

What's happening in Australia and around the world?

In this bundle



Australia

Australian inflation downside miss

Australian inflation shows no signs of coming anywhere near the central point of the RBA's 2-3% range, and we are biting the bullet and changing our...

United Kingdom...

Our April guide to global central banks

Everything you need to know about central bank policy around the world over coming months

By James Knightley, Carsten Brzeski and 2 others



Asia week ahead: Is a technical recession lurking?

Some Asian economies are already showing signs that a 'technical recession' may be around the corner, but low inflation gives central banks some...



South Korea

Korea: From bad to worse

1Q19 GDP growth fell 0.3%QoQ. Another negative quarter in 2Q19 and therefore "technical recession" is quite plausible.



United States

Decent US growth suggests Fed rate cut unlikely

Markets are pricing in at least one rate cut over the next year, but with the economy continuing to perform solidly, we think it is much more likely that...

By James Smith



FX

Does secular stagnation help the dollar?

The Dollar Index has broken to a new high for the year – largely on the back of weaker growth prospects overseas. If secular stagnation fears grow...

By Chris Turner



United States

President Trump's tariffs: Did the 'forgotten men' get their jobs back?

Industries, like steel and aluminium, that President Trump protected with higher import tariffs have shown above-average jobs growth and the downward...

By James Knightley



Energy | Sustainability

Counting the cost of a low carbon economy

Wind and solar power will need a \$13 trillion investment over 30 years to reach emissions targets, as demand for power doubles

By Gerben Hieminga



Natural gas: That sinking feeling

The downward pressure on the European gas market has been relentless. A milder winter, along with weakness in the Asian LNG market, has seen EU...

By Warren Patterson

Australian inflation downside miss

Australian inflation shows no signs of coming anywhere near the central point of the RBA's 2-3% range, and we are biting the bullet and changing our "on-hold" call for the RBA to a cut, possibly as early as the 7 May meeting.

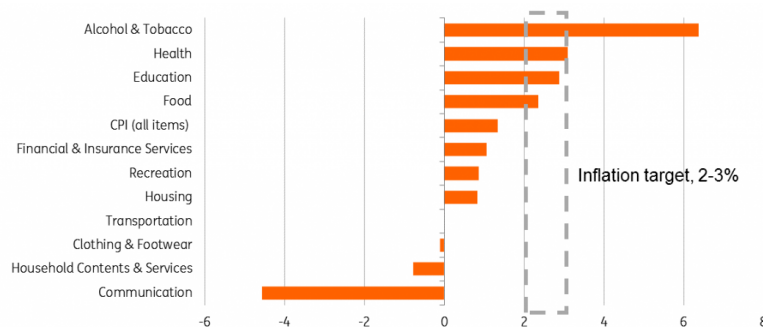


A cash-rate cut now seems entirely warranted

Despite strong labour market data last week, which seemed likely to keep a finely-balanced Reserve Bank of Australia (RBA) from any imminent change in the policy cash rate (1.5% currently), the latest inflation data flip the balance firmly back in favour of some easing. Possibly sooner rather than later.

The headline inflation rate for 1Q19 fell to only 1.3%YoY. This was lower even than the 1.5% consensus forecast, which itself was a sharp fall from 1.8% recorded for 4Q18.

Australian inflation by component (YoY%)



Uniformity in price weakness

By sub-group, goods prices fell 0.2% over the quarter, mainly in the tradeable goods sector. But service sector prices were also softer, though still only managed to eke out a 0.2%QoQ gain. Non-tradeable goods price inflation fell to 1.8%YoY from 2.4% in 4Q18. It hasn't been this low since 3Q 2016.

Inflation wasn't markedly less pessimistic when stripping out volatile items. Indeed, the QoQ ex-volatile items index was slightly worse than the overall headline figure, falling 0.1%QoQ.

At a more granular level, there were big negative QoQ swings in many subgroups from the previous quarter - food, alcohol and tobacco, clothing, furnishings, health, transport, communications, recreation, education, insurance and finance, medical / hospital, in fact, practically everything.

Whither the RBA?

We have been holding on to a low conviction view of "no change" in RBA rates for a very long time now. But this data has painfully jettisoned us off the fence, and we can't now see how the RBA can ignore such a bad inflation miss, even with last week's strong employment gains.

The logic for waiting to assess more data seems quite unnecessary now. Even an August meeting rate cut, as most forecasters have been moving towards, now seems too long to wait, and a cut this quarter, possibly even as soon as the 7 May meeting, would seem quite justified under the circumstances.

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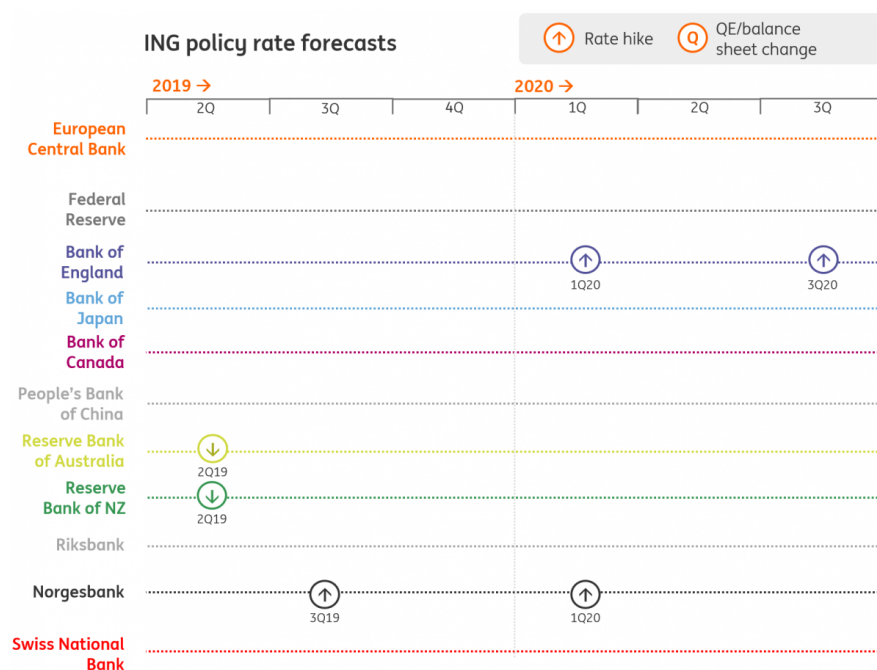
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Our April guide to global central banks

Everything you need to know about central bank policy around the world over coming months

Our global central bank forecasts



Source: ING

Federal Reserve: Economy back from the brink?

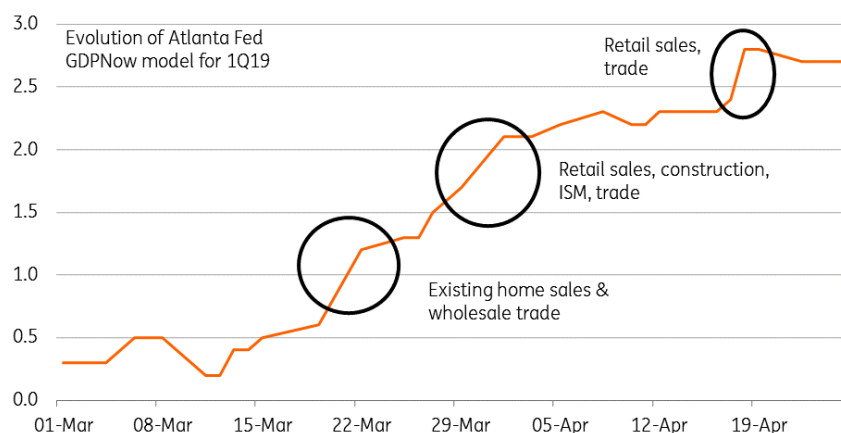
There was a lot of pessimism at the start of the year with the government shutdown, global slowdown fears and an inverted yield curve heightening talk of Federal Reserve interest rate cuts and a potential US recession. However, a recent run of firm macro data and a robust corporate earnings season have eased those fears.

Consumer spending is looking healthy, and there is the growing prospect of a US-China trade deal that can help lift some of the gloom and uncertainty hanging over the global economy. At the same time, the labour market looks resilient and wage growth is on an upward trend while the plunge in mortgage rates is helping to stimulate housing demand and construction spending is accelerating.

There are certainly more headwinds this year, but we continue to look for decent GDP growth in 2019 of 2.4%. We also expect inflation pressures to gradually build thanks to rising labour costs and improving corporate pricing power in an environment of firm demand. As such we see little reason for the Fed to cut interest rates this year with the market seemingly moving in our direction

given the re-steepening of the yield curve.

The Atlanta Fed GDPNow estimate has staged a big turnaround



Source: Atlanta Fed, ING

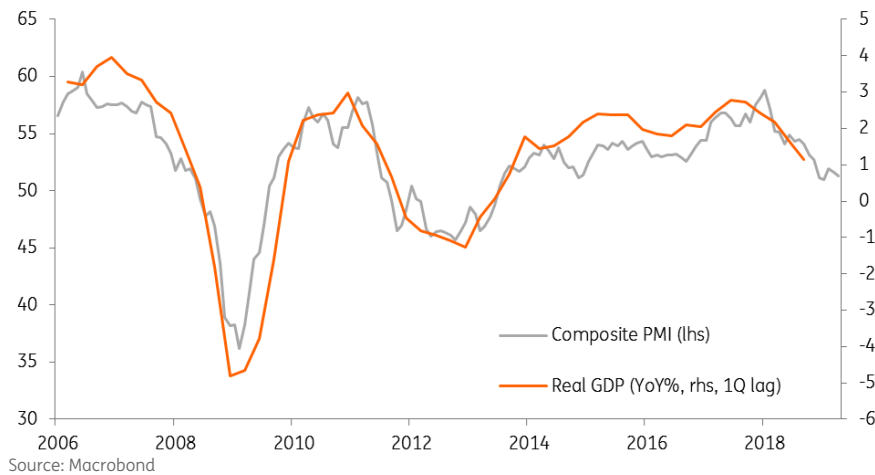
European Central Bank: Wait-and-see with a dovish tilt

They could if they would but they hope that they won't.

This is more or less the summary of the ECB's current monetary policy stance. The unexpected slowdown of the eurozone economy, an unprecedented list of external risks and an inflation outlook far below target motivated the ECB to move towards an easing bias. At the last press conference, ECB president Mario Draghi tried to convey the message that the ECB stood ready to act to any further slowdown of the economy if needed. However, the ECB knows very well that its options for further easing are rather limited. In our view, the ECB will announce the technical details of the next round of TLTROs at the June meeting. The tiering system being discussed will only be an option if the growth outlook worsens further, as it would be the technical preparation for another cut in the deposit rate.

For the time being, the ECB is keeping its fingers crossed, hoping for stabilisation of the eurozone economy over the course of the year. This would mean no additional easing action. Even in such a scenario, any rate hikes are completely off the table. In its current set-up, the ECB has a clear easing bias. This, however, could change with the new ECB president, taking office in November. Until then, it is wait-and-see with a dovish tilt.

Eurozone PMIs have fallen

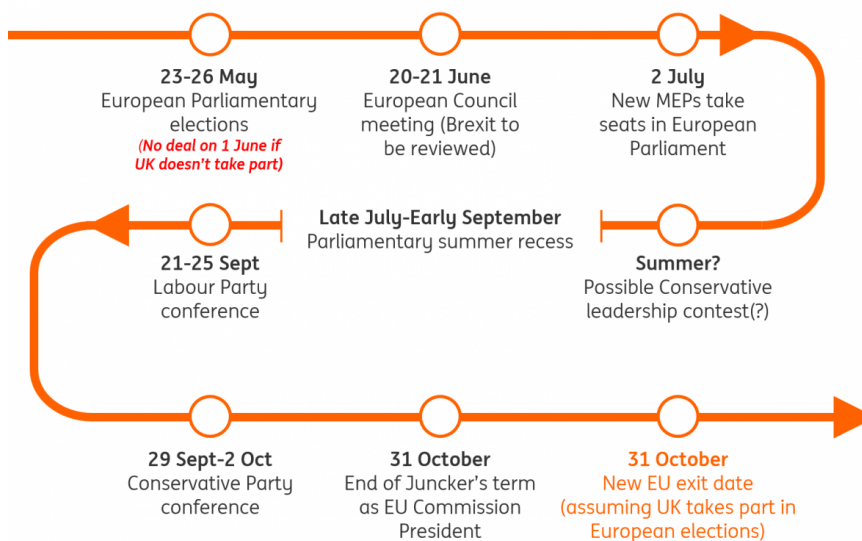


Bank of England: Brexit delay reduces chances of 2019 hike

While the Bank of England has kept the door ajar to further tightening, the chances of it happening this year have receded. The six-month Brexit delay means the threat of a 'no deal' Brexit has been postponed but will come back into focus as the new October deadline approaches. This looks set to keep a lid on growth, as firms maintain preparations for a possible cliff-edge scenario.

That said, skill shortages in the labour market have continued to drive wage growth higher. That means that if a Brexit deal can be approved by parliament, enabling the UK to leave the EU smoothly at some point over the next few months, then this could, in theory, bring a rate hike into sharper focus. But this is a big 'if', and in reality, we think it is more likely that no meaningful progress will be made before October. A rate hike this year is therefore not our base case, particularly amid the global shift to a more dovish central bank stance.

The latest Brexit timeline

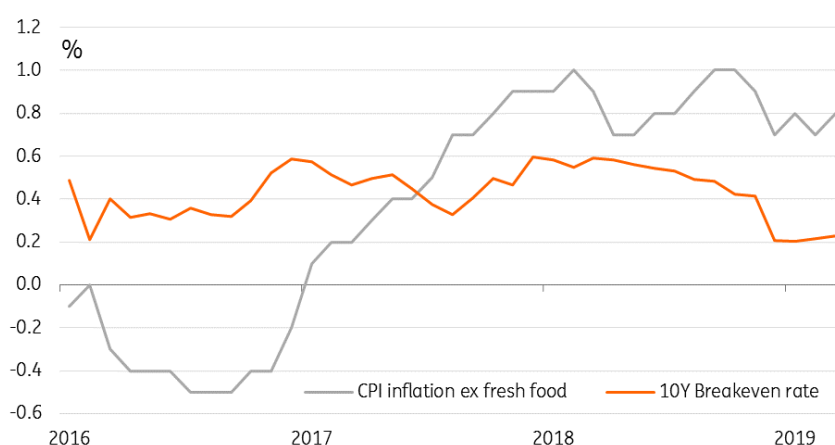


Bank of Japan: Are there any easing options left?

In the press conference of the latest BoJ meeting, Governor Haruhiko Kuroda admitted his frustration with the BoJ's inability to meet its 2% inflation goal. Along with this, came with an increasingly fierce pushback on what he was terming "Modern Monetary Theory" or MMT, which is shorthand for saying that ultra-low interest rates don't work. Tragically, we believe that there is more than a grain of truth in some of this critique of ultra-low rates. Kuroda's "gift" to the markets this time was to change the wording in the BoJ statement, which replaced "extended period" for describing how long low rates would be in place, to "around Spring 2020".

To paraphrase his explanation, he suggested markets were misinterpreting "extended period" and was anticipating rate hikes much sooner than was probable. This assessment by the Governor is, in our view, completely without substance. Not only does the market not believe that the BoJ will meet their inflation target over the BoJ's forecasting horizon, but an increasing number of market participants don't believe they will ever meet it (notwithstanding some slightly better Tokyo CPI figures for April). A tweak to forward guidance as delivered on this occasion is as meaningless as it is irrelevant, and markets shrugged it off as they should have done.

Japanese inflation is still well below 2%



Source: Bloomberg

People's Bank of China: Managing liquidity carefully

Strong credit growth (40% YoY) in the first quarter came as a big surprise to the market. After the release of credit data, the Chinese central bank (PBoC) has changed its policy tool from the required reserve ratio (RRR) to some more flexible liquidity management tools, including the medium liquidity facility (MLF), targeted MLF (that provides liquidity to smaller private firms) and seven-day open market operations.

We believe the central bank's rationale behind not using RRR is that it's one of the most rigid liquidity management tools. Once the RRR is cut, the liquidity injection is long-lasting, and the central bank can only absorb liquidity through open market operations, or by raising the RRR to unwind the impact.

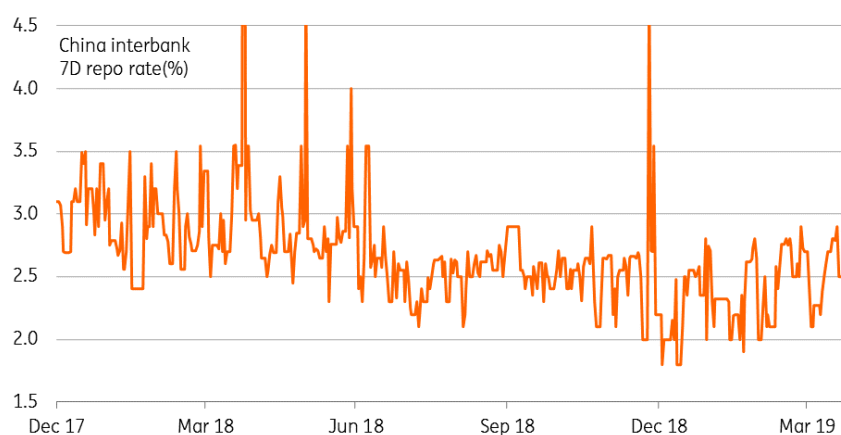
The change of tools does not mean liquidity will be tighter, it just means the same amount of liquidity will be injected by different tools. We now expect no blanket RRR cuts in 2019, having previously forecasted three cuts. Targeted RRR cuts (for smaller firms) would only be needed if

there is a series of bond defaults by private firms, which seems to be less likely given these firms can get loans from banks.

The central bank has been silent on using the 7-day policy interest rate. We believe that this tool has been shelved for now, given the central bank has stated that the interest rate transmission mechanism is incomplete.

USD/CNY continued to follow the ups and downs of the dollar index but not to the same extent. It was stable in the first quarter, and the yuan only depreciated 0.18% and fluctuated in a narrow range of around 1.8%. This narrow trading range could remain in place even after a trade deal has been reached.

China 7-day repo rate



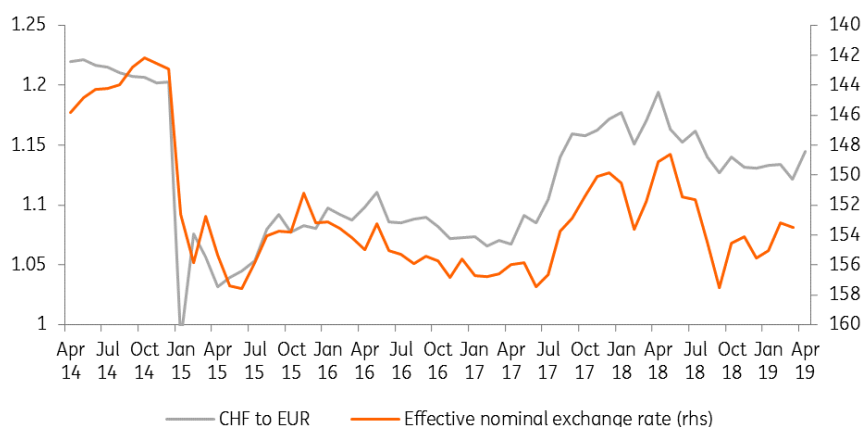
Source: Bloomberg

Swiss National Bank: Negative rates set to remain the new norm

At the March meeting, the SNB maintained its ultra-loose monetary policy, keeping policy rates in negative territory and maintaining a willingness to continue intervening in the foreign exchange market if needed. The SNB has also reduced its conditional inflation forecast (which assumes an unchanged policy rate) and now expects an inflation rate of 0.3% in 2019 and 0.6% in 2020. This downward revision is the result of lower growth prospects in Switzerland, weaker inflation and a revision of expectations concerning global monetary policy. We believe that this downward revision is a sign that the SNB is more dovish than ever before, and does not plan monetary tightening over the forecast period.

The first interest rate increase will not, in our view, be considered before the next economic cycle begins. In the meantime, negative rates are likely to remain the norm for Switzerland.

The Swiss franc



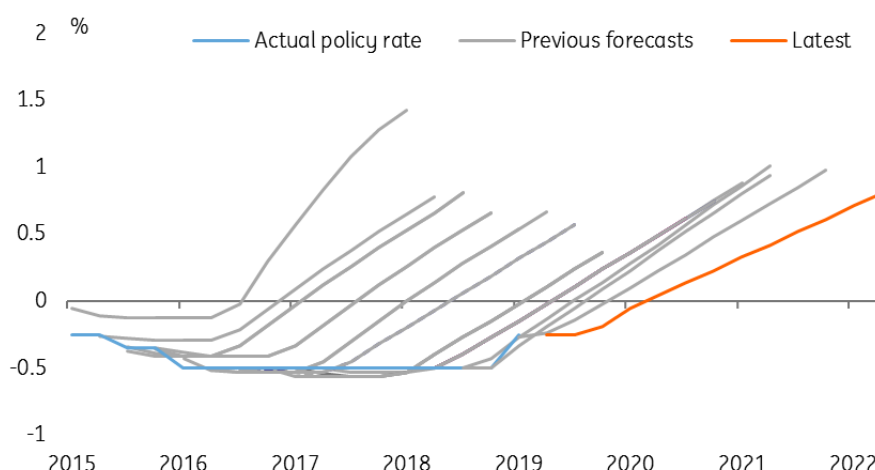
Source: Reuters Datastream

Riksbank: Another delay; more of the same to come

True to form, the Swedish central bank delivered yet another dovish surprise this week. A downward revision to its interest rate forecast pushed the expected date of the next rate hike into “the end of the year or at the beginning of next year” (i.e. 4Q19 or 1Q20) and also reduced the pace of tightening further out to just one hike per year in 2020-2022. In addition, the Riksbank announced a further SEK 45 billion of QE ‘pre-reinvestments’ from mid-2019 to the end of 2020.

We expect more of the same later this year. The key factor for the Riksbank is continued anaemic inflation pressure, which looks unlikely to change in the near term. And with the major central banks on hold, we have a hard time seeing the Riksbank tightening policy at a time when the Swedish economy is slowing and looks set to underperform peer economies.

The Riksbank keeps delaying



Source: Riksbank

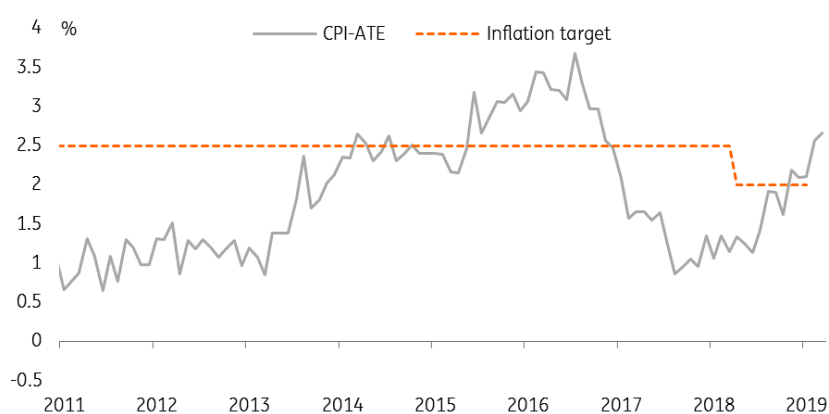
Norges Bank: Rising inflation pressure to keep central bank in hiking mode

In contrast to its Scandinavian neighbours, the Norwegian central bank has seen ample – and perhaps even excessive – inflation pressure this year. Core inflation in Norway has jumped to 2.5% and could well stay around that level this year as momentum in the domestic economy remains solid and wage growth is likely to increase further. While inflation is still comfortably within the NB's +/- 1 percentage point tolerance band, strong price pressure means the central bank is likely to keep raising rates.

In addition to higher inflation, oil prices have risen further, boosting the energy-dependent Norwegian economy, and the Norwegian krone has remained weaker than the NB's forecast. If this combination continues, that strengthens the case for higher rates in Norway, as higher oil prices stimulate both growth and inflation, while the exchange rate is not tightening financial conditions as much as the NB has anticipated.

We think the NB will hike at least once more this year and again early next year (at the September and March meetings). And if we see further upside surprises to inflation, or if oil prices rise further, those hikes could easily shift forward to June and December this year.

Norwegian inflation pushes higher



Source: Macrobond

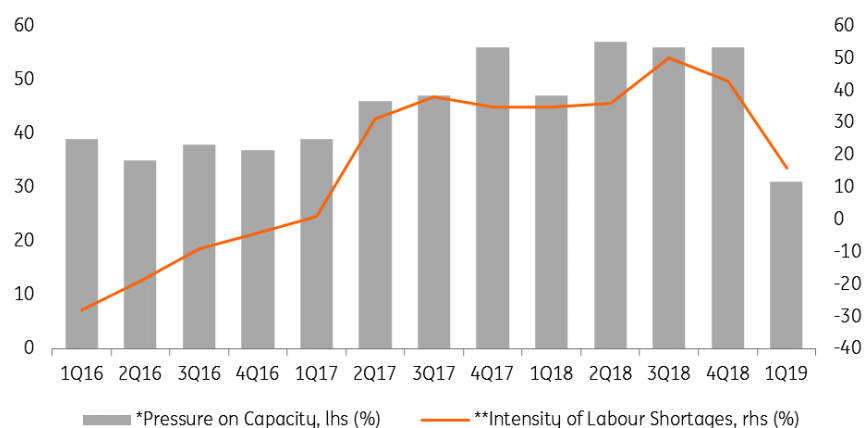
Bank of Canada: Tightening bias abandoned

The Bank of Canada has been taking a more dovish line for some time, but if there were any remaining hints of hawkishness, they were firmly abandoned at the April policy meeting. Interest rates were kept on hold at 1.75%, but more notably, the central bank removed its explicit reference to possible future rate hikes.

The labour markets underlying strength has been one of the only bright spots in the economy, but if the Bank of Canada's (BoC's) spring Business Outlook Survey is anything to go by, the positive news we've been getting from employment reports could slowly start to fade. Even though labour-related production constraints remain the most frequently cited bottleneck, the indicators of labour shortages fell. This could suggest labour market pressures are beginning to subside.

Overall, policymakers will focus on three things: global trade uncertainty, the weaker outlook for the energy sector and doubt surrounding household activity. We think there is scope for some upbeat news as we enter the second half of the year - reinforced by the fact that the Bank still describes its current stance as “accommodative”, suggesting that the committee are less convinced than the market that rate cuts are on the horizon. Nevertheless, we aren’t expecting a rate hike this year.

Bank of Canada Business Outlook Survey suggests jobs market weakness ahead



Source: Bank of Canada Business Outlook Survey

Reserve Bank of Australia: Weaker inflation raises chances of a rate cut

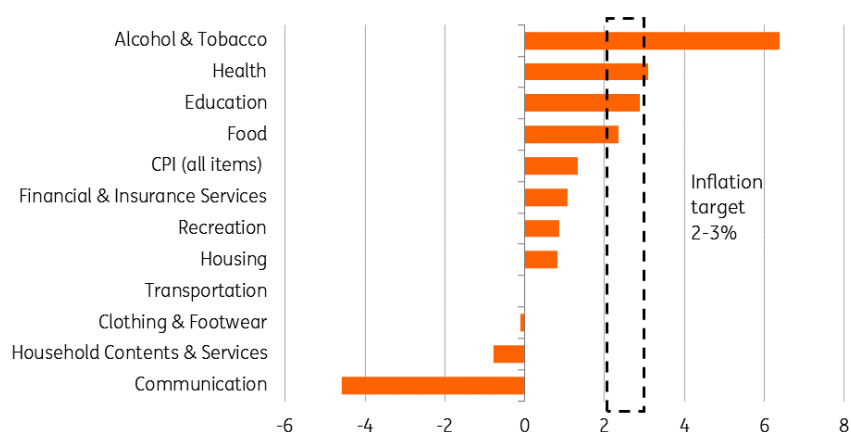
The latest set of RBA minutes discussed the case for a rate cut. But even though the conclusion was that there was no strong case for an imminent cut, markets aren’t convinced, and neither are we.

Data initially supported the “on hold” view, with full-time jobs in March rising by more than 48,000, reversing the previous month’s weakness, though this may have come at the expense of some temporary jobs (not necessarily a bad thing). A rising unemployment rate can also be put down to greater labour market participation (also probably not a sign of desperation).

But more recent inflation data was a huge disappointment, and at 1.3% in 1Q19, down from 1.8% in 4Q18, seem far too dismal for the RBA to ignore. Indeed, these inflation numbers are so bad, that a cut at the 7 May meeting can’t be totally ruled out.

Forecasters and the market had been converging on an August rate cut, just after the next CPI reading. But waiting this long against this backdrop seems completely unnecessary.

Australian inflation components



Source: Macrobond

Reserve Bank of New Zealand: A rate cut looks increasingly likely

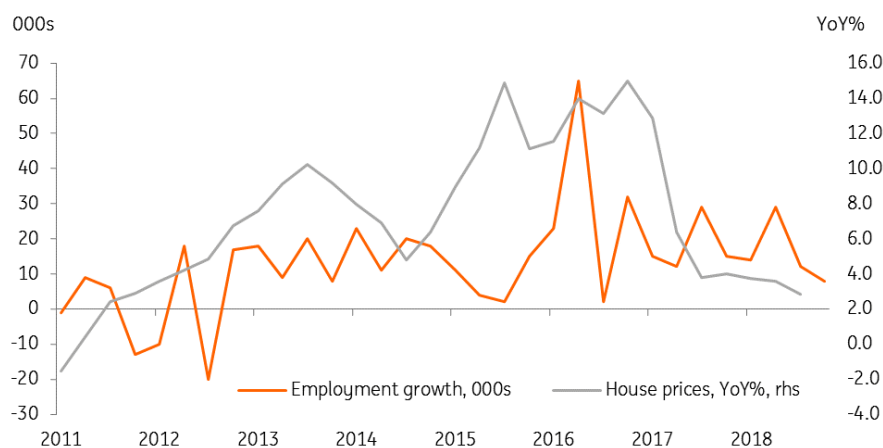
Further inflation weakness in New Zealand also puts the 'on-hold' RBNZ view at considerable risk, and without the same labour-market strength that was helping to keep thoughts of the RBA on hold alive (until their inflation data snuffed out this idea).

The next RBNZ meeting on 8 May will come just a week after 1Q19 employment data (and the day after the RBA) and with no expectation that the labour market will do enough to provide reassurance that a balance between low inflation and decent growth is being achieved, a cut on 8 May looks increasingly likely.

The balancing factor here is house prices, which are in a healthier position than they are in Australia, but they are still growing more slowly, and are sufficiently soft that they won't change the picture even if they hold at the March 19 growth rate of 2.6%YoY.

Market OIS futures put the probability of a cut at the next meeting at 61.7% now, which is up to a level that makes it hard for the RBNZ to ignore.

New Zealand house prices vs. employment



Source: Macrobond

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Asia week ahead: Is a technical recession lurking?

Some Asian economies are already showing signs that a 'technical recession' may be around the corner, but low inflation gives central banks some room to avert one. But aside from that, April economic data should provide a glimpse of where GDP growth and inflation are headed in the second quarter



Source: Shutterstock

➔ Is a 'technical recession' lurking?

1Q19 GDP reporting season is catching up with more Asian countries reporting data next week.

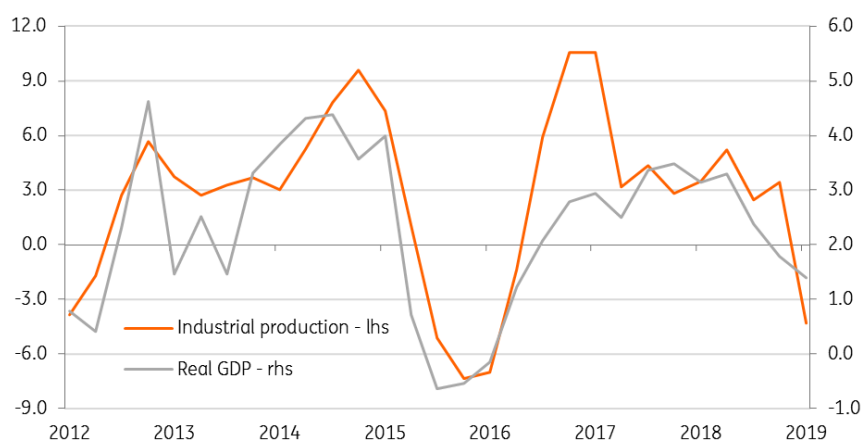
Aside from China, the slowdown in Asian economies gained traction in the first quarter of the year. China's GDP growth was steady, thanks to the fiscal stimulus, but Korea and Singapore posted

sharp growth slowdowns in 1Q19, and the countries reporting next week – Hong Kong and Taiwan – are likely to join this camp too.

The critical question is whether a recession is around the corner. Korea was the first in Asia to report quarterly GDP contraction in 1Q19. Taiwan could follow suit, judging by a steep fall in its manufacturing in the last quarter. As things stand now, we can't rule out another quarter of GDP contraction in 2Q, and after today's GDP numbers from Korea, we think a 'technical recession' is quite plausible.

[Read why the biggest quarterly contraction in Korea GDP is bad news](#)

Taiwan's manufacturing is dragging GDP lower (% YoY)



Source: Bloomberg, ING

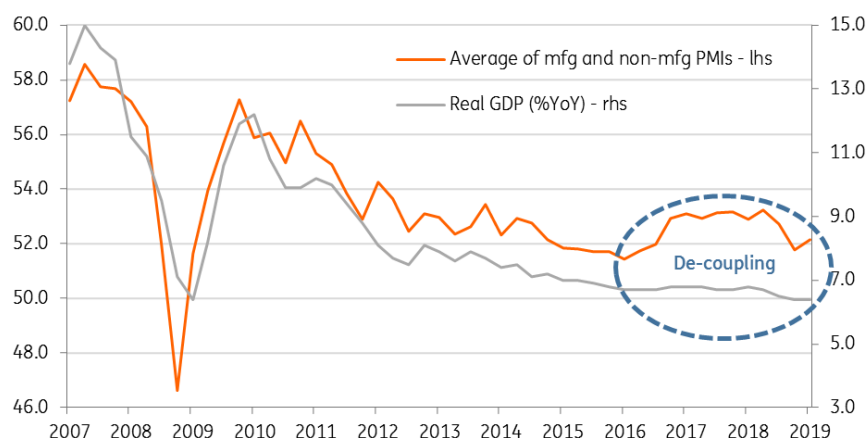
➔ April data should give a glimpse of 2Q growth

April trade data and purchasing managers' index should provide a glimpse of where GDP growth is headed in 2Q. Preliminary manufacturing PMIs from developed countries bode well for those due from Asia next week. The export order components of PMI will be judged for the trade story, which doesn't seem to be getting any better though.

Chinese data will be under scrutiny to see if the economy's better-than-expected performance in the first quarter was a blip and if the slowdown has been delayed. This may be hard to judge from soft data like PMIs, given its de-coupling from real GDP growth in recent years. But it's still a key sentiment driver for markets. A slight improvement as implied by consensus forecasts for both manufacturing and non-manufacturing PMI will be good enough to put a positive spin on China's growth story.

Korea is the first economy in the region, and probably the world, to release trade figures for April, and should prove to be a good guide to trade from the rest of the region. We see no respite from the falling trend in Korean exports which have been reeling under the global tech slump.

China: De-coupling of PMI and GDP growth



Source: Bloomberg, ING

➔ Low inflation allows for more policy support

Korea also reports consumer price data for April along with Indonesia and Thailand.

Aside from the upward pressure on global oil prices, there is nothing to worry about inflation in Asia. And an oil-driven rise in inflation isn't something we expect to see in an environment of slowing growth. But the current low level of inflation across the region does give central banks the scope if needed to ease policies to support growth.

Asia Economic Calendar

Country	Time*	Data/event	ING	Survey	Prev.
Saturday 27 April					
China	0230	Mar Industrial Profits (YoY%, YTD)	-	-	-1.9
Monday 29 April					
Hong Kong	0930	Mar Exports (YoY%)	-2.6	-	-6.9
	0930	Mar Imports (YoY%)	-1.4	-	-3.8
	0930	Mar Trade Balance (HK\$ bn)	-58.5	-	-48.8
Thailand	-	Mar Manufacturing Index (YoY%)	-3.5	-	-1.6
South Korea	2200	May BOK Business Survey Index, mfg	74.0	-	76.0
	2200	May BOK Business Survey Index, non-mfg	75.0	-	76.0
Tuesday 30 April					
China	0200	Apr Non-manufacturing PMI	55.0	55	54.8
	0200	Apr Manufacturing PMI	50.5	50.8	50.5
Taiwan	0900	1Q P GDP (YoY%)	1.4	-	1.8
Thailand	0730	Mar Current Account Balance (US\$bn)	4.4	-	6.5
South Korea	0000	Mar Industrial production (MoM, SA/YoY%)	-1.7/2.5	-/-0.6	-2.6/-2.7
Wednesday 1 May					
Thailand	0500	Apr CPI (YoY%)	1.2	-	1.2
	0500	Apr Core CPI (YoY%)	0.6	-	0.6
South Korea	0100	Apr Exports (YoY%)	-7.2	-	-8.2
	0100	Apr Imports (YoY%)	-6.8	-	-6.7
	0100	Apr Trade Balance (US\$m)	5543.0	-	5206.0
Thursday 2 May					
China	0245	Apr Caixin Manufacturing PMI	51.0	51.0	50.8
India	0600	Apr Nikkei Manufacturing PMI	53.2	-	52.6
Hong Kong	0930	1Q GDP (Q) (QoQ, SA/YoY%)	-/-	-/-	-0.3/1.3
Indonesia	-	Apr CPI (YoY%)	2.5	-	2.5
	-	Apr Core CPI (YoY%)	-	-	3.0
Malaysia	0030	Apr Nikkei Manufacturing PMI	47.7	-	47.2
Taiwan	0130	Apr Nikkei Manufacturing PMI	49.5	-	49.0
Thailand	0030	Apr Nikkei Manufacturing PMI	49.9	-	50.3
South Korea	0000	Apr CPI (YoY%)	0.3	-	0.4
	0000	Apr Core CPI (YoY%)	0.7	-	0.9
	0130	Apr Nikkei Manufacturing PMI	48.2	-	48.8
Friday 3 May					
Hong Kong	0930	Mar Retail Sales Value (YoY%)	-	-	-10.1
	0930	Mar Retail Sales Volume (YoY%)	-	-	-10.4
Malaysia	0500	Mar Exports (YoY%)	1.0	-	-5.3
	0500	Mar Imports (YoY%)	-2.0	-	-9.4
	0500	Mar Trade Balance (RM bn)	16.9	-	11.1
Singapore	1400	Apr PMI	50.5	-	50.8

Source: ING, Bloomberg, *GMT

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Korea: From bad to worse

1Q19 GDP growth fell 0.3%QoQ. Another negative quarter in 2Q19 and therefore "technical recession" is quite plausible.



Source: Shutterstock

1Q19 GDP was bad

The biggest quarterly contraction in Korean GDP since the global financial crisis hit in 4Q 2008 has to be bad news. Year-on-year growth of 1.8% doesn't look too bad, but the components of GDP weakness don't bode well for the quarter ahead. It isn't hard to come up with a set of figures for 2Q19 that would deliver a further decline and as a result, a technical recession.

-0.3%QoQ Korean GDP
1Q19

Worse than expected

How is 2Q19 shaping up?

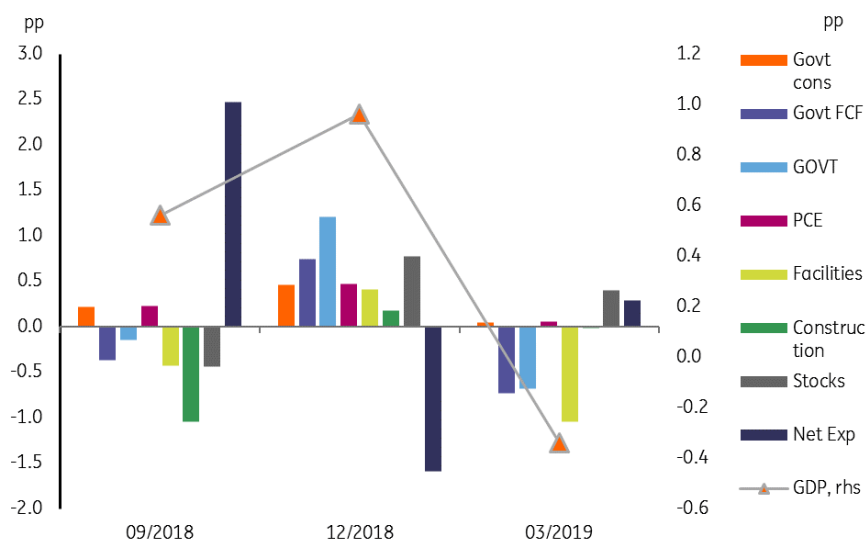
It is early days to be calling the second quarter GDP estimates. For the most part. We don't even have any hard data for April yet. But GDP components tend to exhibit both trend persistence, mean reversion and negative cross-correlation and we can tweak some hypothetical figures to see how sensitive the current GDP numbers are to a further downturn. The answer, it

turns out, is that a further decline in 2Q19 is quite easy to achieve.

Big components of GDP, like personal consumption expenditure (PCE) are not particularly volatile. That said, the 0.1% QoQ growth of PCE in 1Q19 was a sharp fall from 1.0% in 4Q18. That 4Q18 figure was itself a bit of a fluke. Though based on a relatively sombre assessment of the Korean labour market - employment and wages - we reckon something like 0.3% QoQ would be a reasonable starting point for PCE in any quarterly GDP calculation.

Gross fixed capital formation (GFCF) is more volatile. But the private elements of this, which fell 0.3% in 1Q19, could easily fall further in 2Q19 without some pick up in demand for global technology (semiconductors). We aren't seeing that yet, so another -0.3% figure in 2Q19 seems like a fair guess. Public capital formation fell 15% QoQ in 1Q19. The government has a KRW 6.7tr stimulus package ready for implementation. They say it could be worth 0.1pp of GDP. That seems about twice as much as is likely, but nonetheless, we can reverse the 1Q19 public GFCF decline in its entirety, with an expectation of further public sector support in 3Q and 4Q19.

Contribution to QoQ GDP growth by expenditure component (pp)



Inventories and net exports could pull 2Q19 down

The biggest risks to growth in 2Q19 come from the inventory and net export terms. There is usually some negative correlation here, such that a terrible inventory figure will be partially offset by better net export figures and vice versa. In 1Q19, inventories added to GDP to the tune of about KRW 3.1tr. That was up about KRW1.5tr from the previous quarter and added 0.4pp to GDP after a very helpful 0.8pp in 4Q18.

But although imports will most likely feed into that inventory measurement, imports actually fell in 1Q19, and by considerably more than exports, providing an additional boost to GDP (imports are a drag on GDP, so falling imports represent a GDP boost) of about 0.3%QoQ. Exports don't look likely to show any substantial near term improvement, but even if imports remain weak in 2Q19, after their recent dismal performance, they may decline somewhat less relative to exports in 2Q19. The positive net trade contribution of 1Q19 (imports fall more than exports) could revert to neutrality or even a slight drag in 2Q19. As for inventories themselves, after two-quarters of unwanted build,

we would look for them to be drawn down in the second quarter.

Whilst this is more of a sensitivity exercise than a strict forecast, tweaking next quarters figures in this way shows that it is quite easy to generate a further small contraction in overall GDP, and thereby a technical recession. And this is why we think the BoK will be forced to cut, maybe more than once.

What does this mean for the BoK?

The last Bank of Korea policy meeting just over a week ago left rates unchanged at 1.75%. The last change in BoK policy was as recent as November 2018, when they raised rates by 25bp, based on a not terribly convincing argument of high Seoul house prices and high household debt. The most recent meeting trimmed GDP growth forecasts for 2019 slightly to a "mid-2%" level from 2.6% at the January projection. To come even close to this will need (non-annualised) QoQ growth of more than 1% in every quarter until the year-end. In our view, that is simply not going to happen. In response to these latest figures, we think GDP growth for 2019 will do well to exceed 1.5%, which is our new full-year forecast and one that comes pre-loaded with plenty of downside risk.

The BoK's inflation forecasts are somewhat more realistic, in our opinion, than their growth numbers, with inflation expected to remain below 1% for some time. This is also a downward projection from January, but the forecast recovery to low to mid-1% in 2H19 again seems questionable and probably stems from unrealistic growth assumptions.

While the BoK may be relying on government stimulus to do the heavy lifting of combatting the current gloom, the current budget package seems insufficient for the task. We believe the BoK will have to provide some additional support with a rate cut this quarter. Moreover, further fiscal stimulus will also be needed before too long. Korea's good public finances make this an easy choice. Even so, we would not rule out the BoK having to step in to provide further support with another cut later in the year if the hoped-for 2H recovery does not take hold or is weaker than projected.

And the KRW?

Our 2Q19 forecast of USDKRW 1150 has now been smashed with 1160 reached today. We had a 3Q forecast of 1150 too. Both now seem too optimistic, though these forecasts were already at the very gloomiest end of consensus until recently. USD/KRW 1180 seems like a sensible mid-term target for the time being, and we will come up with a more thoughtful quarterly profile shortly.

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Decent US growth suggests Fed rate cut unlikely

Markets are pricing in at least one rate cut over the next year, but with the economy continuing to perform solidly, we think it is much more likely that the Federal Reserve keeps rates on hold for the foreseeable future



Source: Shutterstock

Despite the mountain of headwinds clouding the US outlook at the start of the year, the economy put in a decent performance in the first quarter. The quarterly pace of growth accelerated to 3.2% annualised, up from 2.2% in the fourth quarter of 2018. The overall growth mix was fairly broad-based, although a few key trends stand out.

Firstly, consumer spending slowed to around half the pace of growth recorded in 4Q18. That may be partially related to the government shutdown, but equally the boost from last year's tax cuts is beginning to fade. That said, there are good reasons to expect consumer spending to perform solidly over coming months. The jobs market is strong, and with skill shortages emerging in different parts of the economy, wage growth has been accelerating.

3.2%

US 1Q growth

(QoQ annualised)

Higher than expected

Unsurprisingly, trade made a strong contribution to the overall growth number. At the end of last year, firms appeared to bring forward imports to the fourth quarter to get ahead of the anticipated increase in tariffs. While that deadline was later postponed by President Trump, there was still a corresponding fall in imports during the first quarter, helping to lift overall GDP growth by 0.6 percentage points.

To the extent that these excess imports were simply stockpiled at the end of 2018, you might have expected inventories to correspondingly decline in the first quarter, as these stocks were unwound. In the end though, the inventory component – which is typically very volatile and can be affected several different factors – actually increased, inflating the growth number by 0.7ppts.

The bottom line is that there are some growth-positive factors at play here that are unlikely to persist into the second quarter. Having said that though, we continue to expect a solid performance from the US economy this year, particularly if we get some more encouraging news from the US-China trade talks. While we don't expect the Fed to hike rates again this year, we think it looks pretty unlikely that rate cuts are on the horizon at this stage.

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Does secular stagnation help the dollar?

The Dollar Index has broken to a new high for the year – largely on the back of weaker growth prospects overseas. If secular stagnation fears grow and asset allocation shifts towards bonds from equities, prohibitively high dollar hedging costs could mean the dollar does even better



Source: Shutterstock

Secular stagnation fears in the ascendancy

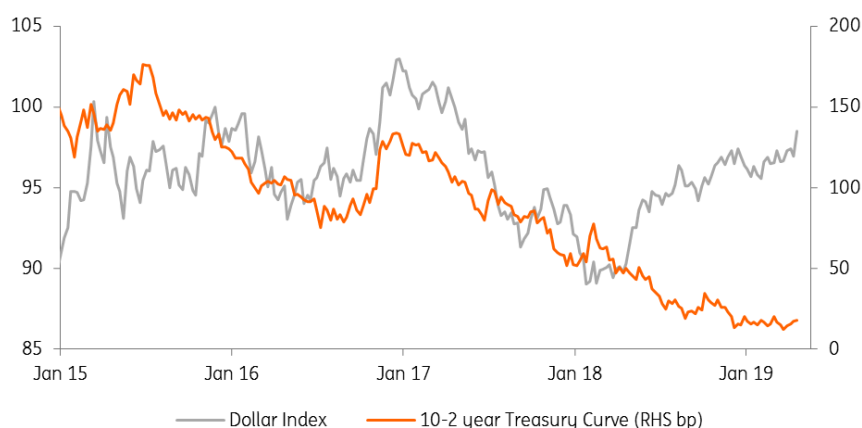
This week the trade-weighted dollar has rallied to a new high for the year. This has been driven less by US growth news, but more by sluggish activity and softer monetary policy prospects in the rest of the world. In fact, most fund managers have a growing conviction that the world economy is entering into a period of low growth and low inflation - or secular stagnation.

Fanning the fears of low growth and low inflation this week have been: [soft CPI readings in Australia](#), continued pessimism from European manufacturers ([German IFO](#)) and a [poor 1Q19 GDP release from Korea](#). We've also seen a dovish raft of central bank communication from the likes of the Bank of Canada, Sweden's Riksbank and, surprisingly, the Central Bank of Turkey.

Despite prospects of [some better US activity data near term](#), the interest rate market has struggled to shrug off fears of a slowdown. And while the jury is still out on whether a flat/inverted yield curve foreshadows the next US recession, the dollar continues to perform well. In fact, the dollar index (DXY) has broken to a new high for the year and has now reclaimed around three-quarters of

the decline since Trump took office in January 2017.

Despite US yield curve flattening, the dollar rallies



Source: ING, Bloomberg

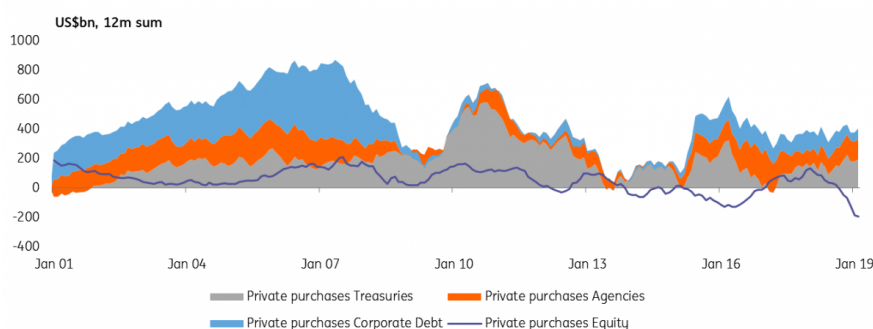
Asset allocation shift to bonds from equities?

If increasing fears of secular stagnation are realised, we would expect to see the investment community (eg, those running balanced funds which invest in both equities and bonds) rotate away from equities and into the bond market.

Buy-side surveys suggest investors are still underweight bonds and overweight equities, although there is some evidence that the rotation (at least in US asset markets) is already underway. Here the US Treasury releases its Treasury International Capital (TIC) data series, showing foreign purchases of US securities and US purchases of foreign securities. The data (as of February 2019) shows consistent foreign private sector purchases of US bonds (Treasuries, Agencies and Corporates). In contrast, foreigners have sold US equities for the last ten months.

Were secular stagnation fears to take hold and more investments be directed towards bonds, market liquidity considerations mean that US fixed income would receive sizable inflows as a result of its large weight in global bond benchmarks. Currently, the US has the largest weight (around 30%) in the Bloomberg Barclays Global Sovereign Index.

Foreign private sector purchases of US securities (US\$bn, 12m sum)



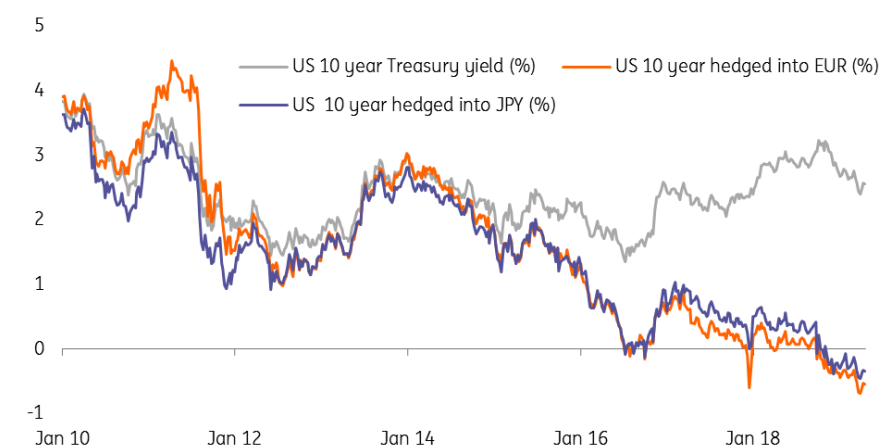
Source: ING, Bloomberg

A rotation to bonds could send the dollar even higher

The recent decline in market interest rates seems to have done the dollar no harm at all. This may be because those foreign asset managers wanting to increase their exposure to the US bond market are faced with prohibitively high dollar hedging costs. For Eurozone or Japanese-based investors the annual cost of hedging FX exposure to US asset markets is now around 3.00/3.10% (using the 3 month FX forwards markets as a proxy). This cost exceeds the yields available across the entire US Treasury curve. It would be no surprise to hear that some of the Japanese Life Insurers are increasing their allocations to unhedged foreign bond positions in the new fiscal year starting this month.

Unless we see a sharp, positive re-assessment of growth overseas, or much weaker US growth to trigger a serious re-assessment of Fed policy including expectations of an imminent easing (such that the short-end of the US curve really softens and USD hedging costs cheapen), we fear that the dollar is going to be staying much stronger than our current baseline forecasts. As such our year-end 2019 EUR/USD and USD/JPY forecasts of 1.18 and 108 look like they'll have to be revised in favour of a stronger dollar.

US Treasury yields, unhedged versus hedged into EUR and into JPY (%)



Source: ING, Bloomberg

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President Trump's tariffs: Did the 'forgotten men' get their jobs back?

Industries, like steel and aluminium, that President Trump protected with higher import tariffs have shown above-average jobs growth and the downward trend in overall manufacturing employment has stopped. However, this isn't the result of the promised 'industrial revolution' but reflects lower productivity growth that may not last



Source: Shutterstock

A new industrial revolution

["I will be the greatest jobs president God ever created"](#), Donald Trump said when he announced he would run for president back in 2015. In the same speech, he promised a new industrial revolution that would restore manufacturing and bring back jobs that had disappeared to China and other emerging economies.

During his election campaign, President Trump laid out his trade policy which can be characterised as America's trade partners should grant the US better terms of trade or else face higher import tariffs at US borders.

2018 showed that President Trump wasn't bluffing. The president picked a fight with China and many other countries by hiking US import tariffs on a wide range of products. While tariffs are primarily a means to pressure trade partners into giving the US better trade terms, President

Trump doesn't really hide the fact that he likes tariffs too. "I'm a tariff man", he tweeted last December. He thinks import tariffs are good for economic growth and employment.

We're not trying to answer the question about the overall effect of Trump's tariff policy on US employment but instead, we're focusing on manufacturing employment to see whether President Trump has managed to address the needs of the 'forgotten men and women' in manufacturing that lost their jobs

Have the tariffs created new jobs in the targeted industries and what has been the effect in other manufacturing industries where steel and the other targeted products are used as inputs?

For a complete analysis of the effects of tariffs on employment, we should also look into the impact on employment due to retaliatory measures by US trade partners and take into account second-round effects on consumer spending and business investments. For example, employment effects due to Chinese tariff hikes on American soya beans, are ignored in this article. But it's worth noting, that these kinds of retaliatory measures amount to about USD140 billion, less than half of the USD300 billion of US imports that have been impacted by the hikes.

So, we're not trying to answer the question about the overall effect of President Trump's tariff policy on US employment. Instead, we're focusing on manufacturing employment to see if he has managed to address the needs of the 'forgotten men' in manufacturing that lost their jobs.

Since most tariff hikes were implemented in the second half of 2018, there isn't enough data available for a conclusive analysis. Nevertheless, it's possible to draw some tentative conclusions for a few industries, as they've been subject to elevated tariffs for somewhat longer, resulting in six to nine months of available data.

We also try to get an idea of the impact of tariff hikes on the performance of manufacturing as a whole. In that way, we take into account that tariff hikes raise input costs for many manufacturers which potentially undo positive employment effects in the industries protected by higher tariffs.

President Trump's tariff hikes in 2018

- **February 2018:** President Trump hiked tariffs on the import of solar panels and washing machines in an attempt to halt the dominance of Asian producers.
- **March 2018:** President Trump picked a fight with a wide range of countries by elevating tariffs on steel and aluminium by 25 and 10 percentage points.
- **July 2018:** President Trump started a bilateral trade battle with China by imposing 25 percentage point tariff hike for a package of USD 34 billion of goods imported from China followed by the same tariff increase on a package of USD 16 billion in August.
- **September 2018:** After Chinese retaliation, President Trump stepped up the fight with a 10 percentage point increase in tariffs on no less than USD 200 billion of imports from China.

The steel and aluminium test

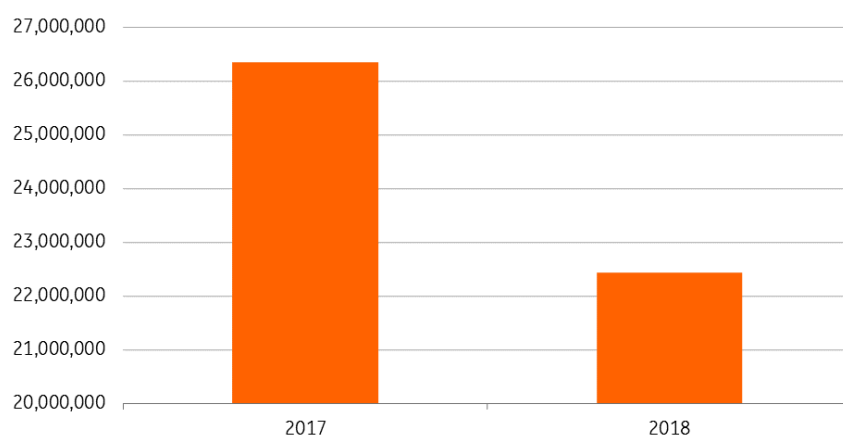
Higher tariffs on steel seem to have been successful in diminishing the American use of foreign steel. Imports of steel volumes have been 12% lower in the nine months after the increase in tariffs than during the same period in 2017, as you can see below.

At the same time, the growth of steel production in the US accelerated from 4% in 2017 to 6.2% in 2018 - above the growth of worldwide steel production (4.8%). However, the growth of US steel exports was lower. In other words, US demand for steel has been serviced to a large extent by domestic steel producers than in the past and this increase in the use of domestic steel, at the expense of foreign steel, is precisely the goal of President Trump's protectionist policies.

Demand dropped back at the beginning of 2019, but this may be tied to uncertainty after temporary concerns about the government shutdown at the start of 2019 and fear of a US downturn in late 2018, signalled by sharp sell-off in risk assets. We suspect a rebound.

US steel imports (metric/tons)

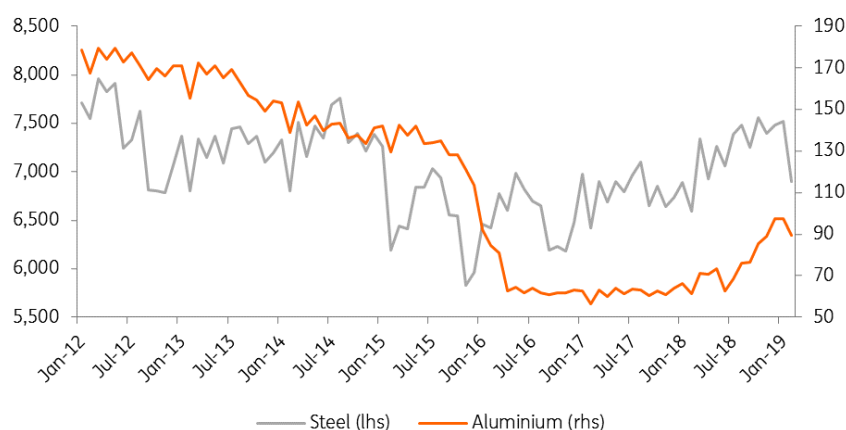
April- December



Source: US Department of Commerce

Steel and aluminium output

(monthly in tons)

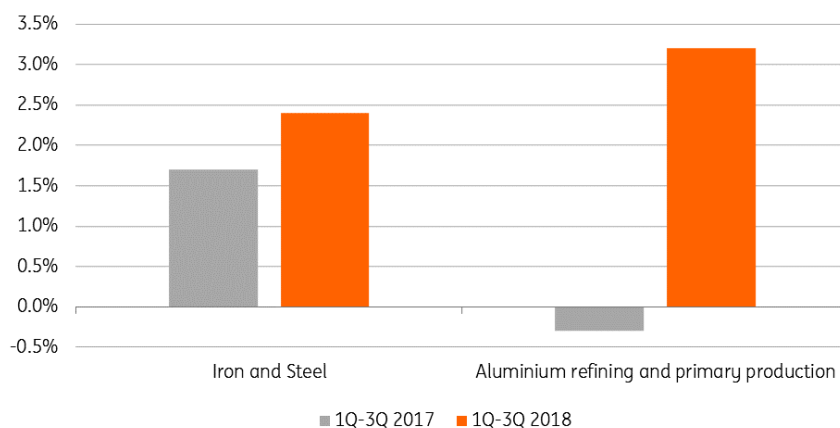


Source: Macrobond

Now, how has this influenced employment in the steel (and iron) industry? Well, jobs growth was 2.4% in the six months after the tariff hikes. The figure below shows that's 1.5 times higher than jobs growth during the same period in 2017, and also higher than employment growth in total manufacturing for the whole of 2018 (2.1%).

Employment growth before and after the tariff hike

Employment growth in steel, iron and aluminium industries for the first six months after the tariff hike compared to the same period in the previous year



Source: BLS

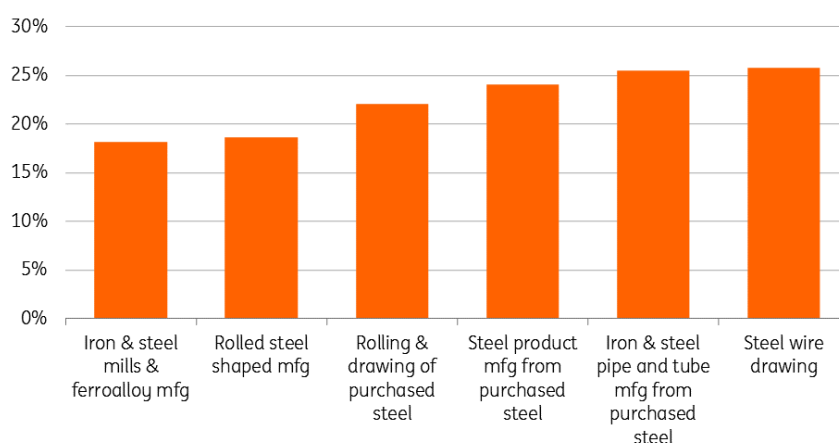
The turnaround in aluminium production has been even better than in steel after several poor years: a 33% increase in production since the imposition of aluminium tariffs (chart 2). The evidence regarding job creation is positive as well: a 3.2% job increase in the first six months after the tariff hikes, compared to a decline of 0.3% in the same period a year earlier, according to the Bureau for Labour Statistics.

Negative price effects

To get a grip on the overall impact of President Trump's steel and aluminium tariffs on manufacturing employment, effects on other industries need to be taken into account too. In the US, steel is an input for many industries and the tariff hikes mean those industries suffer from higher steel prices.

Price increases for different types of steel in the six months after tariff hikes

Annual increases through September 2018 for PPI steel series



Source: Bureau of Labour Statistics

Higher input prices will either lead to higher product prices, which suppresses demand or leads to lower profit margins that could result in lower business investments. So, it's not surprising that many steel-using companies have objected to the tariff hikes and warned about negative employment effects. For example, Ford Motor Co. is blaming President Trump's tariffs for an increase of USD 1 billion annual increase in costs.

Other companies like Caterpillar Inc and 3M Co objected to the steel tariff hike too and said tariff-related costs for this year would likely be USD100 million or more.

Limited damage

The negative indirect effects of higher steel prices have probably contributed to somewhat slower development of production and employment in some manufacturing industries, as the chart below shows. However, so far it hasn't led to eye-catching setbacks.

US automobile industry is a good example. Employment growth was 1.9% during the six months after the tariff hikes. That is less than half the job growth during the same period in 2017, but better than total manufacturing employment growth. Apparently, the cost-effect of the tariffs and potential fall out of demand through higher prices isn't strong enough (yet) to undo tailwinds like the corporate tax reform of late 2017.

Not high production, but low productivity in manufacturing is key in explaining jobs growth

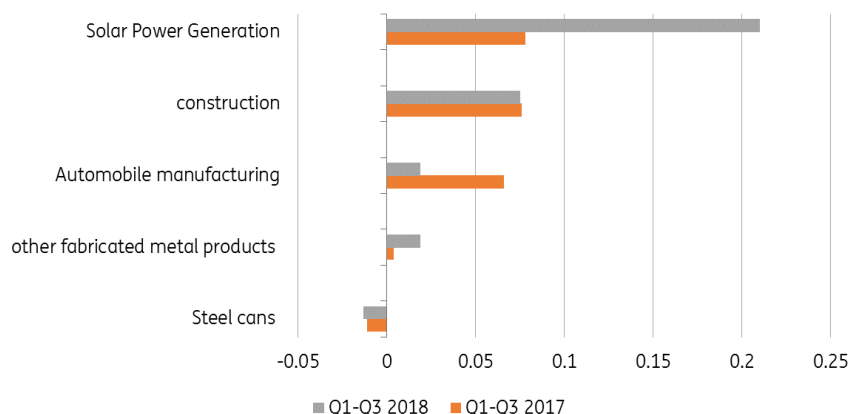
US car companies complaints about steel tariffs have so far not led to their undoing, but haven't completely fallen on deaf ears either. Automakers are probably taking solace in the prospect of potential tariffs on car imports now that the Department for Commerce has, according to press agency AFP, decreed that the import of cars is a threat to the US and a national security issue. President Trump has until mid-May to decide whether to proceed and if he does hike tariffs, it would make American autos more competitive from a pricing perspective.

The industry for steel cans is another industry that has been hit by higher costs of steel. In this industry, employment contracted by 1.3% in the six months after the tariff hike. Bad news, but not much worse than the employment development in the same period in 2017 (-1.1%) before the tariff hikes on steel and aluminium.

At first sight, construction is a sector that seems little affected by the higher costs for steel and aluminium, although it's important to remember that, especially lumber, costs are more important cost factors for residential construction. Interest rates are also low, so that has helped support demand. Nevertheless, we observe that the higher prices of steel and aluminium haven't spoiled the employment party that started in 2017, at least not yet. Employment increased by 7.5% in the six months after the tariff hike, almost the same growth as in the same period in 2017 (7.6%).

Another industry that uses steel as an input is the so-called 'other fabricated metal products', where the evidence isn't very worrying either. Employment is up more than 5,200 (1.9%) between the start of 2Q and the end of 3Q which is five times as much as during the same period in 2017, and more than the average jobs growth in US manufacturing during this period (1.4%).

Employment growth (%), selected industries



Source: Macrobond

Washing machines

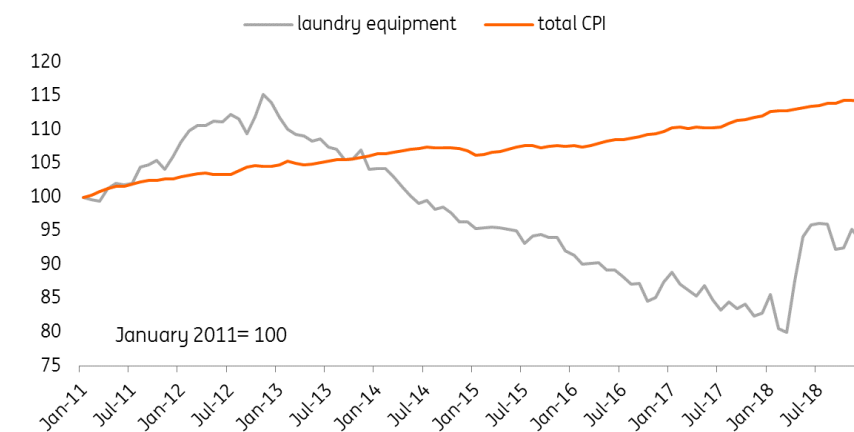
Unfortunately, data on domestic production and employment in the washing machines and solar panels industry is insufficient to draw conclusions about the employment effects of the tariff hikes in these industries. But we do have some information that allows us to get an idea of the

potential negative side effects.

The chart below shows tariff hikes have fired up US consumer prices for washing machines. The negative effect on demand for washing machines seems bearable though because more washing machines were sold in the US in 2018 than in previous years (chart 7). The growth of sales was lower than in 2017, but only by a small amount. And, this decline seems to be only partly attributable to the price rise, because the slowdown of the growth rate fits in a long-standing downward trend.

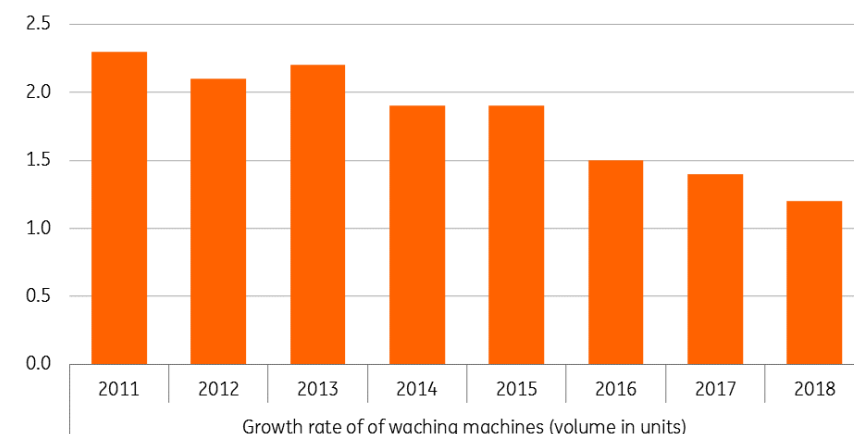
Because of the lack of data, we don't know whether the tariff hike has succeeded in replacing imported washing machines by domestically manufactured machines and subsequently raising employment in the US. Having said that, anecdotal evidence points to some positive employment developments. Sales growth at LG, one of the largest suppliers of washing machines, has been accompanied by employment gains when it opened up a new factory in Tennessee this year. We also see that some companies expanded existing facilities, such as Samsung's plant in South Carolina.

Higher prices for washing machines in the US



Source: Macrobond

Washing machines sold (units, growth rate per annum)



Source: Macrobond

Solar panels

No disaggregated employment data is available for the solar cells/ panels sector either. However, the (employment) development in the solar power generation sector can indicate whether the price increase of solar panels has restrained growth of this sector. After all, 90% of the 38,000 people working in the solar business are employed in the installation business which could be hurt by lower demand caused by the price rises of the panels due to the tariff hike.

The negative effect of higher prices on demand for this product seems to be limited as well. Growth of production of solar power has been three times as high in the nine months after the tariff hike in January than in the same period in 2017.

Summing up

Looking at the data for the industries we've looked at suggests the direct effect of the tariff hikes has been positive in steel and aluminium industries. The indirect effects on production and employment in other sectors, through higher prices, seem to wipe out these benefits in some cases, like for steel cans. For industries like the car industry and construction, the rise of input costs (steel and aluminium in this case) hasn't prevented the growth of production and employment, although at a slower pace than in 2017 in case of the car industry.

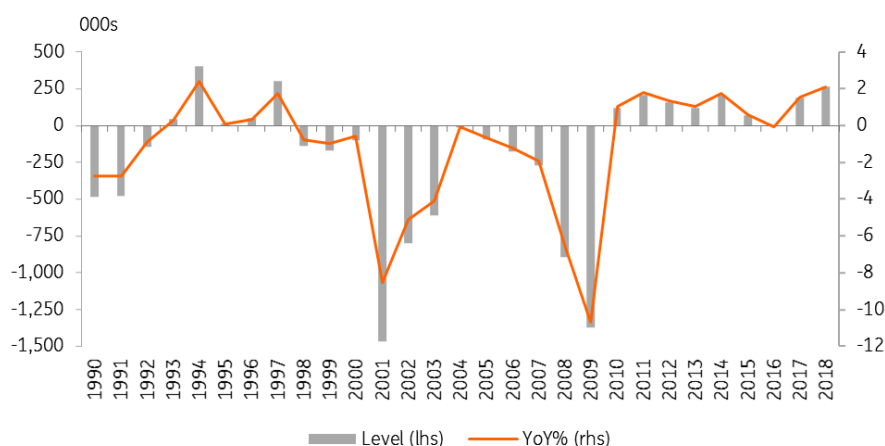
For washing machines and solar panels, indications are that tariffs haven't done harm either, although it should be stressed that data availability for washing machines and solar panels is poor.

A turnaround in total manufacturing

After steel and aluminium, a wide range of Chinese products that have been targeted by the US administration with tariff hikes in 2H18. They are mainly for manufacturing industries in the US. Data about employment development after the tariff hikes in many cases isn't available yet. However, given the fact that it concerns hikes for thousands of input products, looking at the performance of production and employment in total, manufacturing gives us some idea if the positive direct effects (on production and employment in the targeted industries) are wiped out by losses in industries that use these products as inputs.

A first glance, total manufacturing employment suggests President Trump has brought about a positive turnaround as promised. Manufacturing employment has been growing since he took office in 2017 and last year's 2.1% increase (264,000 jobs) is the best jobs result since 1994, as you can see below.

Annual change in manufacturing employment



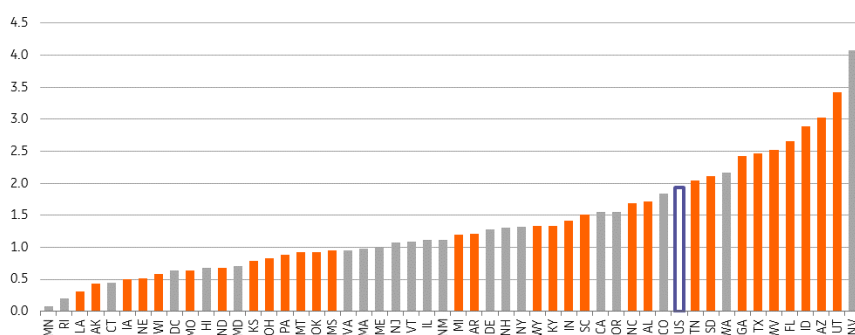
Source: Bureau of Labour Statistics, ING

What about Rust Belt states?

Interestingly, the so-called Rust Belt states which saw significant declines in their manufacturing sectors in the 1980s have continued to underperform. Iowa, Illinois, Pennsylvania, Wisconsin, Ohio and Indiana have all seen weaker employment growth than the growth for the entire economy as the chart below shows.

As such, it doesn't appear that President Trump's policies have yet been able to produce the industrial revolution that he promised the 'forgotten men' in this region, although the growth of employment is, of course, better than decline which was the case during most years since the '80s.

Employment growth (%) at state level since the start of 2018



Source: Bureau of Labour Statistics, ING

Anyways, the president can point to the fact that under his watch total manufacturing jobs, as a proportion of total US employment has been growing. That is a reversal of the steep downward trend since World War II. The pace of job creation in manufacturing outpaced that of total US employment in each of the first two years of his presidency, as you can see below.

The president can point to the fact that under his watch the share

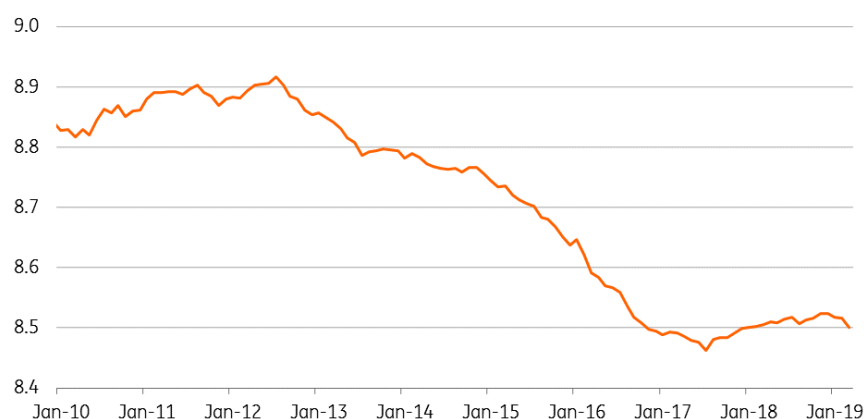
of manufacturing jobs in total US employment has been growing

Manufacturing has begun to underperform once again since late 2018, but we will need to wait and see if this is the beginning of a renewed downward trend of the share of manufacturing employment in total employment. It could also just be a temporary blip. There has been a noted improvement in the ISM manufacturing index and its employment sub-component in March. Anyways, the net increase of manufacturing's share in total employment during Trump's watch suggests that besides general policy measures like the tax cuts, that have impacted employment in all sectors of the economy, something else is going on in manufacturing.

As we've shown above, in some cases the tariff hikes have stimulated employment in the sectors involved with apparently limited damage through the indirect effect of higher prices. But this non-random selection of a couple of sectors doesn't say much about the development of total manufacturing.

Maybe something else is responsible for the positive employment performance of manufacturing under the Trump presidency. Actually, aggregate data for manufacturing shows that seems to be the case indeed.

Manufacturing employment (%) of total employment

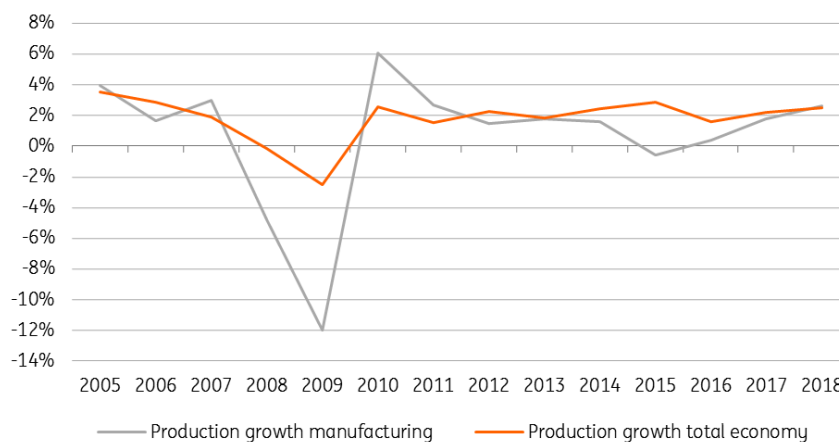


Source: Macrobond

Not high production but low productivity is key

The figure below shows that the 2.2% average production growth of manufacturing during 2017 and 2018 is very good compared to the previous two years but is nothing special if we look a bit further back in time. During the period 2005- 2016 (with the exceptional crisis years 2008 and 2009 taken out), average production growth of manufacturing production has been 2.2% as well.

Annual percentage production growth, manufacturing and all economy



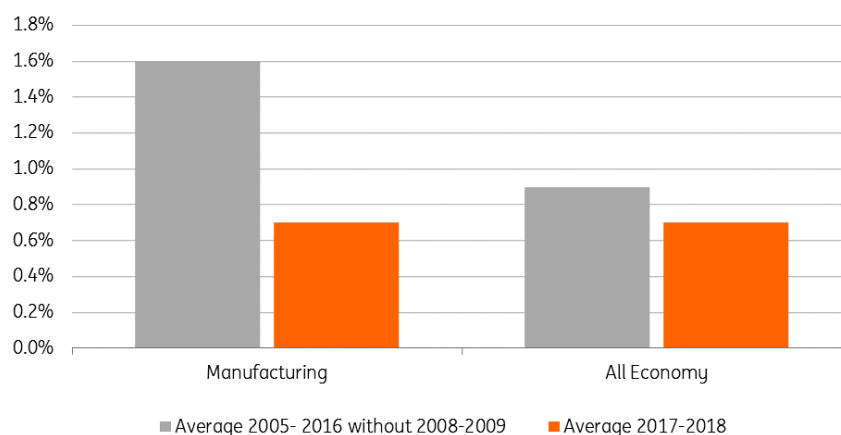
Secondly, the chart also shows that manufacturing hasn't done better than the overall economy. The overall economy grew a bit faster over the last two years (at an average rate of 2.4%).

So, how come that the share of manufacturing jobs in total employment has gone up? The answer is weak productivity growth in manufacturing! Labour productivity grew on average at 0.7% in 2017 and 2018, compared to an average of 1.6% during the 2006-2016 period - again excluding the crisis years of 2008 and 2009.

If productivity had developed at this previous pace, less extra labour would have been needed to produce the production growth that has been realised in 2017 and 2018. In this case, employment growth in manufacturing would have been only 0.9%. considerably lower than the average of 1.6% during the preceding ten years (excluding the crisis years).

A look at the productivity growth for the entire economy shows that jobs growth has been stimulated in other sectors as well by the slow productivity growth over the last two years, but not as much as in manufacturing (Figure 12)!

Large productivity drop in US manufacturing under President Trump's watch



Source: Macrobond, calculations ING

Unintended side effects

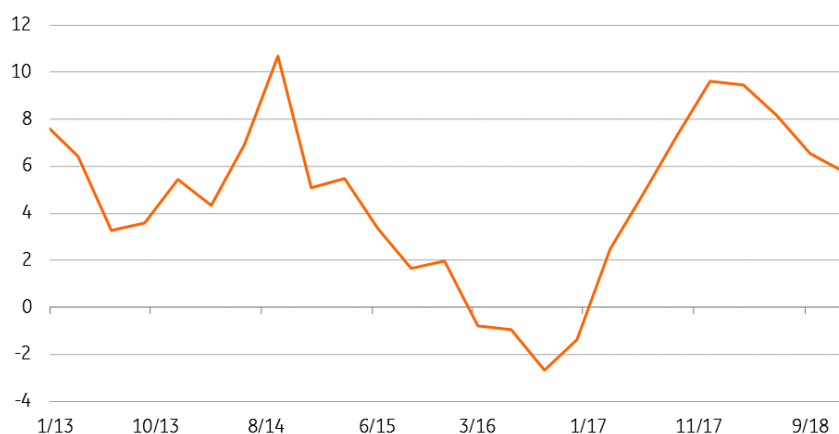
One potential reason for the weak productivity is that US companies simply over predicted demand for their products and hired too many workers. This would tie in with the decline in manufacturing out of total employment in recent months. Businesses may now be slowing their hiring of manufacturing workers after the recent softer patch for US growth.

The strong hiring, weak productivity nexus for manufacturing could also be because of the uncertainty that President Trump's trade policy has created. Businesses might be reluctant to make significant financial outlays on capital expenditure, given fears that an escalating trade war will push up costs, hurt supply chains and limit access to foreign markets in the future. Therefore, to boost output in the near term, firms have been using more labour rather than long term investments in capital goods like machines and production facilities. This aligns well with the observed slowdown of capital expenditure on equipment for the second half of 2018. (Chart 13).

Lower productivity growth was probably not President Trump's goal of the trade war, but as far as uncertainty about trade has contributed to lower productivity growth, the President will welcome this unintended effect of his controversial trade policies.

If the US can strike trade deals with China and the EU in 2019, this may give businesses enough clarity and confidence to make more capital expenditure investments. The result could be that worker productivity growth rises and production growth in manufacturing leads to fewer employment gains than in recent years.

Annual capital expenditure on equipment in manufacturing



Source: Macrobond

What does this mean for the 2020 US presidential race?

If people have jobs and rising pay, President Trump will be keen to take credit for all of this, as he seeks re-election next year. We can see that of the 11 states that have shown the fastest employment growth since the beginning of 2018 than the national 1.9% increase, nine were won by Donald Trump in the 2016 presidential election. They accounted for 123 of the 538 college votes used to determine who wins the presidency. So if he can retain these nine states, he is close to halfway to achieving the 270 electoral votes he already needs. The caveat here is that migration and demographic change will have an impact on the results too.

Also, the top states for employment growth taken by Democrat Hillary Clinton in 2016, Colorado and Nevada were viewed as key swing states that could have gone either way, accounting for a further 15 college votes. Convincing electorates in these important swing states that his tariff and tax policy is responsible for their strong employment performance will be critical in his election campaign.

Conclusion

US manufacturing growth has increased since President Trump kicked off his trade war, but we have to remember the economy was already in good shape and received further boost from a pick-up in real incomes and his 2017 tax reform.

Manufacturing production growth has been higher too, but it doesn't beat growth in the rest of the economy and isn't significantly higher than the average of the previous ten years. So, for now, we can't really see anything, which we might call the 'new industrial revolution' that President Trump promised.

US manufacturing growth has increased since President Trump kicked off his trade war. However it is not higher than the average of the preceding ten years, so we can't really see the 'new industrial revolution' as the president

promised. Employment growth however has been above average, but this mainly reflects lower productivity growth.

For jobs growth, it's a different story. There are clear signs of positive direct effects of the tariff hikes, given the above-average jobs growth seen in the steel and aluminium industry. There is no disaggregated employment data for solar panels and washing machines, but indicative data, like units of washing machines sold, don't look very bad either. Moreover, the mentioned counterweights to the price pressures have limited the negative employment effects of the cost increases. But the jobs growth is largely due to weaker productivity growth.

The indirect effect on other manufacturing industries with higher input prices has been, by definition, negative. But sound profitability of US manufacturers means this cost rise hasn't always translated (fully) into higher prices. As far as price increases are concerned, they've probably been bearable for now given the rise in real household incomes.

We'd like to repeat the fact that our analysis is a partial one and doesn't take into account the employment effects of retaliating trade partners implemented after the US hiked tariffs. Neither does it evaluate the employment effects outside manufacturing.

Despite the fact that manufacturing employment growth can largely be attributed to falling productivity growth, President Trump's good jobs track record gives him the opportunity - politically - to say that his trade policies have been helpful and if anything, are likely to serve him well in the 2020 presidential campaign.

Concerning his particular interest in the 'forgotten men' from the Rust Belt states, the President can point to manufacturing employment growth there too but it is lower than in other states.

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Counting the cost of a low carbon economy

Wind and solar power will need a \$13 trillion investment over 30 years to reach emissions targets, as demand for power doubles



Key points

- A low carbon global economy would more than double the demand for power, from 27,000 terawatt hours (TWh) to 57,000 TWh.
- Wind and solar energy are key in the energy transition: an estimated \$13 trillion of investments in wind and solar are needed to reduce CO₂ emissions by 64% in 2050 compared to current levels.
- The potential for private investment is dependent on public investment: additional grid investment is needed to accommodate the increased power demand and volatility of supply.
- Public commitment is needed in terms of spatial planning, smooth permitting procedures and the labour force to install solar and wind projects.

1 Tech and the transition to a low carbon economy

At the end of 2018, we asked whether technology could provide the answer to climate change. In [our report](#), we presented a 'Positive Tech' scenario, which was optimistic about the pace of solar and wind energy adoption. In this paper, we calculate the amount of investment needed for a 64% reduction in global energy-related CO₂ emissions by 2050.

Although this reduction is in line with the IPCC emissions target for a low carbon economy, it takes

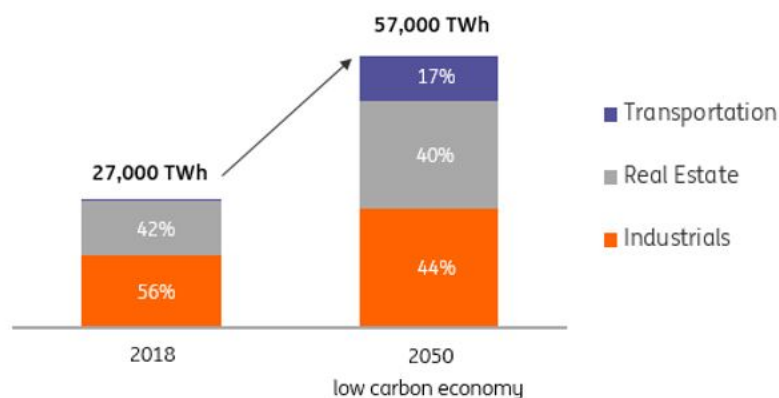
time for new technologies to be implemented while the global economy continues to grow. As a result, the 'Positive Tech' scenario is in line with the 2050 targets, but misses the 2030 targets.

The scenario focuses on the substitution of oil, coal and gas for wind and solar energy sources. These are a crucial factor behind the reduction in CO2 emissions. We believe the scenario is realistic as it factors in sensible implementation pathways of new technologies. It also does not include still highly uncertain technologies like nuclear fusion.

Global power demand more than doubles

Power demand increases from 27,000 TWh today to 57,000 TWh in 2050

Global electricity demand in TWh *



Source: ING Economics Department

Note that numbers from the report, 'Technology, the climate saviour?' have been updated to match IEA's latest data

Energy demand is expected to grow in the coming decades as a result of continuing economic and demographic growth. Electricity consumption is expected to grow even faster because of the search for new technologies that do not need fossil fuels and can therefore reduce emissions. This is likely to happen in the major energy intensive sectors, for example:

- In manufacturing: through increased recycling rates using electric instead of fossil-based processes, for instance in steel. Furthermore, using electricity instead of gas for steam production and the production of hydrogen;
- In real estate: through an increased use of electrical appliances, space cooling and heat pumps and - specifically in developing countries - substitution of bioenergy (burning wood for heating and cooking) for electricity;
- In transport: further uptake of electric vehicles, which could lead to global sales being fully electric by 2040, with almost the entire fleet making the switch by 2050. Furthermore, the electric truck is expected to gain substantial market share in the next decade. This applies to electric ships as well, but to a lesser extent.

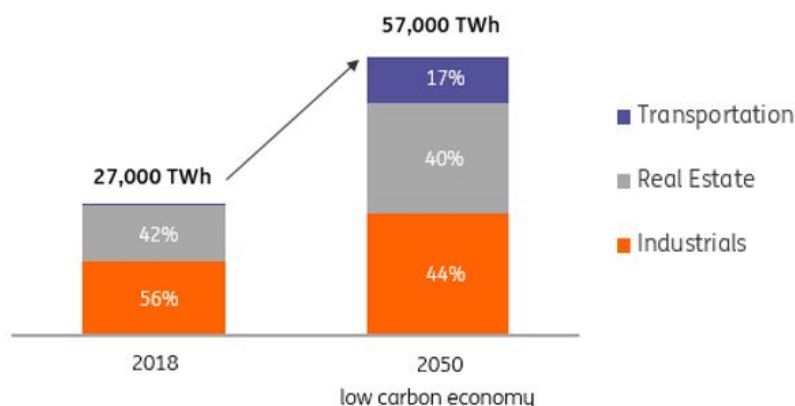
As a result, power demand increases from around 27,000 TWh currently to 57,000 TWh by 2050 in ING's Positive Tech scenario. To put this in perspective, power demand in 2040 is 9,000 TWh higher in our scenario compared to the well-known Sustainable Development scenario from the International Energy Agency, which has a planning horizon to 2040 instead of 2050.

3 38,000 TWh of wind and solar power generated in 2050

Currently, fossil fuels account for two-thirds of the global power mix. In ING's 'Positive Tech' scenario, wind and solar would provide two-thirds of electricity. They would each account for half of the total of 38,000 TWh that is needed in 2050, so 19,000 TWh. Current levels for solar and wind are 600 TWh and 1,500 TWh, respectively.

Power demand increases from 27,000 TWh today to 57,000 TWh in 2050

Global electricity demand in TWh *



Source: ING Economics Department

Note that numbers from the report, 'Technology, the climate saviour?' have been updated to match the IEA's latest data

4 Solar needs more capacity than wind

Since the sun does not always shine and the wind can be unpredictable, more capacity is needed to steadily produce 19,000 TWh each. In other words, these two sources of energy are less efficient than oil and gas. For wind specifically, offshore is the most efficient as wind is abundant and relatively constant at open sea. On a global level, one gigawatt (GW) of offshore wind capacity generates about the same amount of power as one GW of a coal or gas fired power plant. Twice as much capacity is needed for onshore wind farms as turbines on land are smaller than turbines at sea and onshore wind is less abundant.

Solar, on the other hand, needs almost four times as much capacity to generate the same amount of power as gas and coal fired power plants. This is because of the obvious problem that the sun does not shine at night and panels produce less power on cloudy days.

Overall, solar capacity needs to grow to an estimated 14,000 GW by 2050 to deliver the 19,000 TWh needed. Onshore wind would have to grow to 4,700 GW and offshore to around 1,200 GW to achieve its share of TWh generation.

5 \$13 trillion investment in solar panels and wind farms needed from now to 2050

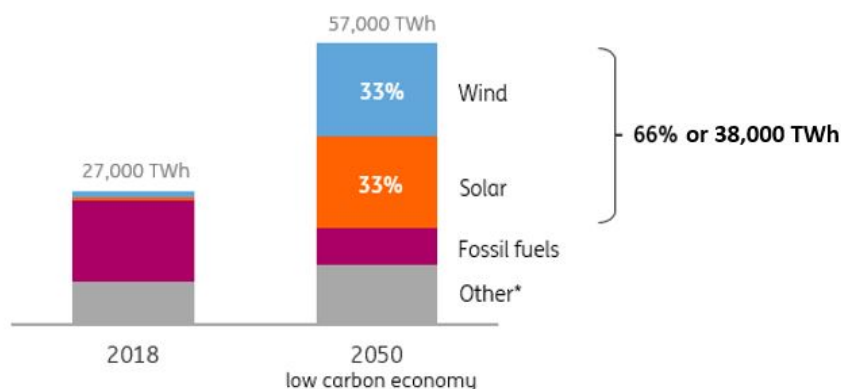
This increase in wind and solar capacity would require a combined, estimated investment of \$13 trillion up to 2050, with wind taking the lion's share at \$7.3 trillion.

The full amount does not include related investments in grids, which rely heavily on public

investment. It also does not include investments in energy storage, which are needed to store electricity for days with less wind and sun. The role of energy storage is complex and yet unclear and will be the topic of a later report.

Two thirds of electricity from solar and wind by 2050

Global power mix (%) and total power generation (TWh)



Source: ING Economics Department

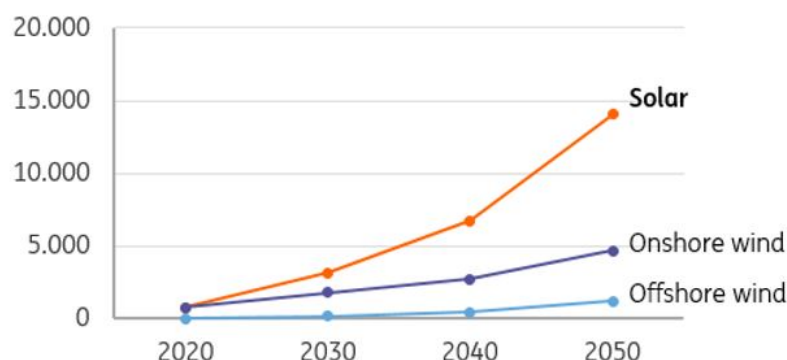
Based on ING's global Energy Transition Model *Nuclear, hydro, geothermal and biomass

6 Wind and solar would reach current oil and gas investment levels by early 2030s

To put the US\$13 trillion investment in perspective, average annual investments in wind and solar would need to grow from around \$200 billion globally in the next decade to around \$500 billion annually between 2036 and 2050. By then, annual investment in solar and wind would at some point exceed current investment levels in upstream oil & gas.

To generate 19,000 TWh of power, more solar than wind capacity is required

Installed capacity in GW



Source: ING Economics Department

Based on ING's global Energy Transition

7 Enormous business opportunity...

The huge investments needed for a low carbon economy suggest unprecedented business opportunities in the wind and solar industry. The global solar and wind markets will have high

growth rates that are expected to last for many years.

Highly innovative companies could particularly benefit from the opportunities that will arise. This may not be true for the production of solar panels, which has almost fully been taken over by Chinese companies, but it could be the case for the development of technology. For example, [technology](#) developed by TNO/ECN in the Netherlands has been applied for decades in the production of silicon photovoltaic cells and they are now developing technology that can capture light on both sides of the cell and solar panel. In addition, European companies are developing new [wind turbines](#) that use less rare earth elements and have higher conversion rates.

Investments in solar and wind total US\$ 13 trillion up to 2050

Global cumulative investments, 2019-2050 (US\$ trillion in 2018 prices)



Source: ING Economics Department

Based on ING's global Energy Transition Model

...but with significant uncertainties

At the same time, businesses are confronted by unknown variables that could prevent them from profiting from this trend. Public investment and future power prices are particularly uncertain.

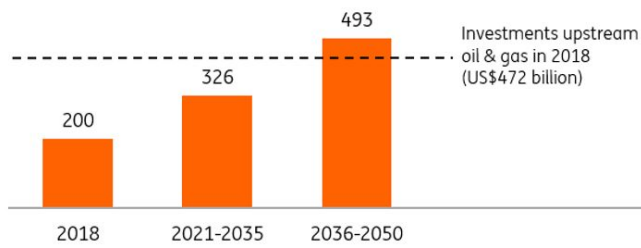
The potential for private investment is highly dependent on public investment. Additional grid investment is needed to accommodate the increased power demand and volatility of supply that comes with weather-dependent energy sources. Furthermore, public commitment is needed in terms of spatial planning, smooth permitting procedures and the labour force to install solar and wind projects. If public companies or governments do not follow, private investments could stall.

Furthermore, uncertainty about future power prices rises as the share of solar and wind energy goes up. According to [Bloomberg](#) and the [New York Times](#), power prices have become more volatile, with increasing hours of negative prices. And a recent [report](#) by Sweco argues that solar and wind will, on average, lower energy prices in the future. It is still uncertain how investors can mitigate these risks.

So while solar and wind certainly provide a bright future in terms of investment volumes, it might become more difficult to navigate these markets skilfully.

Average yearly wind and solar investment exceed current oil & gas upstream investment between 2036-2050

Average annual wind and solar investments, US\$ billion, real prices



Source: ING Economics Department

Based on BNEF and IEA

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Natural gas: That sinking feeling

The downward pressure on the European gas market has been relentless. A milder winter, along with weakness in the Asian LNG market, has seen EU inventories recover to more than comfortable levels. With seasonal peak gas demand now behind us, a sustained rally looks unlikely in the near term



Gas storage tank

Weakness in Asian LNG

Spot North Asian LNG prices have been under pressure since September, with the market down around 55% since then. A milder winter in North Asia certainly did not help market sentiment, while growing LNG supply continues to weigh on the market. Australian LNG exports have steadily increased, as further capacity comes online, with exports over 2018 increasing by 22% year-on-year to total 69.6mt. US exports grew by 53% YoY to total 22.7mt over 2018.

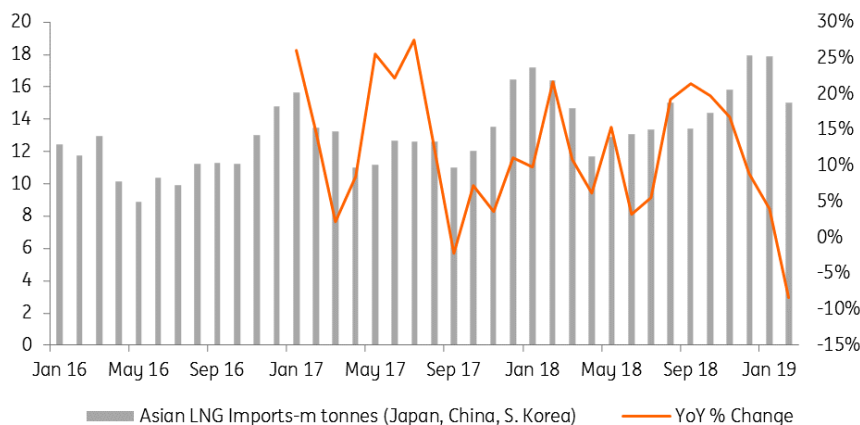
This additional supply comes at a time when import demand growth in Asia is slowing. Japan, the largest importer of LNG has in fact seen year-on-year declines in imports for the last four months. The fall in imports is driven by the restart of nuclear capacity in the country. Over 2018, four nuclear reactors in the country were restarted, taking the total tally of operating reactors to nine. The ramp up of nuclear reactors is likely to weigh on LNG demand over the course of 2019, during a time when LNG supply is only set to grow.

Meanwhile, Chinese import demand has remained fairly robust, with 2018 LNG imports growing by 41% YoY in 2018 to total 53.84mt. These growth rates are a little bit lower than what we saw over

2017, when imports grew by 46% YoY.

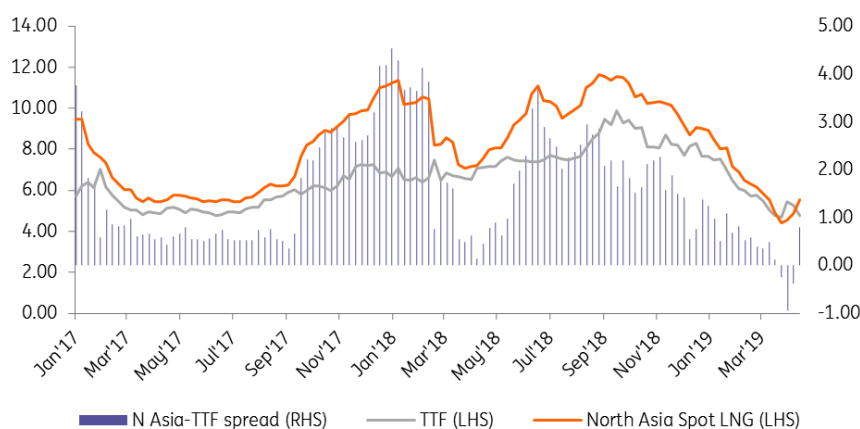
The strong premium that we have seen the Asian market trade to Europe has largely disappeared, and in fact the Asian prices have been trading at a discount to European gas prices at times recently, making Europe a more attractive home for US LNG.

LNG Asian import demand slows



Source: Bloomberg, ING Research

European and Asian gas prices (US\$/MMBtu)



Source: Bloomberg, ING Research

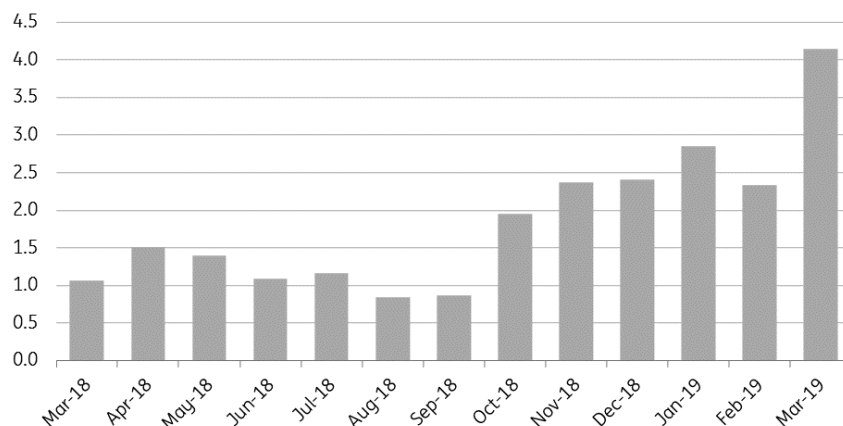
LNG weighs on Europe

This additional LNG has weighed on the European gas market. Latest data from the EIA shows that US LNG exports in January increased 66% YoY to total 2.67mt, with 43% of this making its way to the EU. More recent Bloomberg tracking data shows that North West European import flows from all origins over March broke above 4m tonnes, a 289% increase YoY. At the same time, exports have been largely absent, with some flows in December but the bulk seen between May and September last year. Given that, in the short term, there seems little reason for this dynamic to change, LNG is likely to continue capping European gas prices.

This has also meant that EU gas inventories have recovered significantly over the last year. In 2018

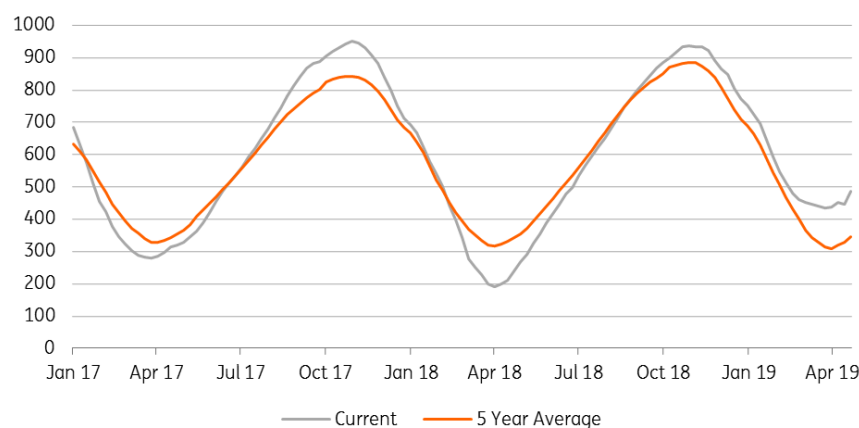
there were concerns over tightness in inventories, with stocks at a nine-year low ahead of the injection season, however they are now back at a five-year high for this time of year, and as a result, prices are unlikely to see much support from injection demand.

NW Europe LNG imports (m tonnes)



Source: Bloomberg, ING Research

EU gas inventories (TWh)



Source: GIE, Bloomberg, ING Research

Where will support for European gas come from?

Other than unplanned outages, it is difficult to pinpoint a catalyst which will push European natural gas prices higher. One factor which could offer some support though, is from the power generation sector.

EU carbon prices rallied to as high as EUR27.47/t over April, up almost 114% YoY, largely driven by the introduction of the Market Stability Reserve at the start of this year, which had the aim of taking excess allowances off the market. The strength in carbon prices along with the weakness in gas prices, has meant that clean spark spreads are more attractive than clean dark spreads in many parts of Europe, and could support a switch from coal to gas. This is also one of the factors behind the weakness in the European coal market.

The market is also likely to find support at levels where it starts not to make sense to ship US LNG to Europe. On a TTF basis, we calculate this level to be around EUR 13.60/MWh- levels which we briefly saw in early April.

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