Deutsche Bank
Research

konzept

The case against US infrastructure mega-spending

October 2016

09

Cover story

The case against US infrastructure mega-spending

There is consensus among economists, politicians and commentators that America needs a massive infrastructure investment programme – even the two presidential candidates agree. In the name of balance, our lead feature sets out the counter argument.

Editorial

Welcome to the ninth issue of Konzept – Deutsche Bank Research's flagship magazine. On our last cover was a Rubik's cube in European yellow and blue with the squares arranged as a question mark. That was before Britain voted to leave the EU. Had we known the result we may have chosen an exclamation mark instead. But four months on, markets have recovered from their initial shock – sterling's recent slide notwithstanding – while economic data seem to have ignored the referendum completely.

Do we risk making a similar mistake again in the US presidential election? After Brexit it would be brave to write off Donald Trump. Hence in this issue we focus instead on one intriguing element of the race: that in spite of disagreeing on almost everything, Hillary Clinton and Donald Trump have both included massive infrastructure investment plans in their manifestos. In fact, almost everyone in America seems to agree that huge fiscal spending programmes are a good thing. In our cover feature John Tierney makes the case against this consensus view.

Not that we're bearish on the prospects for America – far from it. Our chief global strategist, Binky Chadha, argues in another feature that labour productivity growth may soon pick up again thanks to a stronger dollar and tight labour market. This is another contrarian view and has major implications for asset classes globally. We also take issue with those blaming a lack of corporate capital spending for America's economic woes and in addition have a few suggestions on the thorny issue of company tax reform.

As ever we include some shorter pieces at the front of the magazine to whet your appetite. One article close to my heart is about how new and better data are accelerating gender diversity initiatives – particularly at financial services firms. Other articles range from an explanation of how to compare the signals from credit and equity derivatives when forecasting market returns, to the popularity of movies in China. Rineesh Bansal also argues why stocks are behaving more like bonds these days and bonds like stocks.

Finally, our book review returns to 2008, when a fresher faced Barack Obama beat Hillary Clinton to the Democratic nomination. Game Change – a must read – has plenty of juicy insights for those obsessed with the current race for the US presidency. Also at the rear of the magazine, as usual, our spies report back from their latest conference crashing exploits. And our ever-popular infographic seems to show, mirroring the cover story, that higher infrastructure spending by American states does not lead to faster economic growth or even better infrastructure.

David Folkerts-Landau
Group Chief Economist and
Global Head of Research

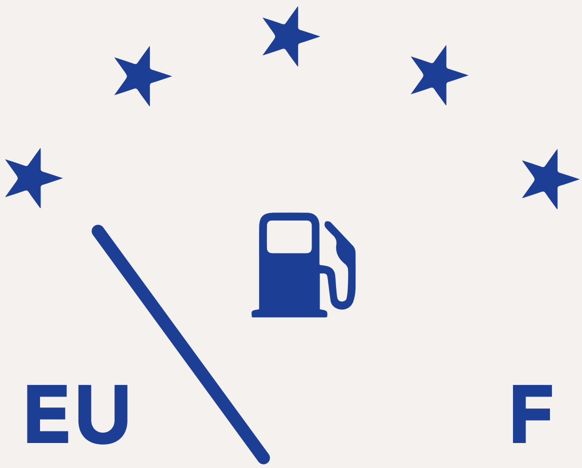
> To send feedback, or to contact any of the authors, please get in touch via your usual Deutsche Bank representative, or write to the team at research.haus@db.com.

Articles

Columns

Features

ECB responsible for lack of reform



Last time the president of the European Central Bank addressed the Bundestag was three months after his famous “whatever it takes” speech in 2012. Since then the eurozone has mustered barely any growth, the worst labour market performance among industrial countries with double digit unemployment rates and more than 20 per cent youth unemployment, unsustainable debt levels and inflation rates far below the ECB’s target. Without a buoyant German economy the situation would be much worse. Today German politicians can ask him what went wrong.

The eurozone’s existential crisis is epitomised by the fraying of the political centre. Brexit shows what a tear can look like. Discontent has its roots in the misery of the unemployed and stagnating incomes – resembling the situation of the mid-1930s. One has to ask whether the ECB’s aggressive, unconventional and untested monetary policy culminating in negative rates has contributed to Europe’s woes. Never has a region depended so much on the dogma of technocrats not directly elected. Do we want to risk the most important economic project in history? Future generations will not forgive our naïve trust in the ECB’s monetary policy.

But not only is the weak economy raising doubts about monetary policy and its effectiveness, more worrisome is that Europe’s problems are structural rather than cyclical. Peripheral countries do not generate enough growth to reduce high levels of indebtedness and unemployment. This is due to a lack of reforms in labour markets, legal systems, welfare systems and tax systems. Governments haven’t acted because they haven’t had to. The ECB’s ultra-loose policy and promise to do “whatever it takes” have made kicking the can down the road the more attractive option – at least in the short term.

Politicians need compelling reasons to risk their job on reforms, particularly those in the

David Folkerts-Landau

periphery who lack broad support. Up until July 2012, urgency was provided by exorbitantly high interest rates and risk premia, as well as the threat of not being able to refinance sovereign debts. Failure meant a rescue program provided by the Troika, conditional on reforms and unpopular spending cuts.

But incentives to reform were eviscerated with the guarantee to bail out countries in need via Outright Monetary Transactions, the ECB's policy of stepping into public debt markets as buyer of last resort. The curious justification was that different sovereign yield spreads signalled a breakdown in the transmission of monetary policy rather than reflecting different country-specific risks. OMT has remained in the drawer, but three years later the ECB alongside national central banks started buying sovereign bonds in undreamt amounts as part of its QE programme. If – as expected – this is extended until 2017, the ECB could own close to a fifth of eurozone public debt.

The OMT announcement was a gift to the periphery. The average risk-premia above German yields fell almost five percentage points. For example, Italy's interest payments dropped by one third, despite an increase in debt-to-GDP. But this lifeline, like the chance afforded by the drop in interest rates immediately after joining the eurozone in 2000, was squandered.

Of course it was. Prior to 2012 it took high interest rates and refinancing threats to force governments to get serious about reforms. In those years more than half of the growth initiatives recommended by the OECD were being implemented across the eurozone. Last year, by contrast, only 20 per cent of these reforms were.

Since 2012, policies such as OMT and PSPP have prevented the eurozone facing hard realities. With no growth and 2.5 per cent fiscal deficits, Italy's three figure sovereign debt level is frankly unsustainable. Yet Rome pays just one per cent more to borrow than Berlin. Only if concerns about rating downgrades and QE eligibility emerge do spreads widen, as can be seen in the case of Portugal. Having disabled the discipline of public debt markets the ECB – good intentions notwithstanding – bears responsibility for the lack of structural change so badly needed. Only pro-growth reforms will prevent a slow disintegration due to economic stagnation. ●

> This is the English translation of an op-ed by David Folkerts-Landau. It was published in the German newspaper, Die Welt, on 28th September – the day Mario Draghi addressed the German parliament.

Equities and bonds— or bonds and equities

Rineesh Bansal

If it doesn't look like a duck and doesn't quack like a duck, is it still a duck? Never mind waterfowl, investors should be asking this question about bonds. After all, their recent behaviour bears scant resemblance to the characteristics typically associated with fixed income assets. In fact, they resemble equities.

Consider a bond portfolio invested in ten-year maturity US treasury bonds, rolling over into the latest vintage every month. Over the past ten years such a strategy produced annualised total returns of 5.4 per cent. Adjusted for inflation that is a real return of 3.7 per cent, the same as the previous decade and in line with the average of any ten-year period over the last 40 years. Even the volatility of monthly returns from this portfolio at about eight per cent recently is broadly similar to the long-run average.

Look more closely, though, and the source of those returns has morphed beyond recognition. In the most recent ten year period, almost half of the total nominal returns was due to capital gains, with the other half from coupon income. Compare this to the prior ten year period when capital gains accounted for less than one-fifth of total returns.

Indeed, the proportion of capital gains in total bond returns is now the highest in at least half a century and twice the long term average. This increased reliance on capital appreciation runs counter to the expected behaviour of fixed income securities.

Equities, meanwhile, are becoming more like bonds. The S&P 500 over the past ten years has delivered a seven per cent annualised total return, barely beating the returns from treasury bonds. Just two-thirds of this resulted from capital gains with dividends providing nearly a third of the total returns. The capital appreciation share of equity returns climbed steadily from 1980 onwards to peak at nearly 90 per cent during the dot com bubble and has been in decline since.

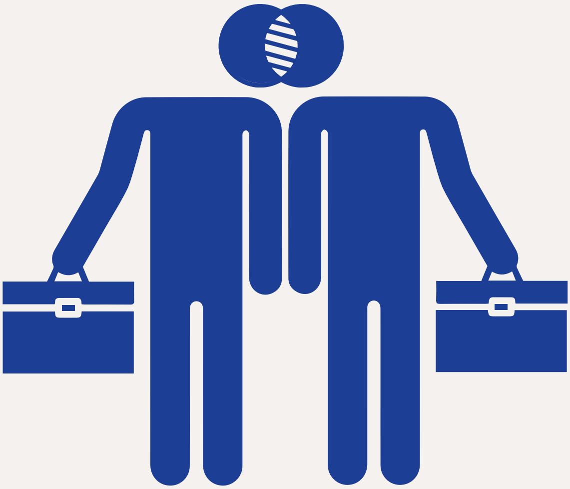
Barring some extremes during the financial crisis, the last time equity market total returns were this dependent on dividends was the late 1980s. In fact, the share of capital gains in ten year total returns is the highest for bonds and the lowest for equities in many decades. As the capital gains share in bond returns fast approaches the corresponding level in stocks, the world's two biggest asset classes look set to fully reverse roles.

Should anyone care whether they make money from capital appreciation or income? The historical performance of stocks suggests they should. Over the last 30 years, a higher share of capital gains in past returns has been a strong precursor to lower and more volatile future returns for equities. Indeed, the proportion of capital gains in the past ten years of total returns on the S&P 500 explains 70 per cent of the variation in the next ten years' total returns and nearly half the variation in future volatility.

Given this strong relationship, the reliance on dividends for equity returns in recent years augurs well for stock market performance over the coming decade. Current prices for long-dated options on the S&P 500 allow us to derive the market expectations of dividend payments over the coming decade. For the S&P 500, these show dividends steadily rising from 2.1 per cent this year to 2.5 per cent by 2026.

And you receive that 2.5 per cent even if the stock market stays at today's level – a scenario with just a six per cent probability based on the historical performance of equities over the past 40 years. Nevertheless even this uncommonly poor total return from stocks would be hard for bonds to match. For Treasury total returns to beat the stock market over this period, the ten-year bond yield would have to fall below zero.

That is unlikely. We can assess the market probability of this happening from the prices of fixed income derivatives instruments. Current market pricing assigns a 20 per cent chance to the ten-year treasury yield being negative in 2026. In other words, there is only a one in five



chance that total returns from treasury bonds beat just the dividend return from stocks over the next decade.

But it is not only against equities that future bond returns look wanting. The bond market's own historical performance suggests a challenge. The high share of capital gains in recent bond returns, itself a side-effect of low and falling bond yields, makes it progressively harder to repeat the performance. For ten-year treasuries to deliver the past decade's 5.4 per cent annualised return over the next ten years, bond yields must grind down to minus two per cent by 2026.

Even though recent experience shows negative bond yields are possible, imagining ten-year treasuries at minus two per cent does stretch credulity. Current market pricing implies a paltry 0.6 per cent likelihood of this coming to pass. Bond investors willing to take such chances may also be tempted by similar bookmaker odds on popular singer Kanye West being elected US president in four years.

More likely than President West occupying the White House in 2020, is that the ten-year treasury yield rises to two per cent over the coming decade. In fact, this is the fixed income market's current central estimate. For bonds that means annualised total returns of 1.5 per cent in the next ten years, their worst performance in over 40 years.

Investors associate bonds and equities with certain performance characteristics. These traits determine suitability for specific investment requirements, for instance, the ubiquitous rule that personal savings portfolios should hold stocks in proportion to a person's age, with the rest allocated to bonds. But the topsy-turvy post-crisis world has changed the behaviour of bonds and equities beyond recognition. Investors planning for the next ten years cannot rely on their old roles. Mind those ducks. ●

> Please go to gmr.db.com or contact us for our in-depth report, "The multi-asset essay - The bond and equity switcheroo"

Taxing companies—US and them

In America these days nearly everyone seems to be in agreement that corporate tax reform is desirable. The one thing standing in the way of an overhaul of the US tax code, however, is no one seems willing to give up that one special break that benefits them. Hence, most policy experts concede that major tax reform will not happen during the next two-year term of Congress.

The implausibility of root and branch tax reform is not necessarily cause for despair, though. Years of neglect means that even technically simple changes can go a long way towards delivering a fairer, more consistent, more competitive and growth-friendlier tax regime.

Take for instance a straightforward proposal to drop the statutory US corporate tax rate from 35 to 25 per cent. For starters this would give American domiciled firms a more globally competitive tax rate, in line with the average across OECD countries. This would not only discourage the persistent moves away from US-based corporate headquarters seen in recent years, but may even increase corporate foreign direct investment into the US.

In addition, any tax rate cut would help address the vexing issue of foreign earnings repatriation taxes. The law requires US companies to pay taxes on foreign profits when repatriating them back to America, but any tax bill is reduced by the amount already paid to foreign governments. Therefore, cutting the US corporate tax rate to 25 per cent would mean that companies that already pay the OECD average tax rate on their foreign earnings face no incremental tax when repatriating those earnings back to America.

This is not simple corporate largesse. The policy would spur large scale repatriation to the US while not rewarding firms that have aggressively minimised their overseas tax rates. Companies that have not paid any significant foreign taxes on profits would still be subject to a large US tax bill, up to 25 per cent, in order to bring their offshore cash home. This seems the appropriate treatment for such companies.

What is more, lowering corporate tax is more likely to work than some of the current ideas on the table. President Obama's proposed 14 per cent repatriation tax holiday represents almost no relief because most S&P 500 companies already pay 20 per cent tax on their foreign profits. Under current rules, what is due in any case is another 15 per cent to bring the cash back home, so paying 14 per cent instead is hardly much of an incentive. Donald Trump's proposal of a ten per cent repatriation tax and other Republican proposals of 6.5 per cent are better, but probably not low enough to spur large scale repatriation.

As important as what a cut in corporate tax accomplishes is what a cut avoids. Here it is important to understand the distinction between unremitted foreign earnings and offshore cash. Companies in the S&P 500 probably have $1tn of cash offshore in aggregate, but perhaps ten times that amount in accumulated unremitted foreign profits. This is because while they have been earning lots of foreign profits for over 30 years, those have usually been reinvested overseas in operations via capex or acquisitions.

Any attempt by the US to tax unremitted foreign earnings would cause an enormous tax bill for many multinational companies, many of which do not have large cash balance. This might force some firms to redomicile their headquarters outside the US. On the other hand, if a new tax is based on cash held offshore, companies may rush to invest the cash overseas, for instance on acquisitions. Both outcomes would damage relations between the US Treasury and major multinational corporations. That is why the only way to raise sizeable tax revenue and improve tax policy towards American multinationals is to provide them with an incentive to voluntarily repatriate at a lower rate.

Aside from spurring the repatriation of more than a trillion dollars of cash held offshore,

David Bianco

a corporate tax rate cut would also simplify other aspects of the tax code. It would give small businesses currently organised as pass-through entities (that is, each owner pays personal income tax on their share of profits) an opportunity to use the standard corporate structure. In effect, small business owners paying the 40 per cent income tax (in line with the top tax bracket) on their partnership profits would now be able to get the lower tax rate of 25 per cent on corporate profits, encouraging them to switch over into a regular corporate structure. Crucially, they would only keep this tax saving if profits were reinvested in the business, promoting growth and jobs. By encouraging productive investment in current pass-through type corporate structures and higher future profitability, lowering the corporate tax might even pay for itself over time.

Naturally, cutting the corporate tax rate would benefit S&P 500 firms, boosting earnings per share by about seven per cent. Lowering the US statutory rate from 35 per cent to 25 per cent would reduce the effective tax rate of the S&P 500 by about five percentage points from roughly 28 per cent to 23 per cent. This is because the US rate applies to about three-fifths of total pre-tax profits earned domestically and the remaining two-fifths are taxed at foreign tax rates.

Of course, in today's political climate, any proposals to cut the headline tax rate would likely lead to calls for compensating measures such as altering accelerated depreciation schedules for tax purposes, research and development credits, and interest deductibility of debt. The merits of each of these also need to be evaluated carefully.

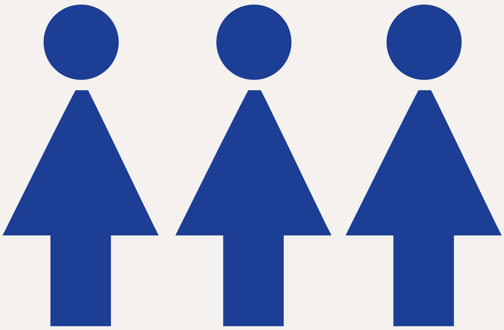
For example, removing or modifying accelerated depreciation could offset much of the incentive for companies to invest. This is because when a company funds a large upfront capex item that will last for many years it strains near-term cash flow, especially when the tax deduction of such a purchase is only based on straight-line depreciation costs. There is, therefore, an important conceptual basis for accelerated depreciation, both to promote growth and to avoid straining corporate liquidity.

Similarly, eliminating the interest deductibility of debt could make corporate profits more cyclical thereby exacerbating economic downturns. This is because taxes would then be applied to earnings before interest payments, but the interest expense would still be a fixed deduction. That said, there may be a case to limit the interest deduction in targeted ways, such as eliminating the incentive to issue debt to fund stock buybacks or reduce excessive use of debt primarily to reduce taxes.

The point is not to avoid corporate tax reform but to remind reformists that broad changes often have unintended consequences. Meanwhile, a cut in the corporate tax rate should be the preferred option because it would stimulate repatriation of offshore profits, make the US corporate tax rate competitive internationally, simplify the tax code, and boost US growth by providing small companies with more profits for reinvestment. ●

> Please go to gmr.db.com or contact us for our in-depth report, "US Equity Insights – Dreams of better US corp tax policy"

Data and diversity—strength in numbers



Despite having a long way to go, female representation in American businesses has advanced some distance over the past two decades. In 1995, women made up 45 per cent of the total workforce and held just 40 per cent of mid-level managerial and professional roles[1]. Today jobs are split almost fifty-fifty while women occupy 52 per cent[2] of middle management, professional and related positions. That's right – more than half!

Likewise there has been movement at the very top. Twenty years ago less than a tenth of Fortune 500 board seats were held by women and there were no female chief executives. Now there are twice as many females to be found in boardrooms and 22 Fortune 500 companies are run by women. Such inroads are to be applauded but equality remains miles away and progress has slowed.

For example in financial services, an Oliver Wyman study projects that at current rates of growth it would take until 2048 for the sector globally to reach even 30 per cent female representation on executive committees, from half that level now. The higher figure is important because it represents the supposed tipping point after which minorities experience less pressure to conform to a dominant group and can finally express their voices[3].

But the impulse for a reacceleration in diversity may be forthcoming from an unlikely quarter: investors. This is not simply because companies with more women perform better – we have known this to be true for ages. A McKinsey report five years ago analyzing 441 companies from six European countries revealed a 40 per cent higher average return on equity for firms with the highest proportion of women versus those with none in top management. Profit margins were also higher[4]. An MSCI study[5] showed a similar boost to returns on equity from having at least three women on a company's board. Faster growing companies also seem to be more focused on supporting women, EY has found[6].

What is new is the sheer quantity and quality of data, supported by a heightened interest in socially responsible investing[7], has unleashed a new crop of investment products that hope to capitalise on the money making potential of gender inclusiveness. Two early vehicles were the Pax Ellevate Global Women's Index Fund and the Barclay's Women in Leadership ETN, which debuted in 2014. The latter tracks an index of US stocks issued by companies with women as chief executives or board members. WIL has $30m in assets and is outperforming the S&P 500 by three per cent year to date.

The Pax Ellevate Global Women's Index Fund has $100m in assets and holds shares in more than 400 global firms[8] showing a commitment to advancing gender diversity. Even the biggest players in the industry are getting involved. One of the newest additions is State Street Global Advisors' SPDR Gender Diversity Index ETF, which launched in March. SHE has attracted over a quarter of a billion dollars in assets and is also beating the index so far this year.

Elen Callahan

What is more, an infrastructure of services and analytics soon builds up around any new pot of money. This is good for diversity as it puts more pressure on companies thanks to better data. For example, inspired by investor demands to understand the gender-related performance, Bloomberg has recently launched a Financial Services Gender Equality Index. This provides a tool to evaluate a company based on gender data across four major categories: internal company statistics, employee policies, product offerings, and external community support and engagement.

Being able to quantify such qualitative factors and "bring transparency to gender-equal policies and practices" is a real step forward. The Bloomberg index places 35 per cent weight on employment data, defined as the number of women in management and senior positions, and another 35 per cent on policies which promote a diverse working environment, including gender-neutral family support. Gender-conscious products, which include promoting financial opportunities for female clients as well as products that benefit the company's own employees, receive a 20 per cent weighting. A company's public support of women accounts for the rest of its score. The inaugural 2016 index is made up of the 26 global financial companies that rank best on this basis[9].

In addition, more data can correct ongoing misconceptions surrounding female career paths. For example, one myth is women are not as ambitious as men. But the numbers show they enter finance with the same ambition, it is maintained in their early years, and then it declines midway through their careers. However, female ambition resurges again[10]. Understanding such trends matters because the probability of women reaching mid-level jobs is almost the same as for men (87 per cent), yet the probability of becoming a senior manager is just 45 per cent[11]. This mid-career female talent drain is an urgent problem for the industry.

Five years into my career, I started my family and had three children in four years. I shifted through full-time, flex-time, part-time, and gradually transitioned to consultancy work. As my home life stabilised again, I moved back to full-time employment. Data show that women are nearly three times more likely to stay with a firm when supported effectively via flexibility[12]. Staying home full-time is not an option for many breadwinning women. Nor do their aspirations disappear when starting a family – often they became stronger. By providing me with the opportunity to navigate my professional and personal goals, my manager kept me engaged and productive.

With more and better data on diversity and women's career paths companies can put into place more effective practices and policies. A surge of interest as well as money under management into funds specifically targeting best-practice companies is now driving this change. The end result should be improved profitability thanks to a more innovative, engaged and diverse work force. ●

1 US Census, "Women in the workforce"
2 US Bureau of Labor Services
3 Oliver Wyman, "Women in Financial Services", Dec 2014
4 McKinsey & Company, "Women Matter 2010"
5 MSCI, "Women on Boards", Nov 2015
6 Ten per cent of the companies surveyed were considered high-performers
7 According to the US SIF Foundation's 2014 report, US assets managed using strategies that consider environmental, social and governance issues grew 76 per cent between 2012 and 2014, to $6.6tn. Global assets rose 61 per cent, to $21.4tn during this period.
8 Deutsche Bank is included in the Pax Ellevate Global Women's Index Fund.
9 http://www.bbhub.io/professional/sites/4/BFGEI_Overview.pdf
10 Oliver Wyman, "Women in Financial Services", 2016
11 Oliver Wyman, "Women in Financial Services", Dec 2014
12 CEB Corporate Leadership Council – Four Imperatives to Increase the Representation of Women in Leadership Positions, Nov 2014

The piece was co-authored by Kathryn Burdett, Deutsche Bank's Head of Diversity & Inclusion for the Americas

Listening to derivatives—turn down the vol

After an election, pundits who fancy themselves as wits will often announce, "The people have spoken. But what did they say?" Markets, too, do not always speak clearly. Certainly movements in linear instruments such as stocks or credit default swaps can show whether bulls or bears are in the ascendancy at any moment. But these do not give any idea of the distribution of future price moves. For that non-linear instruments are needed, such as options.

The standard approach in analysing options is to think about them in terms of volatility. But what does comparing, for instance, the volatility of a 90 per cent strike put option on the Stoxx 50 European equity index with that of a payer option on the iTraxx Europe credit index struck 40 basis points above spot actually tell us? Even if both were priced at the same volatility, differences between the asset classes make them difficult to compare. And how do we even know whether the 40 basis points above spot strike payer is the right one to use for the comparison?

Kunal Thakkar

One important difference is in the relative upside and downside that options on the two asset classes imply. The upside offered by equities is (theoretically) unlimited while the downside is capped; for credit the upside is capped while the downside can be very large. It is not clear that comparing volatility or even price changes for these asset classes will yield meaningful results.

Thinking in volatility terms has obvious appeal for option traders in banks whose remit is to manage the risk of large option portfolios while hedging themselves against moves in the underlying asset. But it suffers serious analytical limitations in signalling the likelihood of future price changes in the underlying.

The biggest weakness is that in the commonly used Black-Scholes framework even options on the same underlying index and expiring on the same date but with different strike prices are evaluated using different probability distributions of future price moves. This violates a basic principle of thinking about future events, namely that there is one distribution from which the likelihood of future outcomes are drawn. What is needed, therefore, is a conceptually simpler model, one that can capture all of the potential outcomes that investors across different asset classes are pricing in, specify probabilities of these outcomes, and thereby derive a single distribution of future events.

Our multi-state model allows us to do this. Consider the nadir of the tumultuous market sell-off earlier this year, for instance. On the 10th February options expiring in April 2016 for both equity and credit indices were pricing in extremely bearish scenarios. In probability terms, equity options were pricing a one in four chance of the S&P 500 dropping more than seven per cent over the next two months. In contrast, the actual performance of the S&P 500 through recent history, which includes several significant sell-offs, associates the one in four chance with a 1.6 per cent drop.

Credit options were similarly bearish, assigning the same one in four chance of the investment-grade credit-default swap index (CDX.IG) spread rising by more than 16 basis points or more by April. History, meanwhile, suggests that probability is more in line with a nine basis point widening of the spread. That is useful information. The model's observations show that relative to the historical movements of their underlying assets, puts and payers were pricing in overly pessimistic future scenarios in February 2016. Hence, a good signal to sell out-of-the-money puts or payers at the time.

There were similar discrepancies at the other end of the probability distribution spectrum. Options markets were also flagging a one-quarter chance that the S&P 500 would be at least seven per cent higher by April 2016, a little above its historically observed six per cent. For credit, option markets were pricing in a 25 per cent probability that spreads would tighten by at least 16 basis points, much more than the historical 11 basis point move. Essentially, relative to historical data, markets were pricing in higher probabilities of extreme up or down moves, and not giving enough due to the chances of small to moderate moves. Investors could have exploited this potential overestimation of the chances of outsized market moves by using derivative strategies such as buying straddles and selling strangles.

Apart from comparing against historical outcomes, this probability based formulation of analysing options also helps identify inconsistencies across equity and credit derivatives markets.

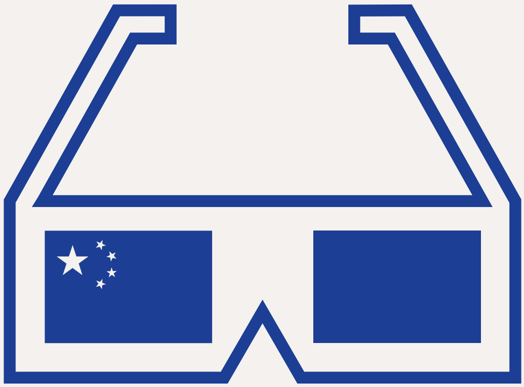
In the month leading up to the Brexit referendum, the July 2016 options on the European E-Stoxx 50 index had priced in a one in four chance of the stock market selling off by 7.5 per cent or more. Thus the equity option market was apprehensive about the Brexit vote but not to a large extent. In the credit derivatives space, meanwhile, similar maturity options on the iTraxx Crossover were pricing in a one in four chance of spreads widening 46 basis points.

However, the historical relationship between credit and equity moves associates a 46 basis point widening in the Crossover index with a 4.3 per cent sell-off in the E-Stoxx 50 equity index. Hence, the credit derivatives space was taking a much more sanguine view of the risks that the upcoming Brexit referendum posed.

Obviously, ex-post the relative pessimism of the equity markets proved more justified than the quiet optimism of credit markets. However, even ex-ante investors could have exploited the substantial informational value embedded in their very different probability distributions. The observations would have suggested a relative undervaluation of payers, which provide downside protection in the credit market. This could have been exploited by investors with a relative value trade to buy payer credit options and sell puts on the equity market.

Ultimately, our multi-state model is about finding better ways to read and understand market signals, something that has become increasingly important since 2008, when a few macro drivers have driven cross-asset correlations higher. In that context, credit investors are increasingly hedging against market shocks with equity options given the greater depth of equity option markets. Equity portfolio managers have become more cognizant of risks flagged by credit markets and actively look at credit markets to understand macro risks better. In such a world, understanding market signals in their totality becomes crucial. ●

> Please go to gmr.db.com or contact us for our in-depth report, "Cross market insights - Market signals: Credit-Equity edition"



China at the movies—stars in their eyes

Tallan Zhou
Karen Tang

When Matt Damon needed rescuing in his film "The Martian", the Chinese Space Agency was there to help. That probably seemed odd to sci-fi fans. After all, the invincibility of Nasa is enshrined in cinematic lore. But Hollywood, as always, was merely targeting its audience. And that audience is increasingly Chinese.

Last year, China's box office take grew by half, five times the growth rate of the American market, and the country now generates two-fifths of the world's cinema ticket sales. But despite its growing scale, the market for cinemas and film-watching in China is in its infancy. Indeed, there are only 23 screens per million people in the country, about half the number in Korea, and just one-fifth the number in the US. That leaves the Chinese market with a long journey ahead and it can be split into three parts.

The first step will be a rush by cinema chains to grow ticket sales by building more and more screens. This is already underway. Over the last five years, the number of screens per person has quadrupled. This can be attributed to three things: the development of cities and shopping malls, increasing disposable income, and a greater number of big-budget Hollywood films. As an example of the latter, the most recent Star Wars, Harry Potter, and Fast and Furious films had budgets roughly double their predecessors from the early 2000s.

This explosion in screen numbers has led to intense competition. Online ticketing platforms have sharpened this further. As a result, the price of a movie ticket has fallen one-fifth over the last five years even though overall prices in China have risen 15 per cent. In contrast, American ticket prices over the same period have risen 30 per cent, almost double the inflation rate. If we assume that the number of screens per person doubles over the next five years to the same level as in Korea, ticket prices should continue to fall for the time being.

Most of the growth in the number of screens will likely come from lower tier cities. Indeed, the 200 Chinese cities in the tier 3-5 brackets have a collective population of one billion people but a screen penetration less than half the 28 tier one and two cities. As a cinema ticket is a relatively cheap form of entertainment, rising disposable incomes in these cities will support more movie-goers.

The second leg of the journey will take place once the number of screens reaches a stable state. After this, the upgrading of cinemas to better quality screens and sound, as well as the ongoing natural increase in demand will allow cinemas to push up ticket prices. Once the ratio of screens per person plateaus at levels seen in Korea, cinema operators can be expected to increase ticket prices by one-third over the subsequent five years.

An ageing Chinese population will provide a natural increase in the demand. But this does not mean the elderly will be watching more films in their retirement. Although over 40s make up almost half of China's population, they generate just two per cent of ticket sales. Not being in the habit of watching films, they are unlikely to pick it up now. In contrast, those in the 18-30 age bracket comprise one-fifth of the population but they love the movies and occupy three-quarters of the seats. The age group to watch, though, is the under 18s which comprise another fifth of the population. Due to their lack of income, they currently only contribute two per cent to overall ticket sales, but are likely to follow in the footsteps of their slightly older cohort and begin to go to the cinema as their disposable income increases.

As Chinese cinemas will likely be able to raise ticket prices at the same time as overall demand for seats is increasing, it is no wonder that US studios have paid attention. In Hollywood's home market, it faces a lack of demand growth; the number of tickets sold has remained relatively flat for the past two decades. Only rising ticket prices has boosted the market.

The final stretch of the journey to a mature market will involve consolidation. Indeed, China's cinema market is ripe for it. The four biggest cinema chains capture just one-third of the market. That is half the market share of the top four American chains in the US. Further up the supply chain, Chinese studios are also far more fragmented than their US counterparts. While the top five Chinese studios are responsible for two-thirds of the films by ticket sales, the "Big Six" American studios make almost nine-tenths.

Consolidation tends to be initiated by firms with market power and in the Chinese movie business that is the cinemas. Some years ago, the studios tried to negotiate an increase to the 43 per cent share they receive from box office revenues. The cinema chains responded by forming an alliance to refuse to show those studio's films and the revenue split hasn't changed since. If cinema chains merge or acquire each other their power will increase further while antitrust issues should be avoided by virtue of their relatively high fragmentation. Some firms have begun to test the waters. Last year Wanda Cinema acquired theatres from Shimao, Hoyts, Aona, and Houpin. After the industry progresses fully through the first two stages of development, this consolidation should accelerate.

The second most likely consolidation trend will be cinema chains acquiring movie studios themselves. This will give cinemas access to higher, albeit more variable, profit margins.

At the end of this journey, the Chinese movie market will resemble that seen in more developed countries. The process will be lengthy, probably taking at least a decade, but it has already started. And as is the case in developed countries, the payoffs will likely be asymmetric, accruing to the strongest firms currently in the market. Those upstarts eyeing the lucrative market and dreaming of silver screen riches will have to be well-funded to absorb losses while they expand to scale. It is not just movie-goers with stars in their eyes. ●

> Please go to gmr.db.com or contact us for our in-depth report, "China movies – quantity to quality to consolidation"

America's fiscal consensus— a bridge too far

Among the many oddities thrown up by this surreal US presidential election is that in a country suspicious of government-led solutions there is now a political consensus for more fiscal spending. Indeed one of the few things Donald Trump and Hillary Clinton agree on is big infrastructure programmes are the next big thing for America. >

John Tierney

Mrs Clinton wants to pass a five-year $275bn spending plan in her first 100 days. Not to be outdone, Mr Trump wants to spend twice that amount. Janet Yellen, chair of the Federal Reserve Board, is also cheering for a more robust fiscal policy. And writing in the Financial Times last month, Larry Summers' opening paragraph began: "There is consensus that the US should substantially raise its level of infrastructure investment."

Why is everyone so sure? Perhaps one reason why infrastructure spending is universally acknowledged as the solution is a lack of consensus over what it is supposed to fix. Some want looser fiscal policy to support output growth as monetary policy wanes. Others want government infrastructure spending to compensate for a supposed $1tn shortfall in private business investment since 2008[1], restoring flagging labour productivity in the process. Beyond these lofty macro policy objectives there are those who simply want America's crumbling roads and bridges repaired. All share the lure of borrowing while bond yields hover near record lows.

But there are big reasons to question the consensus around fiscal spending. First, it is not clear there is a shortfall in public and private investment when the investment figures are appraised properly. Second, current macroeconomic conditions at best offer a marginal case for a fiscal stimulus. Finally, the way infrastructure spending is delivered in the US remains messy and archaic. This needs to be addressed before launching a large spending programme. Each of these counter-arguments is examined in more detail below.

First up is the common belief that government spending on infrastructure has shrunk over time. On a headline basis, real non-defense gross investment by the federal, state and local governments averaged 2.6 per cent of output over the past three years. That is the lowest since the 1940s and one-quarter below the average over the two decades preceding the financial crisis.

However, these statistics rely on using the overall output price deflator to calculate the level of real infrastructure investment. If instead, government investment is adjusted using infrastructure-specific price indices this apparent underinvestment all but disappears. Measured this way, the share of real government investment to output has been stable for much of the last three decades at 2.4 per cent.

A similar fallacy is often repeated about private capex. In nominal dollars business investment is running at about 12.4 per cent of output versus 13.4 per cent in 2007. But in real terms, taking into account the impact of disinflation on technology goods and the consequent change in composition of capex, business investment is around 13.1 per cent of output. This is only marginally lower than its recent all time peak of 13.4 per cent following the recent hit from the slowdown in shale oil-related investment[2]. Measured appropriately, American businesses,

1 See for example, "Central bankers eye public spending to plug $1 trillion investment gap", Reuters, August 25, 2016; and "Remarks on the US Economy", Stanley Fischer speech on August 21, 2016.
2 Please see "US CAPEX – don't be depressed", Konzept #1

in fact, are investing heavily in technology, software, and web-based business infrastructure.

Even as American businesses are investing more in lower-cost stuff, spending on buildings and structures has been neither strategic nor economic. The rise of internet shopping means America does not need more shopping malls or super-sized Walmarts. Furniture factories in the southeast that are producing less than half of what they did 12 years ago before Chinese imports hollowed out their businesses are not likely to be investing in new plant and equipment on expectations that production will soon rise back to previous peak levels. Besides, structures have risen in price about 75 percent over the past 15 years, compared with 31 percent for the broad price level and minus eight per cent for equipment. In other words traditional capex is extraordinarily expensive[3].

Even if public and private investment spending is not as anaemic as commonly assumed, is there still a macroeconomic case for a short-term fiscal spurt? Again the answer is far from unequivocal.

Here it is useful to distinguish between the Clinton and Trump spending plans. The former is to be funded by closing (yet unspecified) corporate tax loopholes and therefore fiscally neutral. That is a virtue, but also a flaw. Raising the effective tax rate could cause companies to scale back investment and employment to maintain profit margins, resulting in public spending effectively crowding out private activity, and reducing the net positive impact on output growth.

The Trump plan meanwhile is debt financed and hence a fiscal stimulus in the more conventional sense of the phrase. The impact on output growth relies on the size of the potential fiscal multiplier, or the extent to which a dollar of stimulus generates additional rounds of spending and output in the economy. The problem is that estimates of fiscal multipliers are hotly debated, highly uncertain and often ideologically driven.

Those favouring more fiscal spending point to the economic damage that has accompanied government austerity in Europe. Then again, Japan highlights the failure of a quarter of a century over which it has deployed fiscal stimulus no fewer than 42 times. Alas, the prospects of the Japanese economy have failed to keep pace with the growing pile of government debt or the number of shiny bridges to nowhere.

A sensible starting point when debating fiscal multipliers is the survey of the subject by Valerie Ramey[4] that concludes: "…the US aggregate multiplier for a temporary, deficit-financed increase in government purchases…is probably between 0.8 and 1.5". Moreover, despite strong disagreements on the precise level of the fiscal multiplier, there is general consensus on some of the factors that influence its value.

For example, a fiscal stimulus is most effective when an economy is in a deep recession with high unemployment and spare capacity. Academic estimates of government spending multipliers in the US during

3 See Public Spending on Transportation and Water Infrastructure – 1956 to 2014, Congressional Budget Office, March 2015

4 See Ramey, Valerie A. (Sep 2011), "Can government purchases stimulate the economy?" Journal of Economic Literature. Vol. 49, No. 3.

mature expansions are generally below one – some are close to zero – while estimates during recessions are well above one, with several estimates near or above two. The US economy today as per most estimates, including the Federal Reserve's, is already near full employment.

Indeed, the biggest shortcoming of the post-crisis US economic recovery has been subpar labour productivity growth. However, even as per traditional Keynesian models the first order effect of additional aggregate demand is to boost output through increased employment and not through higher productivity. Any potential productivity benefits from better infrastructure would likely take years to materialise and are contingent on the spending being well targeted towards worthwhile projects.

Another factor that influences the effectiveness of fiscal stimulus is monetary policy – it should not be tightened at the same time. An IMF study in 2010 found the fiscal multiplier approximately doubles when monetary policy does not counteract fiscal changes. Other academic studies have found fiscal multipliers are three or four times bigger when interest rates are stuck at the zero lower bound while the central bank still wants to ease policy. Once again, the US is moving away from this situation with the Fed now raising rates, albeit gradually. In fact, some proponents of a fiscal stimulus specifically argue for it on the grounds that it will allow rates to normalise faster. This though will also blunt the impact of fiscal policy on output growth.

Fiscal multipliers also tend to be smaller when sovereign debt loads are elevated. The US government debt to output ratio is already above 100 per cent. Granted about one-third of this is held by the Fed and the Social Security Trust Fund so it will be presumably rolled over for years if not decades to come. However, even government debt held by the public is currently projected to rise to 85 per cent of output over the next decade. The dollar's 'exorbitant privilege' minimises the risk of the US losing access to global capital markets. Still, high debt levels could exacerbate the populist backlash that made this election cycle interesting to say the least, leading to both pressure to curtail the fiscal program and some degree of Ricardian equivalence response that negates the original stimulus.

In other words, the US may have less breathing room on the fiscal policy front than appreciated. The federal fiscal deficit in 2015 was the smallest in the post crisis era at 2.5 per cent of output. The CBO projects it will rise steadily from here to reach 4.6 per cent by 2026. And that is without any further stimulus plans or economic recessions along the way. This is no hawkish alarmism. Pure pragmatism dictates that the US utilise its limited available fiscal policy space to maximum effect.

Under current economic conditions – high resource utilisation, slowly rising inflation, and a gradual Fed rate hike cycle underway – Deutsche Bank economists estimate the US fiscal multiplier as close to one[5].

5 "Global Economic Perspectives – Global fiscal stimulus to the rescue", 26 July 2016

Arguments for infrastructure spending are often tinged with references to the 1950s interstate highway roll-out and the golden age of American prosperity that followed. Calls for a repeat of such great acts are misguided.

The average of the Clinton and Trump proposals amount to additional fiscal spending of 0.5 per cent of output. With a multiplier of one, US economic growth would be boosted by 0.5 per cent which in turn adds 0.08 per cent to global output growth. This is hardly the panacea to the world's economic ills that some would have us believe.

In fact when viewed from a global perspective, a US fiscal stimulus looks even less desirable. The debt to output ratio for US non-financial corporations is at an all-time high and household deleveraging has stalled in the last year. This suggests that a US fiscal expansion would rely on excess savings from abroad. Unfortunately, this is mere repetition of a pre-crisis cycle in which America's current account deficit widens and foreign capital floods into the US, further inflating already high asset prices.

Moreover, while any US fiscal stimulus would be cheered by Chinese steel mills buckling under the weight of excess capacity, it would only delay the ongoing efforts to rebalance the Chinese economy towards domestic consumer demand. It also risks fuelling further populist backlash in the US and retriggering the global imbalances that have been curtailed since the crisis. If fiscal loosening is indeed desirable to boost the global economy, it should not come from America but places such as Germany with excess savings.

Nevertheless, America does have real long-term infrastructure problems that need to be addressed. Some estimate that inadequate transportation infrastructure costs US households between two and six thousand dollars annually, due to time lost to congestion, more frequent car repairs and higher gas consumption[6]. Even at the lower end of the range when spread across 120m households, this amounts to some $240bn, or about 1.3 per cent of annual output. Reducing this cost helps the economy as it allows people to be more productive. And upgrading infrastructure improves quality of life by freeing up time and money.

Unfortunately, though, execution remains a key stumbling block. When Congress passed a five-year $305bn transportation programme in 2015 it did little more than continue existing programmes. Real dollars and cents still have to be appropriated each year, meaning they are not guaranteed. Funding uncertainty makes it impossible, for transportation policymakers to plan or execute longer term strategic infrastructure investments. For Congress, however, this is an optimal arrangement that allows individual legislators to threaten to withhold money unless it is directed to pet projects.

Note that the current proposals by both presidential candidates perpetuate this problem by failing to provide a steady and sufficient funding source for infrastructure. Rather money would continue to be funded at the ongoing whims of Congress, or for as long as programmes are slated to run. Once either the money or the programme ends, the infrastructure spending stops. Without stable

6 See for example: Failure to Act: Closing the Infrastructure Investment Gap for America's Economic Future, American Society of Civil Engineers, It's about Time: Investing in Infrastructure to Keep Texas Economically Competitive, and the National Transportation Research Group at http://tripnet.org for a variety of state and regional studies.

funding, therefore, any infrastructure plan, however comprehensive, is doomed to fail.

And what would comprehensive mean, anyway? The American Society of Civil Engineers estimates the country needs $3.3tn of infrastructure spending over the next decade. Currently there is only $1.9tn of visible funding in the pipeline, leaving a $1.4tn gap. Transportation – roads, rail systems, urban mass transit – is the biggest problem[7]. The Department of Transportation estimates it would take $1tn above and beyond its regular budget just to address the deferred maintenance on the nation's roads and bridges. Its annual operating budget is less than one-tenth of that. While civil engineers and transport officials may not be the most objective groups in assessing future infrastructure spending requirements it is worth noting that these figures are several times higher than those proposed by the two presidential candidates.

Yet even if politicians started talking in trillions instead of billions there is the challenge of paying for it. At least this is not insurmountable. Take those transportation investment needs of $200bn annually of which about $95bn is currently funded leaving a $105bn shortfall. Petrol taxes provide 80 per cent of the current funding but the federal petrol tax has not been raised since 1993. Including state taxes, the national average for petrol taxes is just over 50 cents per gallon. To fill the funding shortfall, petrol taxes would have to rise by 235 per cent to $1.20 per gallon – costing the average household an additional $700 annually. That would still leave petrol taxes in America lower than Canada ($1.25), and well below the $2.62 average across OECD countries. Many European countries have taxes over $3 per gallon.

Funding issues, though crucial, pale in significance compared to the governance problems that plague fixing infrastructure. At the heart of these are state rights – the divide between federal and state governments enshrined in the tenth amendment of the constitution. These rights have resulted in no meaningful accountability between federal and state/local governments over building and maintaining infrastructure. It is easy to joke about bridges to nowhere in Japan, but America's system also makes it easy to carry out useless pork-barrel projects.

A case in point was the plan to connect Gravina Island (with 50 residents) in Alaska to the mainland via a bridge the length of San Francisco's Golden Gate Bridge and an estimated budget of $400m funded with federal money. The proposal was finally scrapped last year after a decade of political infighting, but nevertheless a highway was built from the town on the island to where the bridge was supposed to be, just because federal money was available.

Then there is the so-called Corridor H, a 100 mile four-lane highway through the Appalachian Mountains of West Virginia. The project is slated to run through 2035. It is supposed to connect West Virginia to

7 See Failure to Act: Closing the Infrastructure Investment Gap for America's Economic Future, American Society of Civil Engineers.

the eastern seaboard, but neighbouring Virginia has no plans to build a highway to meet the eastern end of Corridor H, meaning it will end near the West Virginia state line[8]. There is no effective mechanism to avoid such projects or to compel cooperation across different governmental bodies.

Even if the right projects were chosen and built the next problem is their maintenance. Essentially the modus operandi of US infrastructure policy is that the federal government pays for or provides significant seed money for major capital projects and then state and local governments are on the hook for most ongoing maintenance. In 2014, total public spending on infrastructure was $416bn, of which one-quarter came from the federal government and the rest from state and local governments. While about 70 per cent of federal funds go on capital projects, at the state/local level, about two-thirds is directed towards operations and maintenance[9]. To the extent that US infrastructure is deteriorating because of a lack of adequate maintenance, this is clearly much more a state and local problem.

A case in point is New Jersey. Until very recently the state had the second lowest petrol tax in the nation. As a result its Transportation Trust Fund was broke, and most infrastructure work was halted for three months during the summer of 2016. Following the Hoboken train crash on 30 September 2016, which killed one person and injured 108 others, the state legislature and governor finally agreed to raise gas taxes. This is symptomatic of a broader problem where action on infrastructure happens only after a major failure. Similar battles are going on in other states. Whoever occupies the White House come January needs to recognise and resolve such problems if the federal chequebook is going to be effective.

Another potential problem is nostalgia. Most arguments for new spending focus on rebuilding or adding to existing infrastructure. They are often tinged with references to the 1950s interstate highway roll-out and the golden age of American prosperity that followed. But calls for a repeat of these great acts are misguided. The infrastructure that was required to help America grow and thrive during the second half of the 20th century is not necessarily what is needed for the future. Little thought is being given to the prospect that infrastructure needs could shift significantly over the next decade, let alone the next half century, rendering many of today's likely projects white elephants.

For example, consider the inevitable switch from internal combustion engines to electric cars. As of midyear 2016 there were 14,328 charging stations throughout America. For comparison there were 157,000 petrol stations or convenience stores, which can service some 800,000 cars. If it takes six minutes to fill a car with petrol and 30 minutes to charge a Tesla, petrol stations can service some 8m cars an hour while charging stations can handle about 30,000 electric cars. That is

8 Please see West Virginia's road to nowhere gets fiscal stimulus, CNN, March 12, 2009; and End of US highway 48, July 5, 2016

9 See Public Spending on Transportation and Water Infrastructure – 1956 to 2014, Congressional Budget Office, March 2015

manageable today with less than half a million electric cars on US roads (versus 255m petrol or diesel powered cars). But if electric cars are to become the norm the number of charging stations will have to expand enormously.

Even this vision of the future seems myopic relative to the recent pace of technology innovation around us. One MIT study found that New York's taxi fleet of 13,500 could be cut by 40 per cent just by the proliferation of on-demand services such as Uber. Driverless cars are already being tested commercially. What will their mass adoption do to number of cars on our roads or traffic patterns within our cities? And there is the possibility of drones delivering Amazon packages, picking up a pharmacy prescription or even carrying people. What if policies to combat climate change negate the need for more airport capacity? Government is not particularly better or worse than anyone else at making these judgements, but the infrastructure needs for the next 20 years seem especially hard to predict today.

Government does have a role to play in facilitating the spread of these new technologies but that is much more about speeding up the granting of permits and approvals and not just spending public money. The widespread implementation of driverless cars and drones, for instance, will almost surely require universally available wireless broadband and access to satellite systems and other smart features built into roads for them to navigate themselves.

However, high speed broadband technology is not available across much of the US, largely because it is uneconomic for private sector providers to build it. To help address this, the Federal Communications Commission passed an order in 2015 overriding state laws that prohibited or limited municipalities from establishing public broadband networks. But this was challenged in August 2016, when a Federal appeals court with jurisdiction in the southeast US ruled that the FCC could not override state laws regulating broadband in Tennessee and North Carolina.

The issue in this case was that some municipalities wanted to extend local municipal broadband service to the broader surrounding region. Private telecom providers, citing state laws, sued to block the municipal service. A New York Times article described a large farm in North Carolina that had built a sophisticated packing plant precisely because high speed municipal broadband service provided by a nearby city was far superior to the previous level of service by a private telecom company. Now that farm is looking at shutting down its new highly productive plant[10].

This may appear to be an isolated example, but 20 states have similar laws controlling municipal broadband service. Issues regarding states' rights may have been less of a problem for infrastructure development in the 18th and 19th century and even much of the 20th, but they are becoming increasingly problematic in the interconnected world of the 21st century.

10 Please see US Court Blocks FCC Bid to Expand Public Broadband, New York Times, August 10, 2016; and Broadband Law Could Force Rural Residents Off Information Super Highway, New York Times, August 28, 2016.

Roadblocks to technology roll-out come from other sources too. Recently a wealthy neighbourhood in New Jersey mounted a campaign to stop cell phone towers from being built within its borders. There were signs asking people to send a text message indicating their support. No one seemed to see the irony in using cell phones to indicate their support of potentially not being able to use cell phones in parts of the town.

The easy part is that everyone – Hillary Clinton and Donald Trump included – agrees that infrastructure is a problem. The hard part won't be finding a way to pay for it. Rather the real challenge will be overcoming the ancient political problem of entrenched interests and privileges frustrating progress. To meaningfully upgrade America's infrastructure the next president has to find a way to address and overcome these hurdles. Otherwise, little will be accomplished other than spending a lot of money and digging America into a deeper fiscal hole. ●

Shovel ready projects?

David Bianco

Hillary Clinton and Donald Trump are both touting infrastructure programs that could essentially double the current federal spend to about $200bn annually and boost total public spending by a quarter to $515bn. Far-fetched as it may seem in this era of an obstructionist Congress, that could be the easy part. The real challenge will be identifying high return projects. Neither candidate is likely to spill any meaningful details until well after the election but it is still a worthwhile exercise to start thinking about what could be.

There will be a certain challenge in quickly finding large shovel-ready projects that can absorb that kind of additional money within the next couple of years. The potential large projects in the pipeline are unlikely to outdo the projects of recent years that are now winding down. Those include New York City's 2nd Ave. subway line in Manhattan; the Water Tunnel No. 3 project, which started in 1970 and runs 60 miles into upstate New York; Chicago's O'Hare Airport expansion; Seattle's Alaskan Way Viaduct tunnel; and Washington DC's Metro link to Dulles Airport.

Coming on-line are three large projects. These are the Gateway Project, which would rebuild much of the rail infrastructure between Newark, New Jersey and New York's Penn Station as well as provide for a new Penn Station; an international bridge connecting Detroit, Michigan and Windsor, Ontario; and a major expansion of New York City's La Guardia's Airport.

The rub is that these projects, plus other large projects that are more than half way completed or nearly finished will only cost about $50bn total between 2017 and 2025 – and much of the spending will not start until 2018 (if current plans stay on track).

Ideally, other smaller infrastructure projects will bubble up, including highways, airport improvement, power transmission upgrades, and new urban light rail passenger systems. Some possibilities include the Los Angeles Metro Rail extensions; Washington DC Metro extensions; Lake Mead water intakes; and improvement to the public/private rail corridor that runs from New York to Louisiana.

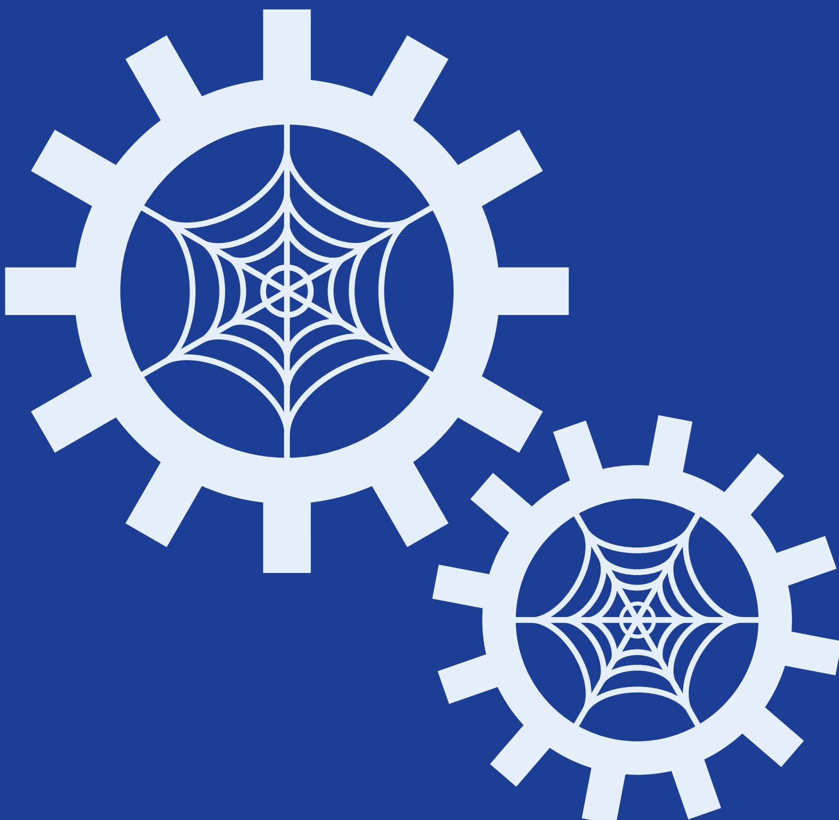
As the current pipeline of projects are completed, the US will need to become much more aggressive in building (or replacing) major transport bridges and tunnels, and reach for the visionary yet still practical infrastructure that addresses national risks such as flooding and droughts. Potential projects include repairing and enhancing the Gulf Levee System in Louisiana, a Sacramento, California River Delta water tunnel, and New York City storm protection system.

And then there is meeting the demands of science and technology, by building super-structures such as rocket launching facilities, biotech labs, next generation communications facilities, and air traffic control systems. There is also the prospect (perhaps more medium term) that some coastal cities will have to be at least partly relocated inland.

From investors' standpoint, the more promising infrastructure investments that benefit public engineering and construction companies will be in electric transmission/efficiency, green power, and water systems. These kinds of projects are likely to be done by public/private partnerships and subsidised by the federal government. ●

For more information about the outlook for infrastructure spending in the US, including a list of some 200 potential projects and public companies that could be involved please see our report Dreams of a better US infrastructure, US Equity Insights, September 2, 2016.

The age of US capital



Luke Templeman

Lambasting corporate managers for a lack of capital investment is a favourite pastime of politicians. Both sides in the current US presidential race have done so. They seem to have a point. Last year, non-financial S&P 500 companies cut their capital spending by five per cent, the first down year since the financial crisis. >

What is more, the decrease looks to be part of a trend of falling capital investment. A quick look at US non-financial balance sheets shows that over the past 25 years, the median age of company equipment, based on the ratio of accumulated depreciation to the gross value of plant and equipment, has risen by one-quarter to 52 per cent. In other words, the capital stock of S&P 500 companies is now more than halfway through its useful life.

This is misleading, though. For one thing the supposed long-run aversion to capex is based on nominal numbers. Adjust for the fact that companies are spending more on stuff where prices have risen slower than the overall economy and capex becomes historically strong in real terms. In addition, as capital has a useful life of about 13 years, the gradual decline of inflation from the high levels in the 1980s still affects accounting calculations back in the 1990s. If the impact of inflation is excluded, the age of the capital stock of America's biggest companies has increased only marginally over the last quarter century.

This stability is supported by data showing that operating metrics have also been relatively stable over the long term. Returns on assets for non-financial S&P 500 companies, at about six per cent, are similar to the levels of two decades ago. Returns on equity, too, seem to move independently of the age of capital stock and are at similar levels to 20 years ago, with the occasional dips during recession years.

All of which suggests the capital stock of American firms is fighting fit or, at least, reinvestment is occurring at a constant rate. But again there is a catch. This overall consistency masks a change in the composition of businesses in America and, particularly, in the S&P 500 index. A defining feature of the past two decades has been the emergence of capital-lite companies, with technology firms the obvious addition to the mix. In fact, the median non-financial S&P 500 member now has gross plant and equipment comprising one-third of its assets. This is almost half the level of 25 years ago.

To adjust for a changing sectoral mix, we separate S&P 500 companies into two baskets based on how much equipment they have relative to total assets in a given year. Firms with an above-median proportion of equipment are deemed capital intensive; those below not. Logically, the quality of equipment used by capital-intense companies should have a greater impact on performance than on capital-lite firms.

Splitting companies on this basis reveals a more discriminating picture. Since the early 1990s, the median age of capital-lite firms' equipment has grown by about one-fifth. By contrast, the age of equipment at capital-intensive firms was falling right up until the financial crisis, after which it rose gradually and is now back up to levels at the start of this millennium. To put it differently, capital-intensive firms were investing to make their capital stock younger before the crisis but then shifted towards sweating existing assets.

The shift in behaviour at capital-intensive firms lets us examine how capital investment decisions impact top and bottom lines. To do this we assume an increase in revenues and earnings in any one year is the result of capital investment decisions made in the prior year. Data since 2000 shows that when capital-intensive companies embark on a capital rejuvenation process – that is, the age of the company's capital stock became younger – revenues increase by a median of six per cent in the following year.

However the data also shows those firms that did not invest grew their top line by same amount. So capital spending is irrelevant for revenues – how can this be? One reason is because a company's spending plans should not be evaluated in isolation from its competition. What matters for sales growth is not so much the level of absolute spending but rather how much a company invests relative to direct competitors.

To illustrate the importance of relative capital spending, imagine a street lined with rival cafés. If they all use the same rusty old coffee machines, the quality of brew will be similarly terrible everywhere, with customers spread evenly between them. But as soon as one café invests in a fancy new grinder or milk frother, the relative quality of its coffee will improve and it will win customers from others assuming its prices remain reasonable.

The example also highlights that high capital spending in one period can be a necessary function of underinvestment in prior periods. Conversely, falling capital investment may be a rational reaction to previous over-spending. Hence, to analyse the effectiveness of capital spending decisions, the existing state of a firm's equipment should be taken in to account. To extend our café analogy, when a barista finally replaces the rusty old coffee machine, the marginal increase in appeal to customers should be greater than if a rival café replaced a newer machine.

To account for a firm's position in the capital replacement cycle, therefore, we split our dataset into companies with above or below-median age of equipment. Since 2000, a six per cent jump in subsequent revenues was generated when firms with younger equipment invested. But when these same firms let their assets age, they also grew top lines by six per cent and experienced higher earnings growth. Customers, it seems, did not care about marginal improvements in capital stock and investing appears to be a distraction for management.

In a street lined with rival cafés that all use the same rusty old coffee machines the quality of brew will be similarly terrible everywhere.
If one café invests in a fancy new grinder or milk frother, it will win customers from others, forcing rivals to follow.

A straightforward rule for managers is they should invest when equipment is old and hold back when it is young.

However, when companies with older capital stock invested they generated a six percentage point revenue jump and ten percentage point earnings jump, both higher than the figures when they didn't upgrade.

So it would seem there is a straightforward rule managers should follow. They should invest when equipment is old and hold back when it is young. And yet even this does not appear to be the case. Since 2000, firms have allowed their equipment to grow older irrespective of whether it was old or young to start with.

Why might this be happening? One explanation is that falling interest rates over the period has shifted investor preference towards companies that offer yield in the form of dividends and share buybacks. Since 2000, stocks that pay high dividends have returned almost four times the market and now trade at a price to book value two-thirds above the rest of the S&P 500. Meanwhile, the value of share buybacks has tripled since the beginning of the century.

Another explanation is the herd mentality of companies and investors. Capital spending at one company tends to be mirrored by rivals. Returning to our café analogy, if one invests in a shiny new coffee machine, competitors worry they may lose customers and buy their own new machines. Alternatively, one café may shun capital spending and reduce prices to try and win customers. Competitors follow. So when no one is spending, the status quo remains until someone takes the first leap. This explains the mini-cycles of plant and equipment spending at capital-intensive firms. Asset growth peaked at ten per cent in the late 1990s before falling into a trough and then peaked again before being cut short by the financial crisis.

For investors that outperformed by prioritising yield over younger assets, there are reasons for concern as well as hope. The former relates to high valuations when the spending cycle finally comes. The risk here is implementation. Some companies will succeed and some won't – particularly given the extended period without a large capital investment programme as the necessary skills of managers may be lacking. Reckless spending has been the downfall of many companies – it will be harder still if US interest rates rise.

On the other hand an opportunity exists relating to returns on equity. Over the last decade, S&P 500 returns on equity have been supported by rising profit margins due mainly to lower interest, labour and tax costs. But asset turn (sales as a proportion of assets) has fallen. If the profit margins of America's companies have reached a plateau, then improving asset turn may be the only way to boost returns on equity.

We have already shown that capital spending to replace older equipment can produce higher incremental sales and earnings, that would, in turn, boost asset turn, thereby increasing returns on equity. And the longer companies wait to replace their assets, the more revenue bang for their capital buck they will receive when they do. Managers will be watching rivals to see who goes first but eventually, a tipping point will be reached at which they will be forced to invest regardless of what competitors are doing.

To conclude, it is difficult to say whether companies are spending too much or not enough on capital investment in aggregate. Certainly, the issue cannot be framed with reference to a single number or threshold. But investors can take comfort in the fact that the gradual ageing of equipment of some American companies' balance sheets means there may be extra room for them to generate higher returns for shareholders when investing in capital begins again. ●

Productivity—the comeback kid

Binky Chadha

No wonder Alan Greenspan "cringed" every time Bob Rubin, US Treasury secretary in the late 1990s, repeated his well rehearsed mantra that the White House supported a strong dollar. A rising dollar, at various times in the past, has been blamed for misfortunes ranging from slumping commodity prices, weaker US growth to emerging market crises.

The downsides of the blistering dollar rally of the past three years have been well documented. A stronger greenback generates apprehension for the companies and banks globally that have borrowed a record $10tn in the US currency, up from barely $4tn a decade ago. Recently, the currency's 23 per cent rise from June 2014 to March 2015 was the fastest pace of dollar appreciation on record in any nine-month period. This eventually precipitated a global equity market shock in January and February this year.

Dollar strength has also suppressed core inflation in the US, thereby holding back further Federal Reserve rate hikes. Empirically, a ten per cent rise in the dollar lowers the Fed's preferred measure of core PCE inflation by 22 basis points, with a two year lag. This implies that the past appreciation of the dollar is currently subtracting 0.3 percentage points from core PCE inflation, a magnitude near 20-year extremes and of a scale last seen in the late 1990s. But for this temporary dollar impact, underlying core inflation has already reached two per cent since February 2016, from a low of one per cent after the crisis, implying mission accomplished for the Fed.

While the rap sheet for a strong dollar is clearly long, there is one important, and often overlooked, associated benefit. Dollar strength can also play handmaiden to sizeable labour productivity gains in the US economy. Essentially, when it coincides with tight labour markets, a strong dollar forces a retooling of corporate America, spurring higher investment and technological gains which result in better labour productivity growth.

Examples of a strong currency's positive impact on labour productivity are not restricted to America. The value of the Japanese yen against the US dollar nearly doubled in the early 1990s. However, contrary to expectations that the resulting hit to corporate Japan's international competitiveness would wither away the country's exports, its trade surplus actually rose.

The resilience of Japanese exports was caused by two factors. It was partly driven by a production shift to high value products, typically consisting of price inelastic components, which were relatively insulated from yen appreciation. Second, firms pursued leaner production processes and reduced wage costs.

On this second point, there are many recent examples of efficiency improvements by Japanese firms in the wake of the yen rally after the 2008 financial crisis. By 2015, Toyota was able to cut the cost to retool an existing production line for a new model by half of what it cost in 2009. It also cut the investment needed for new plants it is planning for Mexico and China by 40 per cent from earlier levels. It did this by cutting a thousand small costs, from smaller and more efficient paint booths to a faster and more flexible robot welding system. Similarly, yen strength after the

Lehman bankruptcy nearly forced Daikin to close its Kusatsu plant. That experience forced the company to innovate at its four home factories reducing energy losses, including by cutting carbon-dioxide emissions per unit by 20 per cent, and raising production efficiency.

Similarly, dollar appreciation, especially during periods with tight labour markets, initially hurts the competitiveness and therefore the profitability of US firms, creating incentives for improving productivity in response. There have only been two periods of two per cent plus annual labour productivity growth in the US since 1960. The first was between 1960 and 1973, when productivity grew 2.8 per cent annually, and the second was between 1995 and 2003, when it rose 3.2 per cent annually (by contrast, it has languished at 1.4 per cent since then). While the dollar was fixed during that first rapid productivity phase, and therefore not relevant for this analysis, the currency's sharp appreciation starting 1995 coincided with the beginning of a rapid productivity growth phase. The eight years to 2003 saw the dollar trade-weighted index rise two-fifths, underpinning those efficiency gains.

Tight labour markets too contributed to the mid-1990s productivity boom. By 1995, the labour market had recovered following the 1991 recession, and the unemployment rate was back down to near most estimates of the natural rate. The NFIB survey of small business showed that businesses were complaining about the poor quality of labour as well as its high and rising cost. Facing foreign competition and a higher wage bill, firms were compelled to invest and innovate their way out of the mire.

Indeed, data suggest that both a strong dollar and tight labour markets are necessary for productivity growth to pick-up. The tight labour market conditions of 1978-1979 and 1987-1989 coincided with a cheap dollar, thereby blunting incentives for companies to invest. Similarly, in the mid-1980s the dollar was strong but unemployment was still high after the stifling recessions earlier in the decade, so again productivity growth remained weak.

What do these past experiences tell us about the coming years? The current situation is characterised by the rare confluence of a strong dollar and tight labour market. The dollar is already up a third from its cycle lows, enough to drive productivity growth going forward. The unemployment rate is near the Fed's estimates of full employment. Small business complaints about the quality of labour as well as its cost are near the peak of the last cycle. The aligning of both these factors should result in an inflection point in labour productivity growth

What gives even more cause for optimism about the current cycle are the banks. Their recovery could be the third factor boosting productivity growth. In fact, a significant component of depressed productivity in recent years has been the financial sector, which is still struggling with the scale of monetary easing in developed markets as well new regulation. Data show that productivity growth in the business sector has increasingly lagged the productivity of the nonfinancial business sector, the differential of which is a proxy for productivity growth in finance. That proxy is positively correlated with the ten-year Treasury bond yield, implying that higher rates would boost bank productivity by raising net interest margins and returns on financial assets in general.

This is good news. Policymaker chatter on productivity has been overwhelmingly negative in the last few years. Thirteen years into the current slow productivity phase, economists are still debating whether it is labour productivity (which depends on the ratio of capital to labour) or total factor productivity (which depends on technological progress) that is the problem.

Yet what all the recent handwringing about productivity ignores is the time needed for it to recover from a financial crisis and recession. Indeed, perhaps the main reason developed markets have suffered from low productivity since the crisis is that five years of productivity growth were packed into the financial crisis. US labour productivity in the nonfarm business sector jumped by 7.5 per cent in the six quarters from late 2008 to early 2010. That amounts to half a decade of productivity growth at the current pace. That the US has experienced slow growth since does not look particularly unusual.

Importantly, this large jump in productivity did not represent a bounce back from any initial decline at the onset of recession. Instead, the initial stages of the recession saw a relatively steady level of productivity.

Needless to say humility is in order. This is only the second time that the beginning of a tight phase in the labour market has coincided with a strong dollar since the currency floated in 1973. What we do know is that when productivity cycles go, they go and go. The average cycle, including this one, extends for about 13 years at a time. So if productivity is indeed at an inflection point, then the narrative of an ailing US economy weighed down by structural problems could very well turn. That would be an optimistic story of US strength as undisputed as our pessimism seems today. ●

Please go to gmr.db.com or contact us for our in depth report, “Asset Allocation - Drivers Of Productivity Growth Aligning For A Pickup”

Columns

Book review—Game Change

Sylvia Foteva

The 2016 presidential election is entering its final stages and the last time American politics was this dramatic was eight years ago, when Barack Obama beat Hillary Clinton to the Democratic nomination and eventually the presidency. Thus I have just re-read Game Change, the brilliant political page-turner on the 2008 race by journalists John Heilemann and Mark Halperin.

The book delivers on its promise of an "intimate portrait" of the characters. Looming large of course are Barack Obama and Hillary Clinton. Then there is John Edwards, who was brought down by a love child that he awkwardly denied on television (now immortalised on YouTube). Not to be outdone, Republican John McCain shocked everyone by flying in little known governor Sarah Palin as his VP candidate at the last minute.

All this is set against the background of the biggest financial meltdown since the great depression. Even so, you may ask, why read about the 2008 presidential race when the current version puts everything to shame in the "I can't believe this is happening" stakes? Here are three (and a half) reasons why you should still read this book. For starters, Game Change is great literature, written with pace but also an eye for the minutiae. The way the authors personalise every detail turns a story about politics into an unputdownable drama.

Second, Game Change is a thorough lesson in US politics. This step-by-step guide to presidential elections covers the prodding and doubt before deciding to run, assembling (and keeping) teams together, balancing family life, the news cycle, developing key messages, wining and dining with campaign sponsors, debating as well as knowing when to give up. As well as the myriad personality portraits the thing I enjoyed most about Game Change was following key decision processes each step of the way.

The third reason you should read it is because it brings you right into the heart of Hillary Clinton's team, circa 2008. In fact, it goes back to her almost-candidacy in 2004. The description of the Clinton head quarters is not altogether positive, especially when contrasted with the depictions of an energetic and efficient "Obamaland". The book remains relevant as a painfully direct portrait of Hillary Clinton as a candidate.

Finally (and here's the half reason) Game Change is valuable as a time capsule of political life and electoral opinions when, during the Bush and early Obama years, shockwaves from the global financial crisis had only just begun to shake the world as we know it. I rate this as half a reason only because it is a topic too large to do justice in, and one not central to the narrative. But it is fascinating to ponder how different the non-establishment vote in 2008 was from the one stirring up American politics today.

You can't help poring over every page and asking: were the seeds detectable in 2008 that grew to allow the success of a candidate as unconventional as Donald Trump? How quickly things have changed so that many now proclaim America has entered a period of "post truth politics"? It was so much more innocent then. Candidates in 2008 were attacked on issues such as a lack of a coherent message, or negative comments made by their pastor. How tame such setbacks seem in the context of this election.

Game Change is an indulgent political thriller with a plot and characters kindly provided by the reality of US politics. The authors also wrote Double Down about the 2012 election. I've got my fingers crossed they'll do justice to the 2016 race in due time. While we wait, you should grab Game Change for your next flight.

Conference spy—commodities

Sahil Mahtani, Luke Templeman

Metals & mining and energy are the two best performing sectors in the European stock market so far this year. Your conference spies sneaked into the Deutsche Bank conferences in London covering these industries fully expecting a cheery crowd of participants after the dark days of the last few years. Here are some snippets of the best bits of information we gleaned for you.

Zinc: It seems illogical that metal prices experience such violent swings when medium-term supply and demand can be forecast with reasonable accuracy. Take zinc prices, for instance, which jumped by half this year, returning them to last year's level. In the process 99 per cent of producers suddenly turned cash profitable. One reason is the strong dollar which has lowered fuel and other costs. A more comprehensive explanation involves tipping points. One such event occurred late last year when Glencore announced mine closures that will remove 1.2m tonnes, or one-tenth of global zinc consumption, from supply forecasts. That brought into focus the fact that years of underinvestment will lead to a supply shortfall of 2.6m tonnes in five years' time. While possible new projects are forecast to deliver two-thirds of this gap, many face substantial political risk casting doubt on the industry's ability to fill the hole.

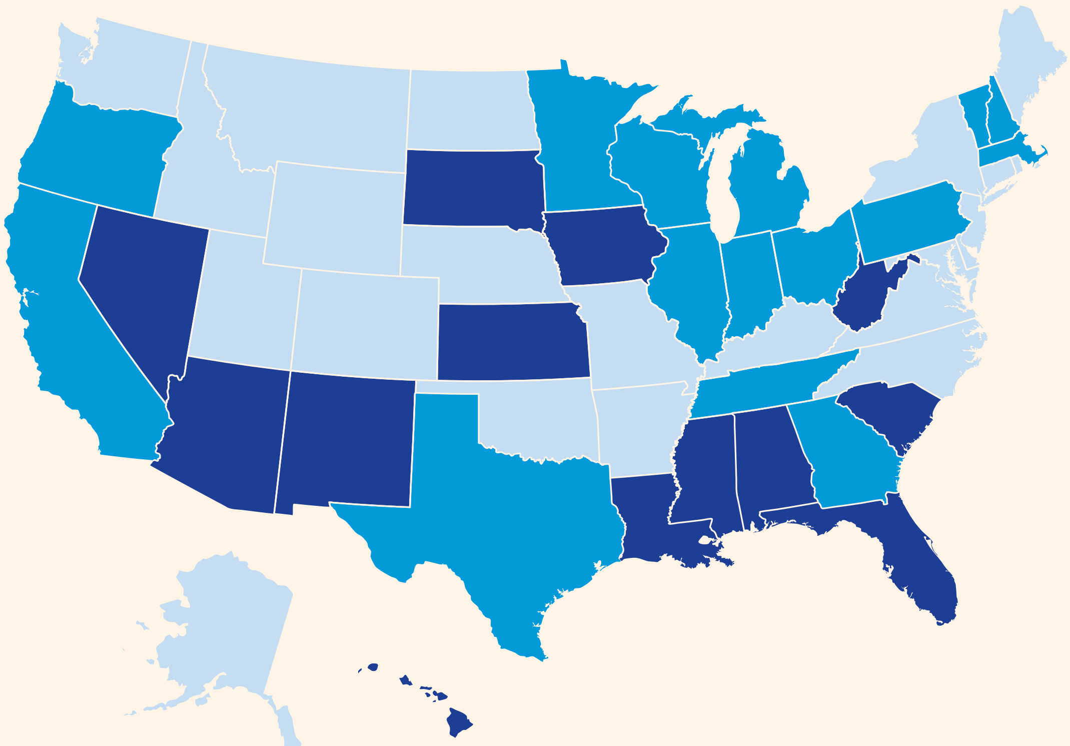
Copper: If zinc is the big winner in the metals recovery, copper is certainly the laggard. Yet there is a marked symmetry in the red metal's outlook and that of zinc. Copper prices have been flat this year. Part of the problem is an unusually low rate of mine disruption. Over the last decade, about five per cent of planned production did not materialise. So far this year, a near absence of strikes and shorter ramp up times mean the disruption rates have halved. Longer term, however, this excess supply may reverse. At today's level of investment, production will fall precipitously after 2020. Even if new investment prevents this decline, to satisfy demand forecasts to 2025 an additional 2.3m tonnes of production is required. That is equivalent to one-tenth of current global production.

Tighter and tighter: Oil and gas conference participants were wowed by how efficiency gains continue to drop the cost of US tight oil production. Breakevens have fallen $19 per barrel since mid-2014 to the current weighted average of $51 per barrel. The question is whether this can continue. For naysayers, rising bankruptcies and falling rig counts since 2014 mean that only the best producers with the best crews on the best acreage are operating—no wonder efficiencies have improved. On the other hand, a slowing of previously frenetic activity between 2012 and 2014 points to a more systematic application of technology. Use of high resolution reservation mapping, deployed more precisely in one centimetre increments rather than six, and increased vertical integration (for instance, by sourcing fracking sand from an internal supply chain), have all helped push down breakevens. That increased know-how suggests costs may stay low even when capital spending recovers.

Saudi summer shock: Conference-goers also pondered the mystery of higher crude production in Saudi Arabia over the summer. In just a matter of months, production rose from 10.2m barrels per day to 10.7m barrels. The question is whether the Kingdom has changed its strategy from maintaining market share (itself an innovation after years of merely balancing the market) to furiously expanding market share to maximise sustainable production. Separately, Saudi Arabia has also proven unexpectedly decisive in increasing the cost of domestic petrol by over half. The Saudi expert, though, argued that social cohesion issues would prevent domestic prices from being repeatedly pushed up. On the other hand, the Saudi renewable target of 3.45 GW by 2020 is unlikely to be met. Only 483 MW of projects had been announced, with no specific dates for delivery.

> Notes from Deutsche Bank conferences on Metals & Mining and Oil & Gas

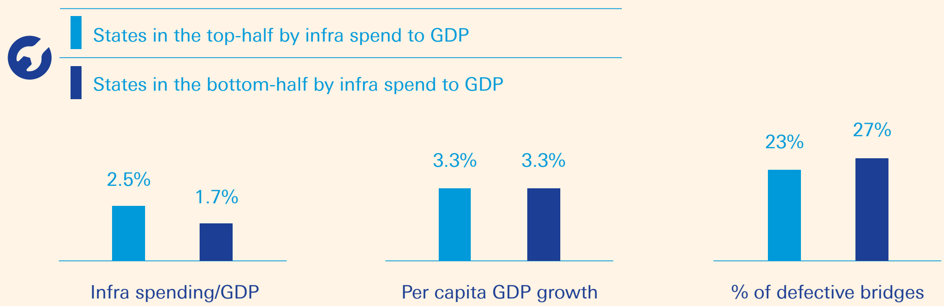
Infographic—infrastructure spending by states has no affect on per capita growth

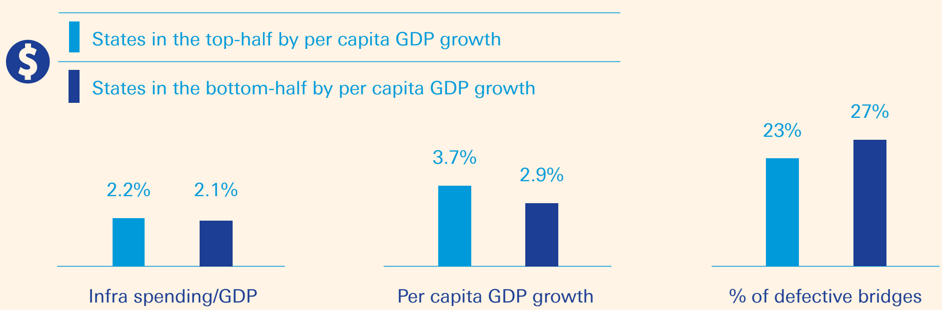


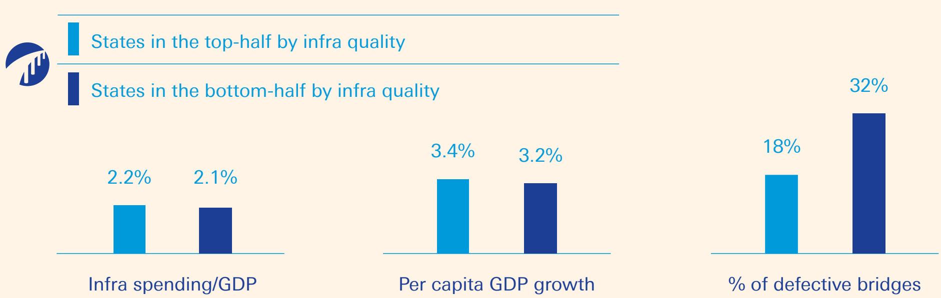
16 states have below average infra spend but above average per capita GDP growth

13 states have above average infra spend but below average per capita growth

Infrastructure spend as % of GDP and per capita GDP growth over the last five years.


States in the top-half by infra spend to GDP
States in the bottom-half by infra spend to GDP
2.5%
1.7%
Infra spending/GDP
3.3%
3.3%
Per capita GDP growth
23%
27%
% of defective bridges


States in the top-half by per capita GDP growth
States in the bottom-half by per capita GDP growth
2.2%
2.1%
Infra spending/GDP
3.7%
2.9%
Per capita GDP growth
23%
27%
% of defective bridges


States in the top-half by infra quality
States in the bottom-half by infra quality
2.2%
2.1%
Infra spending/GDP
3.4%
3.2%
Per capita GDP growth
18%
32%
% of defective bridges