable. The only option now is for the UK to negotiate access based on continuing regulatory equivalence with the EU – either as part of a pre-Brexit tailored agreement or in the context of post-Brexit third country mutual recognition.

Whether the UK has regulatory equivalence with the EU is not in question. Under the European Securities and Markets Authority's (ESMA's) own definition, it clearly has. As an EU member state, it is more equivalent than any other third country and – as envisaged in the EU (Withdrawal) Bill – that will continue post Brexit.

Indeed, some believe that equivalence could be extended to provide the same 'passporting' rights as if the UK were still in the EU. Unfortunately, not all business lines are covered by equivalence and, even if they were, having cake and eating it is not a negotiating option, otherwise half the member states could be serving their own Article 50 notices! Others believe their particular business lines do not need any bestowed rights of EU access, in some cases, relying on characteristic performance or reverse solicitation. However, both these alternatives carry real legal risks and the EU may well close off what it perceives to be post-Brexit regulatory 'loopholes'.

The fact is, absent any special arrangements, access based on equivalence is likely to be less reliable and narrower in scope than passported access. The Commission intends to make the process of measuring and monitoring equivalence more robust, but it has to be seen whether that will make it more reliable or more restrictive.

One real option for strengthening equivalence could be shared regulation. International compliance with the G20 objectives, the Basel prudential requirements and the International Organization of Securities Commissions' (IOSCO’s) conduct and market standards may have significantly reduced regulatory differentiation; strengthened Memorandums of Understanding have improved information flows between regulators; and globalisation is clearly forcing the pace on cooperation. As against that, IOSCO’s Task force on cross-border regulation (FR23/2015) finds that regulators lack the confidence to delegate their regulatory and supervisory responsibilities to their counterparts. Even if that were not the case, the IOSCO standards lack the detail to provide, in themselves, a basis for equivalence sufficient to enable regulators to safely outsource their regulatory responsibilities.

What does shared regulation mean?

Share regulation would include inter alia retaining regulatory colleges in the case of market infrastructures and systemically important institutions; enhancing information-sharing gateways; enlarging cooperation protocols; facilitating shared supervision; and collaborating more closely on regulatory policy. The underlying issue for the UK is how much cross-border cooperation could be demanded and how much may be conceded. Sharing regulation in this way will be to the advantage of both the EU and the UK (and to wider Europe) in that it should:

(a) reduce compliance complexity for firms and enhance/clarify investor protection rules for customers when carrying on EU/UK cross-border business;
(b) reduce the risk – and therefore political concerns – regarding possible anti-competitive consequences in facilitating inward access;
(c) strengthen confidence in regulatory ‘equivalence’ as a basis for access and reduce concerns over the importation of foreign-sourced systemic and investor risk;
(d) facilitate efficiency by reducing concerns over the outsourcing of key functions instead of requiring their duplication.

All this may call for a new consensual, pan-European ‘IOSCO’, ie, without the rule-making mandate of ESMA to, for example:

- strengthen and future-proof EU/UK equivalence, eg, by providing a mechanism for early notification and discussion of rules changes in advance of notification
- approximate standards in market regulation to the point where CMU for the EU27 could (possibly!) be extended to non-EU European countries, including a post-Brexit UK, and so enlarge the pool of market liquidity and the sources of capital and investment
- ensure the even-handed pan-European implementation of

international standards
- facilitate multi-regulatory information sharing
- provide an independent mechanism for dispute resolution for pan-European regulatory issues.

The advantages of shared regulation are self-evident, but there are also red lines! Shared regulation must not overturn the primacy and lead role of licencing authorities or become a back-door route to rule-taking. Equally, it must not restrict the UK from developing a more proportionate framework of regulation for domestic SMEs; or negotiating its own access/recognition arrangements in financial services with third countries.

Shared regulation could, for example, provide a workable interjurisdictional compromise to the controversial proposal of the European Central Bank (ECB) to restrict euroclearing to the eurozone.

The European Central Bank (ECB) is (understandably) concerned over the level of potential systemic risk posed by large volumes of euro-denominated business being cleared in London outside the eurozone and now, post Brexit, beyond the reach of the EU authorities. At the same time, its proposal to restrict euroclearing to the eurozone also carries significant economic, legal and risk-related consequences (see the FSNF Forum2 paper Euro-clearing and Brexit: the practitioner’s view).3 These include undermining the euro’s role and reputation as an internationally traded currency, damaging market liquidity and distorting the economics of market participation by increasing the costs of raising capital, trading, investing and managing portfolio and commercial risks. Even the risk of a ‘tit for tat’ response from affected countries cannot be discounted!

Of course, all EU central counterparty clearing houses (CCPs), including those licenced in the UK, are regulated to the same high standard and that will continue post Brexit. Shared regulation could, however, provide an additional degree of regulatory enhancement sufficient to satisfy the ECB’s systemic risk concerns and avoid the market disruption of relocation. It could include the continuation of the EMIR regulatory colleges, enhanced supervision and a more shared approach to oversight similar to the US conditions in place for recognising non-US CCPs. It is, of course, a decision for the UK authorities as to how much ‘consent to jurisdiction’ they are prepared to concede in the wider market interest.

All this suggests that one of the first and protracted negotiation priorities of the EU and the UK should be to decide on how they are going to collaborate on regulation post-Brexit – and this is yet another reason for a transitional arrangement.

Conclusion

As markets and risk go global, regulatory harmonisation through the development of more granular international requirements should take on a higher degree of urgency. In the interim, shared regulation will help to balance the trade-off between, as the IOSCO report put it, “increased cross-border market access and financial activity, on the one hand, and maintaining appropriate levels of investor protection and managing the importation of potentially harmful risk, on the other”. On that basis, a high degree of post-Brexit shared regulation must be in the best interests of the EU, the UK and the wider Europe.

2. The FSNForum has since merged with the Legatum Institute and is now the Legatum Financial Services Forum
The Petroleum Age, the era dominated by petroleum and other fossil fuels, has driven economic growth initially in Organisation for Economic Co-operation and Development (OECD) countries and increasingly in emerging markets, resulting in a commodities supercycle. Global climate change, slower economic growth globally and in China, an acceleration in the deployment of renewable energy technologies, and resulting persistent lower oil prices, put natural resource-rich countries at a significant disadvantage compared to countries with a well-diversified economy.

Since April 2014, oil prices have come down from levels above $100 per barrel and have stayed at roughly half that price. Now that oil prices are low, and will likely stay low, the question has become: How can these countries achieve sustainable development?

Most oil-rich countries have built their economic model on extracting and depleting natural capital to grow financial capital, without much attention to the other types of capital. Environmentalists tend to consider only natural capital, while economists tend to focus only on financial capital, and social scientists tend to focus on social capital and reducing inequality. These unidimensional approaches to economic development do not work. Instead, a comprehensive approach to sustainable development is needed. Sustainable development is concerned with balancing and growing or maintaining all five types of capital – financial, natural, manufactured, social and human.

Although oil-rich countries will continue to depend on natural resources for the next few decades, they need to create the foundations to develop sustainable economies that are not dependent on natural resources. Here, we lay out a four-pronged strategy about how this can be achieved, now that the energy transition away from oil is already underway.

### The Energy Transition Away from Oil is Already Underway

Something which ten years ago would not have been considered plausible is actually happening, and the conventional wisdom is moving away from a world of resource scarcity to a world of peak demand for oil and one that is increasingly driven by natural gas and by renewable energy. Not the end, but the gradual decline of the oil era is fast approaching.

The commodities supercycle has ended, and is unlikely to return. Although oil wells had been drilled in China during the 4th century, the Modern Petroleum Age, the era dominated by petroleum and other fossil fuels, began with the first modern-day oil well drilled in Baku, Azerbaijan in 1846. Colonel Drake in Pennsylvania, on the other hand, drilled the first commercial oil well in 1859 using a steam engine. Drake was under contract by the Seneca Oil Company whose oil products were initially used for kerosene and oil lamps. Large petroleum discoveries in Sumatra, Persia, Peru and Mexico, combined with the 1908 launch of the Ford Model T, the first mass produced car by Ford Motor Company, dramatically accelerated the demand for oil and oil products.

Rebuilding Europe following World War II, followed by an acceleration in trade, eventually led to globalisation that resulted in rapid economic growth and the shift in economic gravity from west to east. This led to a commodities supercycle, primarily driven by China and other BRICS (Brazil; Russia; India; China; South Africa) countries.

Today, the top three oil producing countries are the US, Saudi Arabia, and the Russian Federation, each producing more than 10 million barrels per day (mmbd). The other oil producing countries produce less than 5 mmbd, less than half of the three production leaders. Only since 2013 has the US joined the ‘club of 10 mmbd’ and this is primarily because of the shale revolution. Iran’s oil production, currently at 3.9 mmbd, is likely to increase given that sanctions have been lifted and Iraq, despite the ongoing instability in the country, has been able to increase oil production from 2 to 4 mmbd since 1996 (Table 1). As a result, it is unlikely that we will see a shortage of oil in oil markets any time soon.

![Table 1: Top ten oil producing and consuming countries, 2015 (mmbd)](http://www.bp.com/en/global/corporate/energy-economics/statistical-review-of-world-energy.html)

<table>
<thead>
<tr>
<th>Producing countries</th>
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<th>Consuming countries</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Country</td>
<td>Production</td>
<td>Country</td>
<td>Consumption</td>
</tr>
<tr>
<td>US</td>
<td>12.7</td>
<td>US</td>
<td>19.4</td>
</tr>
<tr>
<td>Saudi Arabia</td>
<td>12.0</td>
<td>China</td>
<td>12.0</td>
</tr>
<tr>
<td>Russian Federation</td>
<td>11.0</td>
<td>India</td>
<td>4.2</td>
</tr>
<tr>
<td>Canada</td>
<td>4.4</td>
<td>Japan</td>
<td>4.2</td>
</tr>
<tr>
<td>China</td>
<td>4.3</td>
<td>Saudi Arabia</td>
<td>3.9</td>
</tr>
<tr>
<td>Iraq</td>
<td>4.0</td>
<td>Brazil</td>
<td>3.2</td>
</tr>
<tr>
<td>Iran</td>
<td>3.9</td>
<td>Russian Federation</td>
<td>3.1</td>
</tr>
<tr>
<td>Kuwait</td>
<td>3.1</td>
<td>South Korea</td>
<td>2.6</td>
</tr>
<tr>
<td>Venezuela</td>
<td>2.6</td>
<td>Germany</td>
<td>2.3</td>
</tr>
<tr>
<td>Brazil</td>
<td>2.5</td>
<td>Canada</td>
<td>2.3</td>
</tr>
</tbody>
</table>

Oil was historically considered to be the most versatile of fuels and is today consumed in a variety of ways, such as: 1) transportation fuels (kerosene for aviation, diesel and gasoline to power cars, and marine fuels for shipping); 2) fuel oils for electricity generation and heating; 3) feedstock for plastics and chemicals; and 4) asphalt, mainly for roads.

In 2015, global oil consumption exceeded for the first time 95 million barrels per day, or more than a thousand barrels per second.

Until the 2008 global financial and economic crisis, China and the US were the growth engines of the world. For more than two decades, the Chinese economy grew at more than 10% in real terms, something that has been referred to as the ‘Chinese miracle’. This growth was driven by an export-led strategy and very rapid urbanisation towards the coastal cities, such as Shanghai, Hangzhou, and Shenzhen. Investment in urban cities, factories, and transport infrastructure led to a commodities boom or supercycle never seen in human history. However, since the global financial and economic crisis and the economic slowdown, especially in China, the demand for commodities and oil is growing more slowly. Several Chinese ghost cities have emerged as a result, with empty apartment blocks and manufacturing facilities, conservatively estimated to be the size of a large European city. While China was growing at double digits, India was growing at 5–6% during most of the 1990s and the early part of the 21st century. It is only recently that the Indian economy has...
been growing at 7–8%. But even with India growing faster, it is unlikely that the world will see another commodities supercycle.

GLOBAL ACTION ON CLIMATE CHANGE AND ACCELERATION IN RENEWABLES DEPLOYMENT WILL LEAD TO PEAK DEMAND FOR OIL

A theory that is still used in the oil and gas sector, and by policy makers globally, is the ‘Hubbert peak theory’ developed by Dr MK Hubbert in 1956. He predicted that oil production of the US Lower 48 states – the contiguous US – would peak by the year 1970.4 This view challenged the consensus view that US oil production would continue to rise until at least the end of the century. Hubbert reasoned that since oil is an exhaustible resource, the rate of discovering new reserves would eventually reach a peak. Cumulative discoveries will therefore follow an S-shaped curve over time. Although the theory has its limitations, it proved to be initially very accurate for the US Lower 48 states as the initial peak year turned out to be 1970, the date predicted by Hubbert’s theory.

Since the 1970s, the world has frantically looked at this, and given that natural resources are finite, it was deemed logical that this could also happen one day at the global level. The late Mathew Simmons, author of Twilight in the desert, fueled much fear during the late 1990s and early part of the 21st century with claims that the world was running out of oil before a viable alternative would be able to replace it. What Simmons and others did not include in their projections was that advances in technology (such as 4D seismic combined with big data analytics), ultra-deep-water exploration, the prospects to economically develop the Athabasca oil sands in Canada and in the Orinoco basin in Venezuela, and the emergence of hydraulic fracturing would change all that. As a result, the peak oil theory has now been debunked.

Another reason why the peak oil theory has fallen by the wayside is that energy transitions did not happen because of resource scarcity – wood fuel gave way to coal because of “energy density, ease of use and the rise of personal mobility,” and coal gave way to oil because of “ease of use, versatility and universal appeal.” 5

Instead of peak oil, several organisations are starting to see another phenomenon. Royal Dutch Shell in its New Lens Scenarios (2013),6 OPEC in its World Oil Outlook (2016),7 and the World Energy Council (WEC) in its World Energy Scenarios (2016),8 see peak demand for oil happening within the next five to 15 years. What is driving the anticipated peak demand for oil? There are five factors to consider:

1. The first is sluggish global economic growth, especially since the 2008 global financial and economic crisis. World Bank data shows a gradual decline in global GDP growth from more than 5% during the 1960s, to less than 3% over the past 5 years.9 GDP growth has also become more volatile and has proven to be highly vulnerable to exogenous shocks, such as the oil price shocks of 1973 and 1979, and the 2008 global financial and economic crisis. Slower and more volatile global economic growth translates directly into less demand for natural resources, including oil and oil products, even when we account for the shift in growth of oil demand from OECD to developing countries.

2. Second is the acceleration in technology development and deployment clock speed has become apparent, leading to a renewables ‘revolution’.12 This combined with lower costs, especially of solar, has translated into dramatic growth in electric renewables.

3. Third is the unprecedented global climate deal following the Paris Agreement. The Paris Agreement, which came into effect on November 4, 2016, provides a framework to reduce carbon emissions globally and reduce our addiction to hydrocarbons.

4. Fourth is the expected electrification of the personal mobility sector, which will eat directly into the demand for oil.

5. Finally, the focus on energy efficiency, such as better insulation, smart devices that monitor energy use, and efficient lighting (such as light-emitting diodes or LEDs), also points to a coming peak in demand.

Three of these factors – growth of electric renewables, electrification of personal mobility, and energy efficiency – have now reached a point of no return, implying that demand for oil will likely peak over the next five to 15 years, providing little time for oil-exporting countries to diversify their economies and capture value-added (instead of exporting) commodities.

Figure 1 provides a simple systems diagram illustrating the non-linear relationships between these five factors, ultimately leading to peak oil demand. While other scenarios are possible, it is striking that several organisations independently arrived at a similar outcome.

Figure 1: Simple systems diagram leading to peak oil demand

Peak demand does not imply that soon all primary energy will be derived from renewable sources, such as wind and solar. It implies that oil demand peaks during the next five to 15 years, followed by a gradual decline, and that wind and solar gain significant share over the next 40 to 50 years. Another factor that is often not considered when exploring the future of oil is that petroleum is used not only as a transportation fuel, but also as a feedstock for plastics and chemicals. To provide a viable alternative to oil, renewable biofuels will need to scale faster and breakthroughs in second-generation biofuels are needed. Today, all the oil majors have major investment programs and operations in first- and second-generation biofuels, because they see it as the logical evolution of their current business model – only the feedstock will be different.

Many Resource-Rich Countries Have Fallen Victim to the Resource Curse and Still Need to Explore the Concept of Sustainable Development

When economic rents come relatively easy because of the exploitation of natural resources, countries and their citizens often lack the desire to consider the long term and explore ways to diversify their economies, capture value-added, and distribute wealth evenly. This phenomenon is often referred to as the ‘resource curse’ and very few countries have been able to avoid it. Evidence shows that natural resource-dependent countries that have implemented a proper diversification strategy are able to grow faster, are less exposed to economic volatility, and have a proven track record of job creation compared to those countries that have not.

Most oil-rich countries are less diversified today than during the 1990s, resulting in reduced global competitiveness

Sachs and Warner (2001) conducted an extensive study covering a 20-year period from 1970 until 1989 to test whether the resource curse phenomenon is actually true. They found that during this period, economic growth in natural resource-dependent countries stagnated, implying that the natural resource curse holds. The driving forces behind the stagnation of economic growth are the result of ineffective local institutions, prevailing bureaucracy, and in some cases corruption.

To illustrate the challenges that natural resource-dependent countries face in avoiding the resource curse, consider the following example. In natural resource-dependent countries, governments levy taxes on the extraction industry, which they then use for public expenditures. In this context, taxes levied on the citizens are a small portion of the total government funds and, as a result, the citizens are less incentivised to challenge government spending, potentially leading to the inefficient allocation of resources, or corruption. In a natural resource-poor country, on the other hand, an important share of government funds comes from the taxes paid by its citizens who are thus more likely to scrutinise government spending. Figure 2 contrasts citizens’ incentives for oversight of government spending in natural resource-dependent and resource-poor countries.

A related phenomenon is ‘Dutch disease’. When the Netherlands discovered the Groningen natural gas field in 1959 and subsequently started developing the field to export natural gas to neighboring countries, they observed an important appreciation of the Dutch guilder, the national currency at the time. Although the Netherlands was already a diversified economy, the currency appreciation artificially increased the export price of Dutch agricultural and manufactured products, making them uncompetitive in international markets. The Netherlands could address the challenges related to Dutch disease, but it was a lengthy and painful process of readjustment. For natural resource-dependent countries, the Dutch disease phenomenon makes it even more difficult to diversify the economy away from natural resources and implement an export-led economy.

Infrastructure investment – roads, rail, ports, power and telecommunications – generally has a strong economic multiplier. The same applies to supply infrastructure – drilling rigs, pipelines, refineries, retail stations, and export terminals – needed to develop natural resources. However, natural resource-dependent countries tend to underinvest in all types of infrastructure and do not pay much attention to developing support services and local content. The insufficient investment in infrastructure and local content reduces a natural resource-dependent country’s capacity to effectively compete and many countries find themselves in a poverty trap.

The Observatory of Economic Complexity at the Massachusetts Institute of Technology media lab measures a country’s economic complexity. A higher economic complexity score implies a higher degree of multiplicity of know-how encapsulated in the economy of a country. The resulting Economic Complexity Indicator (ECI) measures the degree of complexity and variety of goods produced in each country. ECI measures the degree of diversification of a country’s economy and how complex its export products are. Table 2 provides a summary of the economic complexity of several natural resource-rich countries. Note that the US is among the largest oil producers in the world yet it is not considered a natural resource-dependent country given the diversity and dynamics of its economy.

Figure 2: Oversight incentives of government spending in natural resource-dependent and resource-poor countries

Table 2: Economic Complexity Indicator (ECI) of Natural Resource-Rich Countries

<table>
<thead>
<tr>
<th>Country</th>
<th>ECI Score</th>
<th>Industry Complexity</th>
<th>Trade Complexity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Norway</td>
<td>0.95</td>
<td>0.84</td>
<td>0.92</td>
</tr>
<tr>
<td>Canada</td>
<td>0.94</td>
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<tr>
<td>Australia</td>
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<td>0.81</td>
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</tr>
<tr>
<td>United States</td>
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</tr>
<tr>
<td>Brazil</td>
<td>0.89</td>
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</tr>
<tr>
<td>Russia</td>
<td>0.87</td>
<td>0.75</td>
<td>0.88</td>
</tr>
</tbody>
</table>

15. http://atlas.cid.harvard.edu/about/glossary
Among the natural resource-dependent countries, only Norway ranks among the top 20 (out of 141) in terms of economic complexity, with Mexico, Canada, Malaysia, and Saudi Arabia scoring relatively well. In other words, natural resource-poor countries take the top 19 positions. The five countries with the highest ECI are: Japan (2.30), Switzerland (2.14), Germany (2.09), Sweden (1.85), and the United States (1.83) claiming the top spots.

Table 2: Economic complexity of selected natural resource-dependent countries in 2015

<table>
<thead>
<tr>
<th>Country</th>
<th>Rank</th>
<th>ECI</th>
<th>Country</th>
<th>Rank</th>
<th>ECI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mexico</td>
<td>21</td>
<td>1.20</td>
<td>Kazakhstan</td>
<td>48</td>
<td>0.40</td>
</tr>
<tr>
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<td>22</td>
<td>1.18</td>
<td>India</td>
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<td>0.39</td>
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<tr>
<td>Malaysia</td>
<td>23</td>
<td>1.15</td>
<td>Colombia</td>
<td>57</td>
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<td>Russia</td>
<td>26</td>
<td>1.08</td>
<td>Australia</td>
<td>58</td>
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</tr>
<tr>
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<td>Chile</td>
<td>60</td>
<td>0.23</td>
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<td>UAE</td>
<td>60</td>
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<tr>
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<td>Algeria</td>
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<td>46</td>
<td>0.45</td>
<td>Nigeria</td>
<td>140</td>
<td>-2.07</td>
</tr>
</tbody>
</table>

The McKinsey Global Institute’s study, *Reverse the curse: maximising the potential of resource-driven economies*, plotted the world’s natural resource-dependent countries based on the compounded annual growth rate of per capita GDP against per capita GDP, and the results are startling (Figure 3). Based on data from 2011, and before the oil price decline, only 5% of the 58 countries assessed have both a compounded annual growth rate higher than the 2.5% average, and a GDP per capita higher than the $10,900 average, while 77% have below average GDP levels, implying that most natural resource-dependent countries are stuck in the middle.

But not all prosperous countries have a high ECI. Qatar is a good example. Although Qatar has amongst the highest GDPs per capita in the world, it ranks 60th in the world based on ECI and behind Mexico, Brazil, Kazakhstan, and Colombia. There are several reasons to explain this apparent discrepancy: 1) Qatar has some of the largest natural gas reserves in the world and is the largest liquefied natural gas (LNG) exporter, 2) Qatar has a very small population of about 2.2 million, and 3) its economy is too dependent on a single commodity. The key question is how Qatar will be able to turn resource rents into long-term prosperity given that its economy is overly dependent on the export of a single finite natural resource.

Economic complexity (and not GDP per capita) as a predictive tool for economic growth tends to indicate that natural resource-rich countries will grow slower compared to the global average, making it difficult to avoid the resource curse.

**THE HIGH FIXED COST OF DEVELOPING NATURAL RESOURCES AND LACK OF ECONOMIC DIVERSIFICATION HAS RESULTED IN INTRINSICALLY HIGH VOLATILITY**

As discussed, most resource-dependent countries have not been able to benefit economically from monetising natural resources, and they tend to share three characteristics: 1) a per capita income below the global average, 2) growth slower than the global average, and 3) more volatile growth.

To illustrate how resource dependency amplifies the volatility of growth, consider four resource-dependent countries: Iraq; Kazakhstan; Nigeria; and Saudi Arabia. In 2013, the average oil price reached $96 per barrel, while two years later, in 2015, it averaged $45 per barrel or a 53% reduction in the oil price. In 2013, given the high oil price, the real growth rate in all these countries was high, but after the halving of the oil price, real GDP growth in these countries was significantly reduced. Table 3 overleaf shows that a 53% reduction in the oil price led to a 68% reduction in GDP growth for Iraq, a 79% reduction for Kazakhstan, a 69% reduction for Nigeria, and a 65% reduction for Saudi Arabia.
To have low economic complexity and need to import value-added goods, natural resource-dependent countries also tend to have low economic complexity and need to import value-added goods, and social welfare programs, these days the fiscal break-even prices of oil-exporting countries are above the current oil price and despite spending cuts in many oil-exporting countries, fiscal challenges remain. Since the sharp oil price decline, OPEC countries have lost over $2tn in revenues and investments, and many countries are tapping into their sovereign wealth funds, stabilisation funds, and foreign-exchange reserves at central banks to continue to finance welfare programs and support energy subsidies. For example, Saudi Arabia’s foreign reserves shrank by 16% to $555m during the September 2015 to August 2016 period, and this despite a recent reduction in welfare spending and modest energy subsidy reforms. Saudi Arabia is, generally speaking, in a better position than other natural resource-dependent countries to reverse the curse and this is primarily for three reasons: 1) Saudi Arabia already has a relatively high ECI, indicating that its export basket is quite diverse and not fully dependent on oil; 2) welfare and energy subsidies are relatively easy to reform; and 3) the country has one of the largest sovereign wealth funds in the world and it has started the partial (5%) flotation of Saudi Aramco, by far the world’s largest oil company. Although there may be other factors that have played a role in the sharp decrease of the real GDP growth of these four resource-dependent countries, such as lower demand for oil, it is clear that the consequences of a change in an exogenous factor have a multiplicative impact on economic growth.

What adds to the volatility is that international oil companies (IOCs) and national oil companies (NOCs) alike will tend to delay investment in exploration and production during periods of low oil prices. And when expectations about an albeit modest oil price increase emerged following, for example, the November 2016 OPEC production cut, the IOCs restarted exploration activity and the shale producers scaled up production. Exploration and shale production have become the two levers for IOCs to manage costs and future production depending on the oil price, which further increases oil price volatility and the volatility of economic growth of resource-dependent countries.

To manage volatility, the governments of several countries, including Azerbaijan, Chile, Kazakhstan, Russia, Saudi Arabia, Turkmenistan, and the United Arab Emirates, have used stabilisation funds to help them offset cyclical fluctuations. Although stabilisation funds have helped to smooth government spending in the short term, they have not been able to offset the fluctuations in economic output.

It is important to keep in mind that these stabilisation funds are not a solution. Instead, they provide further incentives for natural resource-rich countries to focus on the short term, instead of developing tangible sustainable development solutions, such as exploring ways to diversify their economies, capture value-added, and distribute wealth evenly. At best, stabilisation funds allow natural resource-rich countries to buy time for their diversification strategies to work.

As has been discussed, natural resource-dependent countries also tend to have low economic complexity and need to import value-added products, such as cars, delivery trucks, appliances, planes, pharmaceutical products, and even food. Because of the dependence on oil exports, value-added goods imports, and social welfare programs, these days the fiscal break-even prices of oil-exporting countries are above the current oil price and despite spending cuts in many oil-exporting countries, fiscal challenges remain. Since the sharp oil price decline, OPEC countries have lost over $2tn in revenues and investments, and many countries are tapping into their sovereign wealth funds, stabilisation funds, and foreign-exchange reserves at central banks to continue to finance welfare programs and support energy subsidies. For example, Saudi Arabia’s foreign reserves shrank by 16% to $555m during the September 2015 to August 2016 period, and this despite a recent reduction in welfare spending and modest energy subsidy reforms. Saudi Arabia is, generally speaking, in a better position than other natural resource-dependent countries to reverse the curse and this is primarily for three reasons: 1) Saudi Arabia already has a relatively high ECI, indicating that its export basket is quite diverse and not fully dependent on oil; 2) welfare and energy subsidies are relatively easy to reform; and 3) the country has one of the largest sovereign wealth funds in the world and it has started the partial (5%) flotation of Saudi Aramco, by far the world’s largest oil company.

If Saudi Arabia can address these issues, its economy will become much more competitive and resilient to external shocks. It will also set the benchmark for other natural resource-dependent countries to follow.

### RESOURCE-RICH COUNTRIES NEED TO EXPLORE AN ALTERNATIVE AND MORE SUSTAINABLE DEVELOPMENT MODEL

Historical attempts to diversify the economies of oil-rich countries have, apart from a few exceptions such as Norway, typically not worked. Economists argue that resource-rich countries are different and that they will continue to be more extractive and tend to suggest implementing fiscal reforms and managing volatility as an alternative to economic diversification. Unfortunately for natural resource-rich countries, the current realities are fundamentally different and continuing to rely on short-term and unbalanced solutions would be irresponsible and will not lead to balanced sustainable development. While fiscal reforms and volatility management are needed, this will not lead to long-term sustainable development, but merely provide a short-term patch without addressing the pressing issues needed to balance and grow or maintain all five capitals.

This final section provides a four-pronged strategy to develop sustainable well-balanced economies that depend less and less on natural resources.

**Table 3: Volatility of growth following an oil price collapse**

<table>
<thead>
<tr>
<th>Country</th>
<th>2013 GDP growth (%)</th>
<th>2015 GDP growth (%)</th>
<th>2013–2015 GDP reduction (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iraq</td>
<td>6.6</td>
<td>2.1</td>
<td>68%</td>
</tr>
<tr>
<td>Kazakhstan</td>
<td>5.8</td>
<td>1.2</td>
<td>79%</td>
</tr>
<tr>
<td>Nigeria</td>
<td>11.8</td>
<td>3.6</td>
<td>69%</td>
</tr>
<tr>
<td>Saudi Arabia</td>
<td>10.0</td>
<td>3.5</td>
<td>65%</td>
</tr>
</tbody>
</table>

Figure 4: A four-pronged sustainable diversification strategy for natural resource-rich countries

---

A SPECTRUM OF MONETARY, FISCAL, FINANCIAL, ENVIRONMENTAL, AND SOCIAL SECTOR POLICIES REQUIRES PRIORITY

Now that the energy transition away from oil is already underway, which is resulting in sustained low oil prices, it is creating both problems and possibilities for policy makers in oil-dependent countries. There are some immediate measures that governments can take that span the spectrum of monetary, fiscal, financial, environmental, and social sector policies. The most important are fuel subsidies, energy taxes, financial spillovers, and macroeconomic frameworks.20

Reducing fuel subsidies: During the boom years, resource-dependent countries enjoyed periods of high government income which was spent on generous welfare programs and energy subsidies. According to the International Energy Agency (IEA), the global value of fossil fuel subsidies amounted to $493 billion in 201421 and almost half of the public expenditures on energy subsidies are by governments in the Middle East and North Africa. A large part of these subsidies goes to the non-poor. It is estimated that 15% of this spending goes to the bottom 40% while the richest 40% corner over 70% of the subsidies.

The price decline presents a rare opportunity to reduce fuel subsidies that have been documented to be costly, distortional, and environmentally irresponsible. There have been some encouraging developments, as when Indonesia, Iran, and Malaysia implemented reductions in fuel subsidies in 2013 and 2014.

Taxing energy use: The coincidence of low oil prices and high unemployment rates creates a favorable climate for shifting the tax burden from labour and savings to energy and consumption. So far, the picture is mixed. Some countries are taking advantage of low international prices to raise domestic prices. Kuwait plans to triple both diesel and kerosene prices, for instance. Lower fuel prices provide benefits to consumers but, unless accompanied by other policies, will inevitably weaken incentives to invest in energy efficiency and clean energy.

While building short-term resilience, policy makers should stay focused on longer-term realities. To do this, they can:

- Move to market-based pricing, rational taxation of fuels, and institute mechanisms for automatic price adjustments when oil prices change.
- Prepare for volatile fuel prices by strengthening social safety nets.
- Continue to pursue renewable energy policy targets.
- Support improvements in energy efficiency, the cheapest and most readily available source of energy.

Limiting financial spillovers: Low oil prices hurt the financial sector of oil exporters through standard macro channels. Persistently low oil prices will decrease consumption, investment, and external balances as balance sheets and income positions deteriorate. This reduces both the capacity and resilience of the financial sector, leading to poor lending practices and weakening asset prices, thereby creating a vicious economic cycle. For example:

- In Malaysia, asset quality and earnings in banks with loan portfolios concentrated in the energy value chain have weakened, reducing liquidity and funding for exposed banks and corporations.
- In Russia, the loss of fiscal capacity and creditworthiness has weakened economic prospects, deteriorating export earnings and possible capital outflows.
- In Nigeria and Russia, higher policy rates may be necessary to stem outflows and defend the currency, which would lead to interest rate risks.
- In neighboring countries, there are cross-border spillovers from commodity price declines and evaporating ‘petro-dollars’, affecting the emerging market asset class.

Other sectors also experience spillovers. Recent work points to the indirect impacts of fiscal and currency risks and exposures to energy-sensitive sectors such as agriculture, construction, and transport.

Recalibrating macroeconomic policy frameworks: The fall in inflation expectations in high-income countries and oil prices globally will affect monetary policy in developing economies. The traditional view is that central banks need not react to temporary price shocks that do not affect core inflation. But the disinflationary tendencies in many countries may make it essential for policy makers to balance the immediate effect of oil price fluctuations with expansionary monetary policies. Since June 2014, for example, the US Federal Reserve has signaled that it would not adjust policies to counter what it assesses to be a temporary drop in inflation.

In the Euro Area and Japan, where it is feared that falling prices may alter inflationary expectations, central banks have loosened policy since mid-2014. Central banks in developing countries with low inflation rates may need to do the same.22

In some large oil-importing developing countries, the combined effect of declining current account deficits and inflation moving back in line with policy targets has allowed several central banks to cut interest rates. In oil-exporting countries, however, policy considerations are different. Monetary authorities have been trying to balance the need for growth against the need to stabilise inflation and investor confidence in the face of pressures on their currencies. While orderly exchange rate depreciations can help oil exporters adjust to adverse terms of trade shocks and limit the decline in demand, unruly movements will strain balance sheets and could lead to a toxic combination of inflation and recession.

Many oil exporters such as Russia have run large non-oil fiscal deficits, and they should adjust spending to prepare for the energy transition away from oil. Even countries with low debt and sizeable stabilisation funds should start gradually adjusting their fiscal frameworks to avoid eroding these buffers. Simulations suggest also that Angola, Ecuador, Ghana, Kazakhstan, and Nigeria are vulnerable because of the magnitude of the shock and the size of their fiscal buffers.

These measures, while important, are not enough to help natural resource-rich countries to achieve sustainable development.

NATURAL RESOURCE-RICH COUNTRIES NEED TO BUILD EFFECTIVE INSTITUTIONS AND AN ENABLING INFRASTRUCTURE

The World Bank, the McKinsey Global Institute, and the Boston Consulting Group23 argue that in addition to the absence of a proper diversification strategy, one of the key reasons why natural resource-dependent countries have so far underperformed compared to those without

20. This sub-section was written by Indermit Gill and Dean Storelli of the Duke Center for International Development at the Sanford School of Public Policy at Duke University and updates the analysis in ‘The economic consequences of cheaper oil’ paper prepared for the IMF-World Bank Development Com mittee, Indermit Gill et. al., March 2015.
significant resources is due to their institutional foundations. These include ineffective governance, a lack of openness and accountability, and weak rule of law that often impede the transition to sustainable growth. Institution building and effective governance of the resources sector is based on two key pillars:24

- **A stable regulatory regime with clear rules and clear roles for private sector participants:** The oil and gas sector is prone to external discontinuities, making it a risky business. A stable regulatory regime with clear rules could help reduce the underlying uncertainty of the business and improve a country’s FDI attractiveness. Publicly traded companies hate uncertainty and will allocate resources to those markets with the clearest and most transparent rules.

- **Exposure to competition:** This is often lacking in natural resource-rich countries because of the various barriers that exist for foreign companies to conduct business in these markets. However, a study covering two million companies conducted by Burke and Hussels (2013) shows that exposure to competition, especially during its early years, helps improve a startup’s survival prospects.25 SMEs in natural resource-rich countries could thus benefit from exposure to especially foreign competition, making them more competitive and further helping to develop local content. Over time, as has been the case with Norwegian SMEs supporting the oil and gas sector, they in turn will start competing for business abroad. For example, Aker Solutions, a Norwegian oil and gas services company, is active in the US Gulf of Mexico, which is often considered to be the most competitive environment in the world.

In addition to building effective institutions, natural resource-rich countries should invest in infrastructure, which has a high economic multiplier and is a key enabler for sustainable economic development.26 Here, a distinction needs to be made between physical and digital infrastructure. Physical infrastructure relates to the oil and gas supply infrastructure: the ports, road and rail networks that provide the foundation for industrial development and economic diversification. The United Arab Emirates (uae), for example, has invested extensively in seaports and airports, and related logistic services, making it one of the largest product and environmental impact of BP’s oil and gas production operations.28

### Each sector is going digital, including the natural resources sector.

Without advanced digital technologies, such as snake wells, big data, and advanced seismic imaging, the shale revolution would not have become a reality in the US. BP, the British oil major, has partnered with GE to launch offshore digital technology to improve reliability, reduce costs and environmental impact of BP’s oil and gas production operations.28

### Investment in education and developing local content are the key building blocks of sustainable development

Natural resource-rich countries are facing a more complex world, now that we are at the advent of the Fourth Industrial Revolution. Speed, agility, technology, and entrepreneurship – not resources – are of the essence to be successful in this next industrial revolution, and this applies to natural resource-rich countries as well.

As Bank of England economists Mauricio Armellini and Tim Pike put it: “Economists looking at previous industrial revolutions observe that none of these risks have transpired.” By risks in this context, they mean disruption to companies, industries and countries that could make the way we currently do things obsolete in a short period of time. They add: “However, this possibility underestimates the very different nature of the technological advances currently in progress, in terms of their much broader industrial and occupation applications and their speed of diffusion.”29

Therefore, in addition to the physical and digital infrastructure discussed previously, natural resource-rich countries need to invest in technical and vocational education and training (TVET). Often, the focus of many governments is on university-level training, but most jobs do not require a university level education. Switzerland and especially Germany have built their economies based on what is often referred to as ‘the dual system’. They argue that vocational skills are best learned under a training contract with a company, where apprentices combine formal training with practice within a company department/factory.30 The skills learned at these vocational training schools are continuously updated based on what is needed in the marketplace. This has allowed German companies to stay at the forefront of industrial competitiveness. Technical and vocational skills are diverse and include welders, electricians, mechanics, accountants, laboratory technicians, computer programmers, dental hygienists, and commercial pilots. Boston Consulting Group (BCG) argues that TVET is one of the critical missing links in the economic development strategy of many countries, especially for natural resource-rich countries.

In addition, and equally important, the skills and SMEs needed to make the extractive industries more sustainable are also needed in other sectors and are critical to diversify the economy away from a dependence on natural resources. For example, big data centre employees are also needed in the pharmaceutical sector, for advanced logistics services, and in the automotive and telecommunications sectors. Similarly, oil and gas laboratory technicians can easily be retrained to occupy similar positions in biotechnology and hospital laboratories. There are many potential skill synergies yet to be harnessed.

Following the examples of Germany and the US, some other advanced economies are coming to realise the importance of investing in the development of a vibrant vocational talent pool which meets the needs of the future. The UK’s largest reform effort of post-16 education since A-levels were introduced in 1951 brings more streamlined and technical qualifications (the so-called ‘T-levels’) to students in the UK. In March 2017, the UK’s senior budget official announced significant new funding to train and ‘upskill’ British technical students through more rigorous training programs, with clearer qualifications31 (for both students and industry), to further enhance national productivity in a post-Brexit world.

24. See note 17.
31. British vocational education offers 15,000 technical education routes which under ‘T-levels’ would be pared down to focus on 15 key sectors.
EMBRACE A CIRCULAR ECONOMY MINDSET AND DIVERSIFY THE ECONOMY

With proper governance, an improved environment for doing business, proper physical and digital infrastructure, and a properly trained workforce, resource-rich countries will be well prepared to capture the upside, diversify the economy, and achieve sustainable development.

A circular economy (CE) is one that is restorative and regenerative by design and was popularised by the Ellen MacArthur Foundation and McKinsey & Company. According to McKinsey, the circular economy has the potential to create €1.8bn of incremental value in Europe by 2030. In natural resource-rich countries, the potential (as a percentage of GDP) is much larger and estimated at up to 2% of incremental annual GDP growth. This is because there are many opportunities to reduce, reuse and recycle waste in the extraction industries value chain by leveraging skills, enabling infrastructure and SMEs. The circular economy in natural resource-rich countries will create skills, jobs, maintain and improve or at least help maintain natural capital, and create financial capital that is not dependent on the volatility of the demand of natural resources.

The physical and digital infrastructure, technical/vocational skills, and SMEs created in the process are well positioned to capture not only value added across the natural resources value chain, but also to develop other product and service sectors that do not depend on natural resources.

CONCLUSION

Sustainable development is not solely concerned with managing economic volatility in the short term. The argument that oil-rich countries are ‘different’ and that as a result they should not focus on diversifying their economies is not only a short-term one, but also dangerous as it sends the wrong message to policy makers. This message does not lead to change and given the more complex world of which they are part, with ‘permanent’ low oil prices and the need to consider the planetary boundaries in which we all operate, this message leads to a vicious downward spiral one that is not sustainable from the perspective of any of the five types of capital. This is because the resultant policies lead to short-termism, boom-bust cycles, huge skill gaps among the population, rapid depletion of natural capital, high levels of unemployment, and high levels of inequality. Finally, the resulting policies are not aligned with the objectives of the SDGs and the 2016 Paris Agreement, which both emphasize the need to balance and grow or maintain all five capital stocks simultaneously, nor are they aligned with the realities of the Fourth Industrial Revolution.

Instead of focusing on short-term and unidimensional measures, we provide here what we believe is a compelling argument why oil-rich countries need to aggressively pursue an economic diversification strategy based on a four-pronged strategy. Those that fail to act now will eventually have to face the consequences of declining prosperity and civil unrest.

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Source: Exhibit from Reverse the curse: maximizing the potential of resource-driven economies, December 2013, McKinsey Global Institute
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32. https://www.ellenmacarthurfoundation.org/circular-economy
1. Risk culture is an important determinant of compliance behaviour, which is in turn effected by incentives and the behaviour of managers/co-workers. When managers/co-workers are profit-focused, and when incentives are linked to profits, rates of compliance fall. The effect is felt via risk culture.

2. Profit-based incentives are often used in financial services to encourage effort and boost profits. In our study, profit-based incentives did not significantly boost the number of profitable transactions. Profit-based incentives currently being debated within the financial services industry.

3. When we reduced the burden of calculations on participants, we noticed an increase in compliance with risk policy – probably because people are less able to resist the temptation to breach policy when they are tired. This suggests that to increase risk compliance, the sector should take better account of cognitive load, ie, automate analysis where possible and design work patterns in such a way that staff are not unduly depleted when making crucial decisions.

4. Personal attitudes to risk management/compliance are a significant determinant of compliance behaviour. This finding has implications for the screening of job candidates, such as considering candidates’ attitudes towards risk management in recruitment/promotion decisions.

5. Workers from the superannuation sector were less likely than others in financial services to comply with risk policy. This finding should be treated with caution due to the small sample, but it warrants further investigation. If confirmed, it may mean that additional work is needed to improve risk culture in this sector.

6. The research project has demonstrated that ‘culture’ experiments can be usefully conducted in the lab. Subject to obtaining funding, we hope to extend the research to investigate how risk culture may be improved in financial institutions.

Table 1: Experiment groups

<table>
<thead>
<tr>
<th>No framing</th>
<th>Profit framing</th>
<th>Risk framing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed payment ($120) less any compliance penalties</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Incentive payment based on the expected profits from investments, less any compliance penalties</td>
<td>2</td>
<td>4 and 6</td>
</tr>
</tbody>
</table>

In recent years there has been a lot of discussion about the culture within financial institutions and how it might affect behaviour. By culture we mean the norms of behaviour – perceptions of what is expected. It is important to distinguish between what actually happens and policy statements: the ‘is’ versus the ‘ought’. When new staff members join an organisation, they don’t study the procedure manual to learn how to behave; instead they
learn from those around them. People look to the words and actions of managers and co-workers, especially when the team is under pressure to perform. Previous research suggests that staff discern the norms based on what gets rewarded, the words and actions of those they respect and admire in the workplace, what kind of behaviour builds status, the extent to which ‘bad’ behaviour is excused. All of this information creates a perception of the norm (culture) which then influences behaviour.

To mimic these influences in the laboratory we used two types of framing: profit-focused or risk-focused. Participants who were assigned to the culture treatments received a short paragraph of text and a picture at the beginning of the experiment. This was repeated at regular intervals.

### Example:

This example illustrates the treatments with incentive payments. The risk limit (for the loss amount) is $200,000.

<table>
<thead>
<tr>
<th>Profit framing</th>
<th>Risk framing</th>
</tr>
</thead>
<tbody>
<tr>
<td>In your workplace, compliance with risk policy seems to have a low priority compared with meeting profit targets. Non-compliance is common. Your manager rarely mentions the risk policy but talks often about the need to meet budget. She is always giving you motivational messages to encourage you to boost profits. You notice that colleagues who breach policy are excused if they are top performers. The risk policies are often criticised by staff because they can interfere with meeting profit targets. Risk managers have low status compared with people who have great profit figures.</td>
<td>In your workplace, non-compliance with risk policy is taken very seriously and is extremely rare. Breaches are not excused or tolerated, even if they produce high profits. Your manager is an excellent role model of risk management behaviour and talks frequently about the need to comply with risk policy, even when the team is behind on profit targets. It is clear from what colleagues do and say that compliance with risk policy is regarded as essential for the firm to survive and prosper. Risk managers are highly respected because they are seen as adding value to the organisation.</td>
</tr>
</tbody>
</table>

The investment has 60% chance to gain $200,000 and 40% chance to lose $250,000. So, the expected profits can be easily calculated: $60,000 x 0.60 = $36,000 and $40,000 x 0.40 = $16,000

This investment violates risk policy (the loss amount of $250,000 is more than the specified limit of $200,000). If you invest, then total expected profits will increase by $20,000. If you are caught (20% chance) then you will be penalised by 3x$20,000 or $60,000.

So, the overall expected value on the deal: $16,000 - $8,000 = $8,000

At the end of the experiment we asked participants to complete a short survey so we could understand and control for demographics and attitudes. We also asked them a crucial question about their perceptions:

**Perception question:**

In the experiment you just completed, several investments were outside of risk policy because the loss amount exceeded $200,000.

In your opinion, what percentage of participants in the experiment would ALWAYS follow risk policy (i.e., not invest if outside the risk policy)? (Enter X%)

The answer to this question is a good measure of workplace culture because it measures perceptions of workplace norms regarding compliance with risk policy. This captures very well what is meant by the term ‘risk culture’. We expected that this measure would predict how individuals behaved. In other words, people tend to behave in a way that they believe will be socially acceptable.

### RESULTS

Comparing groups 1 and 2, we expected that group 2 (having profit-based incentives) would complete more transactions but would be less compliant with the risk policy. As shown in Table 2 overleaf, the proportion of people who always complied with risk policy decreased (from 68.6% to 42.3%) when incentives were introduced. Also, fewer ‘bad deals’ were rejected (78.4% of the bad deals vs 85.9%). The average number of total investments increased from 28.4 to 30.3 but this was not enough to be statistically significant. This is a bit surprising, especially since the whole point of incentives is to encourage staff to work harder and benefit shareholders. But it is consistent with a recent report which finds that reducing profit-based incentives in the UK has not adversely affected business outcomes. It is also consistent with the possibility that finance professionals are intrinsically motivated to work hard so pay-for-performance (outside motivation) is not essential.

In groups 3–6 we introduced other elements into the equation, i.e., risk and profit framing. Remember that these are statements provided to participants with information about the behaviour of peers and managers.

We found that the profit framing had a powerful effect when combined with profit-based incentives. You can see this in Table 2 row (d). For Group 2 (incentives but no framing) the compliance rate per deal is 78.4%. When profit framing is combined with the incentives (Group 4) the compliance rate drops significantly to 63.7%. When risk framing is combined with the incentives (Group 5) the shift in the compliance rate to 82.9% is much smaller. The results suggest that the signals from managers-peers are most powerful in influencing behaviour when they are consistent with the incentive program.

---

1. You could argue that risk culture also captures norms regarding other types of risk behaviour like speaking up, but compliance with risk policy is a crucial aspect of risk management behaviour and arguably the minimum standard for finance professionals.
The final row of Table 2 (row e) displays perceptions of compliance. We treat this as a measure of risk culture because it measures expectations of compliance (with risk policy) by participants – the extent to which people in this group believe that compliance is ‘the norm’. Notice that the highest perceptions of compliance occurred in Group 1 (fixed payment and no framing). The lowest perceptions of compliance related to Groups 4 and 6 (incentive payment and profit framing). All the groups with incentive payments had perceptions of compliance below 70%; we can infer that a culture that values compliance is fundamentally inconsistent with profit-based incentives. In regression analysis (not reported here) we were able to demonstrate that the effect of incentives was felt through the channel of culture.

Comparing row (e) with row (c), notice that perceptions of compliance were always better than the reality (i.e. actual compliance in the lab)!

Finally, we decided to check whether the task of performing the calculations had any impact on the outcomes. Group 6 is a variation of group 4 where participants were not required to calculate expected value; instead the expected value was given and participants had only to decide whether to invest. Not surprisingly, people in that group were able to enter into many more investments. What is particularly interesting is that compliance rates in this group were significantly improved. In row (d) we see the compliance rate jump from 63.7% (Group 4) to 72.7% (Group 6). This is consistent with previous research that has shown that people are better able to regulate themselves (resist temptation to cheat or break rules) when they are not tired or depleted. For example, people are much more likely to break a diet when they are tired.

As shown in Table 3 overleaf, one of the few additional variables that explained risk behaviour was individual attitudes to risk management/compliance. We established that individual attitudes are not significantly linked to other variables such as age, gender, individual risk tolerance or workplace. We did find, however, that participants with South-East Asian ethnic background (14% of our sample) are more likely to have favourable attitudes to risk management/compliance.

The finding relating to workers from the superannuation industry (10% of our sample) is intriguing. The fact that this group is less likely to comply with risk policy may be consistent with concerns expressed by some that risk culture is less mature (or at least more variable) in the superannuation sector compared with other segments of financial services. We note that this finding should be treated with caution due to the small sample.

### OTHER FINDINGS REGARDING COMPLIANCE BEHAVIOUR

Incentives (through risk culture) seem to influence compliance behaviour, but we also checked to see if other factors might be important. Characteristics of the individual (such as age, personality, attitudes) were considered, along with characteristics of the investment (expected profit, risk) and characteristics of the workplace that each participant is drawn from. For example, if an individual works in an environment where compliance is not taken seriously, then this may have influenced his or her behaviour in the experiment. The table overleaf summarises what we discovered.
Table 3: Other influences on compliance behaviour

<table>
<thead>
<tr>
<th>Variable</th>
<th>Detail</th>
<th>Impact on compliance based on regression analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>How old are you? Less than 25yrs, 25–34, 35–44, 45–54, 55yrs or over</td>
<td>No impact</td>
</tr>
<tr>
<td>Gender</td>
<td>Are you male/female?</td>
<td>No impact</td>
</tr>
<tr>
<td>Time in Australia</td>
<td>How long have you lived in Australia? All my life; 20 years or more; 15–19 years; 10–14 years, 5–9 years, less than 5 years</td>
<td>No impact</td>
</tr>
<tr>
<td>Sector tenure</td>
<td>How long have you worked in financial services? Six months to just less than 1 year; 1 year to just less than 3 years; 3 years to just less 5 years, 5 to 10 years, 10 to 15 years, 15-20 years, 20-25 years, &gt; 25 years</td>
<td>Longer tenure was associated with more compliance</td>
</tr>
<tr>
<td>Seniority</td>
<td>At what level are you currently working? senior management; report to senior management; middle management; team leader; professional employee (but not a manager); team member/front-line employee</td>
<td>No impact</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>We asked people which ethnic group they most identified with ie, Anglo-European, Chinese and North Asian, South-East Asian, other.</td>
<td>South-East Asian participants were marginally less likely to comply, but note small numbers here. Ethnic differences generally not important in this study</td>
</tr>
<tr>
<td>Lines of defence</td>
<td>What best describes your role (also known as the lines of defence model)? 1) business (line 1); 2) independent/specialist risk manager, including compliance (line 2); 3) internal audit/assurance (line 3); 4) don't know</td>
<td>No impact</td>
</tr>
<tr>
<td>Segment</td>
<td>In what segment of financial services do you work? banking and finance; superannuation; broking; financial planning/wealth management; funds management; consulting; professional services; other</td>
<td>Those working in superannuation were significantly less likely to comply.</td>
</tr>
<tr>
<td>Gross income</td>
<td>What do you estimate your gross income will be from all sources this year? (including the value of expected bonuses, allocations of shares and options) &lt;$40,000; $40,000 to $80,000; $80,000 to $120,000; $120,000 to $160,000; $160,000 to $200,000; $200,000 to $300,000; $300,000 to $400,000; &gt;$400,000; Decline to disclose</td>
<td>No impact</td>
</tr>
<tr>
<td>Individual risk tolerance (financial)</td>
<td>A set of five items that assess an individual’s propensity to take financial risk in their life outside of work. Eg, how likely is it that you would: • Invest 5% of your annual income in a very speculative stock • Bet a day’s income on the outcome of a sporting event</td>
<td>Compliance was reduced for investments with higher expected value</td>
</tr>
<tr>
<td>Individual attitude to risk/compliance</td>
<td>A set of three items that assess an individual’s personal attitude to risk/compliance in the finance industry. These are answered on a sliding scale eg, risk management is: An unnecessary impediment to doing business versus an enabler for doing business</td>
<td>Those with favourable attitudes to risk/compliance were significantly more likely to comply</td>
</tr>
<tr>
<td>Individual personality (conscientiousness)</td>
<td>A set of five items to assess the extent to which an individual has Conscientious personality (this is one of the big five personality variables) eg, Do you agree/disagree with the following? • I get chores done right away • I like order</td>
<td>No impact</td>
</tr>
<tr>
<td>Investment expected value</td>
<td>The expected value of the investment (recall that incentive payments in the experiment were based on expected value)</td>
<td>Compliance increased in cases where the loss amount was higher</td>
</tr>
<tr>
<td>Investment risk</td>
<td>In the experiment, the risk policy was defined in terms of Loss Amount for the investment.</td>
<td>Compliance increased in cases where the loss amount was higher</td>
</tr>
<tr>
<td>Workplace culture in the real world (avoidance)</td>
<td>A set of 6 items assessing the real-world workplace of the participant which may potentially affect behaviour in the lab. These are drawn from the Macquarie University Risk Culture Scale.4 High scores are unfavourable, eg, Do you agree/disagree with the following regarding your usual workplace? • The behaviour of those who breach risk policy is typically excused if they are a top performer</td>
<td>No impact</td>
</tr>
</tbody>
</table>

4. The Macquarie University Risk Culture Scale is (to our knowledge) the only survey tool of its type with psychometric evidence of reliability and validity. It has gone through the process of peer review and a paper is available presenting this evidence in the Journal of Business and Psychology. Download the paper. The Scale has been used to assess risk culture in financial institutions in Australia, Canada, New Zealand and the UK. For further information about the Scale (including potential use of the Scale) please contact Elizabeth Sheedy on esheedy@mafc.mq.edu.au