Rogue Nations – Peak, Plateau or Plunge?

Ghosts of Disruption Past, Present and Future: Industrial Revolution 4.0; Globalization; Geopolitics

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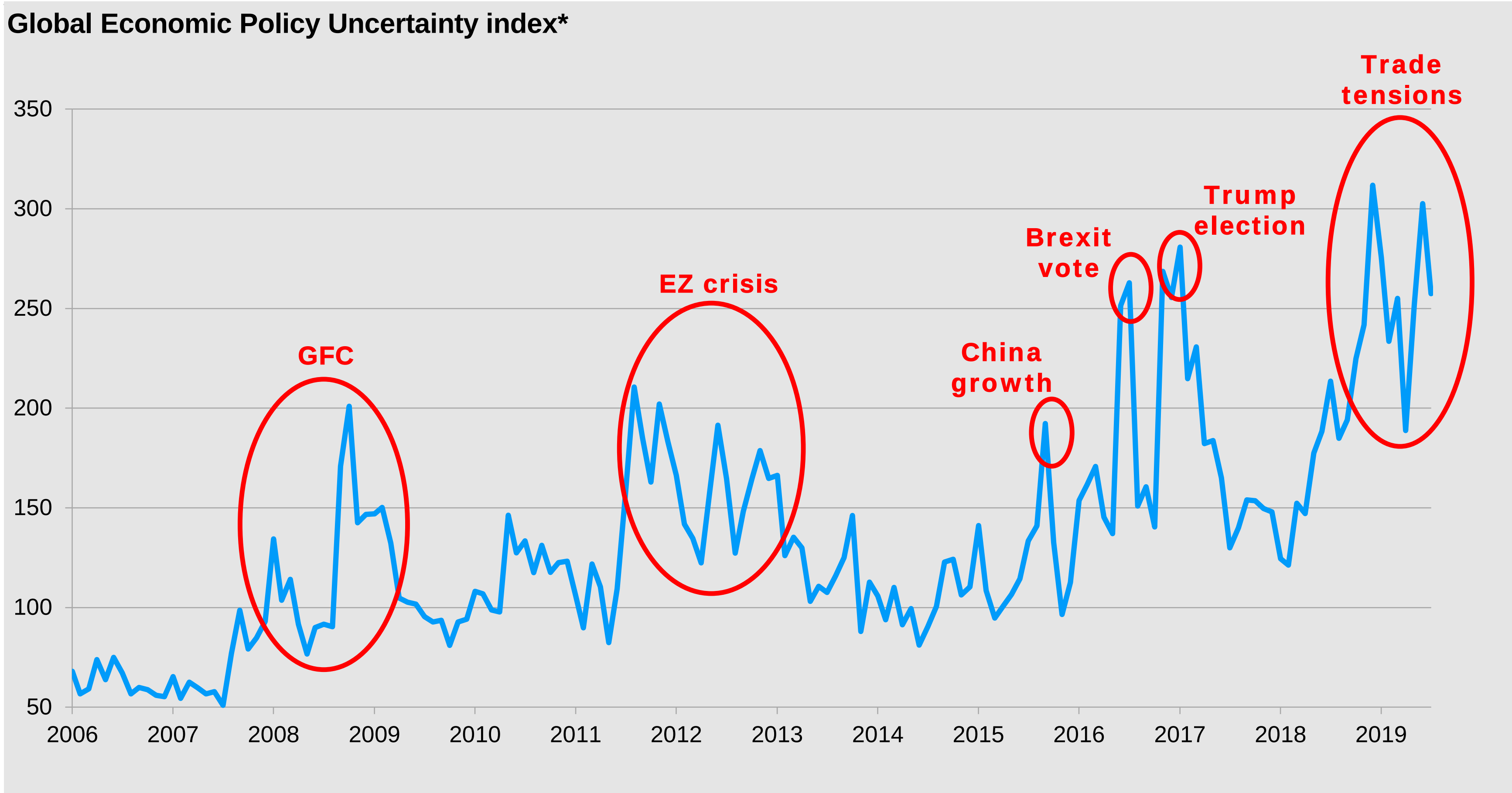
Agenda

High, Rising and Recurrent Uncertainty

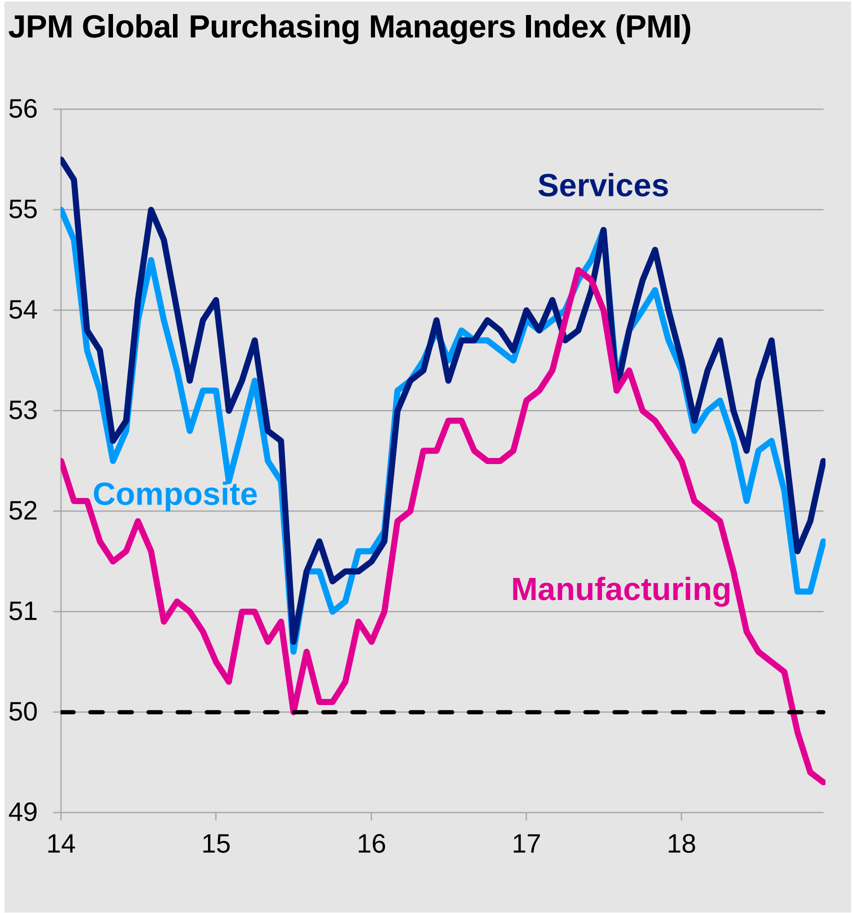
Risk – probabilistic, quantifiable scenarios; manageable outcomes
Uncertainty – unknowable/unquantifiable; cannot be risk-managed



Source: Bloomberg; Invesco. Data as at 6 August 2019. *Based on current price GDP weights. GFC = Global Financial Crisis.

Growth: Geopolitical Tensions Drag Down Manufacturing, Trade

Uncertainty weighs on cyclical *and* potential growth via investment; Industrial sector and surplus/commodity economies are most exposed

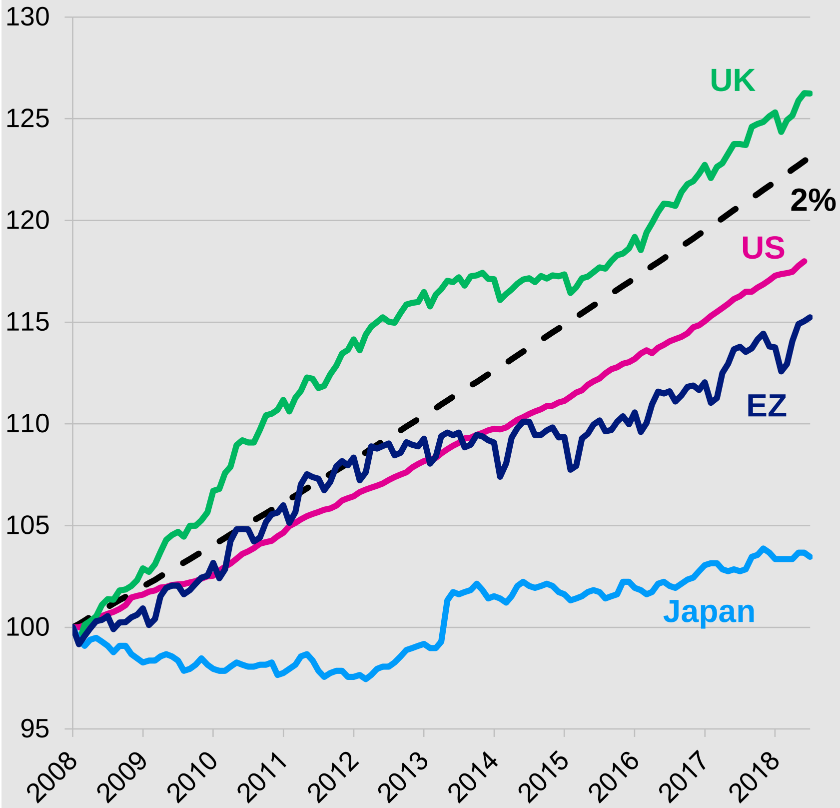


 Source: Bloomberg and Datastream as at 6 August 2019.

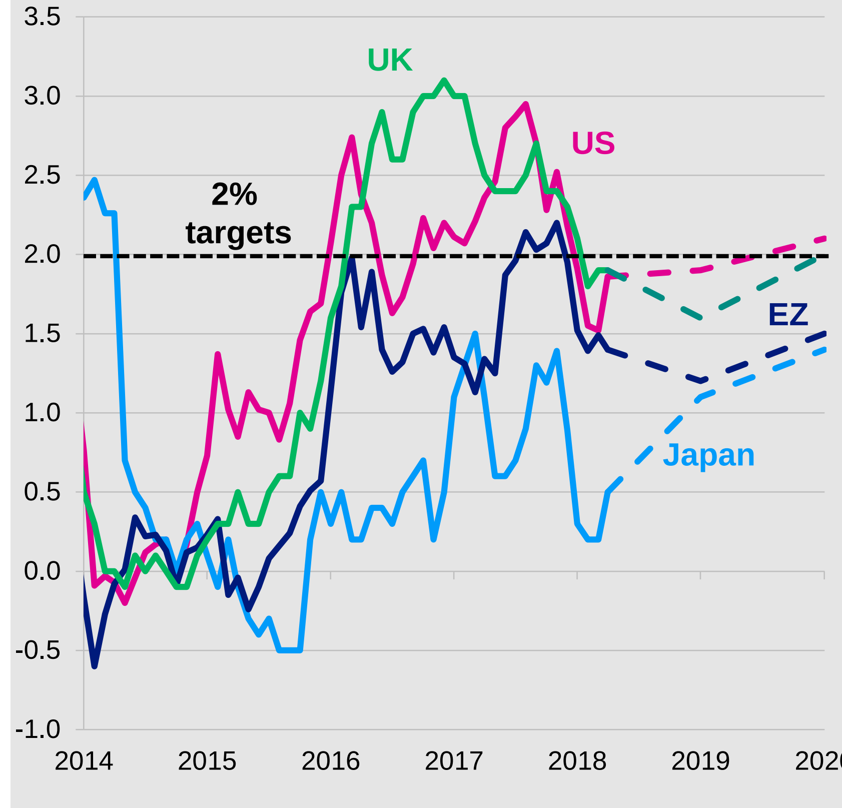
Inflation: Largest Economies have been Below Target

Major central banks expect low inflation – even the BoE, even though UK inflation has exceeded target since the GFC

Inflation relative to Central Bank inflation objectives since the GFC*

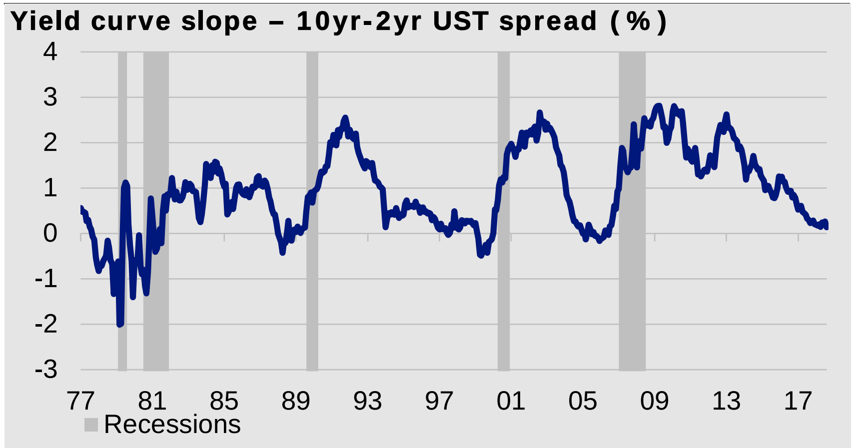


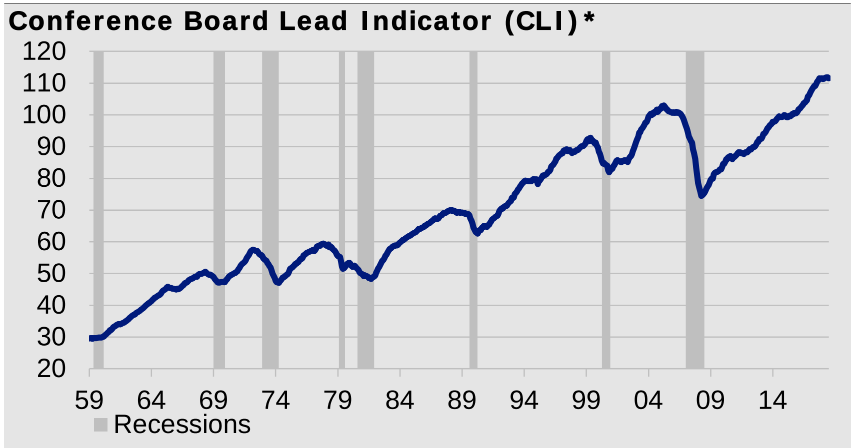
Headline inflation and Central Bank forecasts (yoy %)*

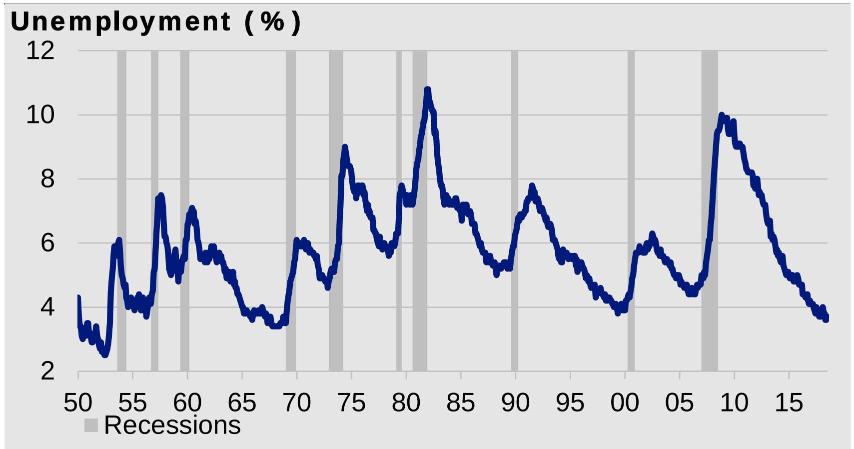


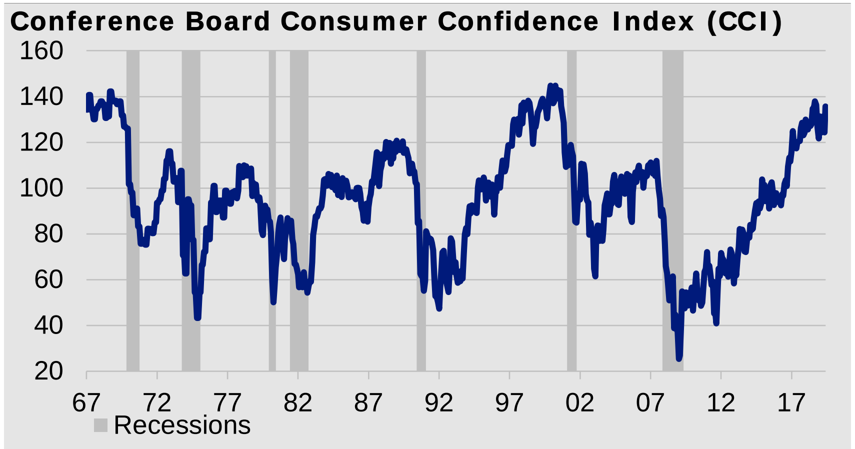
Source: LHC: Source: Datastream as at August 2019. *Rebased 100 = 31 December 2008. RHC: Source: Datastream and Central Banks as at 1 August 2019. *Dashed lines are Central Bank forecasts to end of 2020. Japan forecast is ex Fresh Food and includes impact of consumption tax hike in October 2019. US is based on PCE inflation.

US Curve Signals Recession Risk Rising, Despite Decent Data





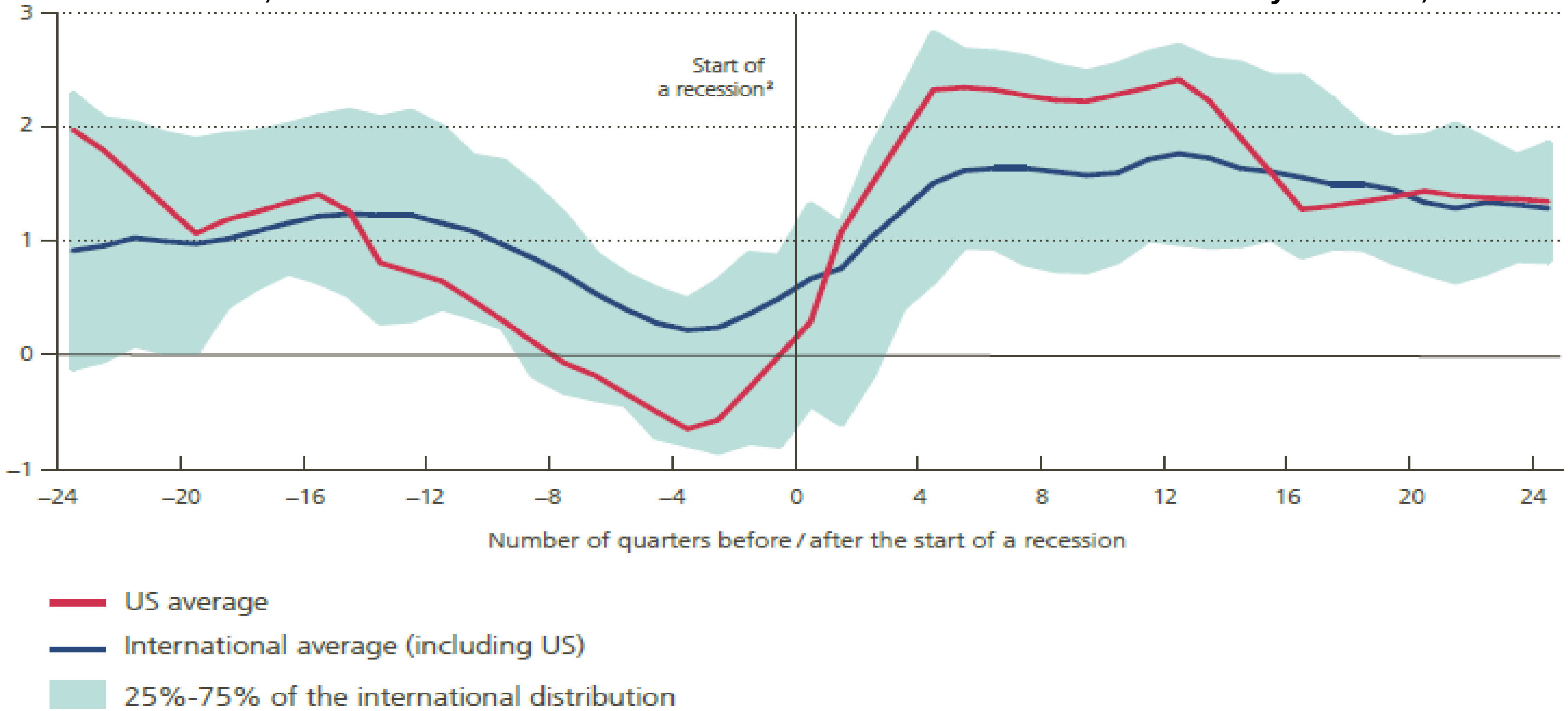




Source: Datastream as at August 2019. *The CLI is the composite average of the following: Average weekly hours, manufacturing; Average weekly initial claims for unemployment insurance; Manufacturers' new orders, consumer goods and materials; Vendor performance, slower deliveries diffusion index; Manufacturers' new orders, nondefense capital goods; Building permits, new private housing units; Stock prices, 500 common stocks; Money supply, M2; Interest rate spread, 10-year Treasury bonds less federal funds; Index of consumer expectations.

US Yield Curve Slope – Best Cyclical Leading Indicator of all?

US Fed Funds Rate, % RHS and NY Federal Reserve One-Year Ahead Recession Probability Indicator, % LHS



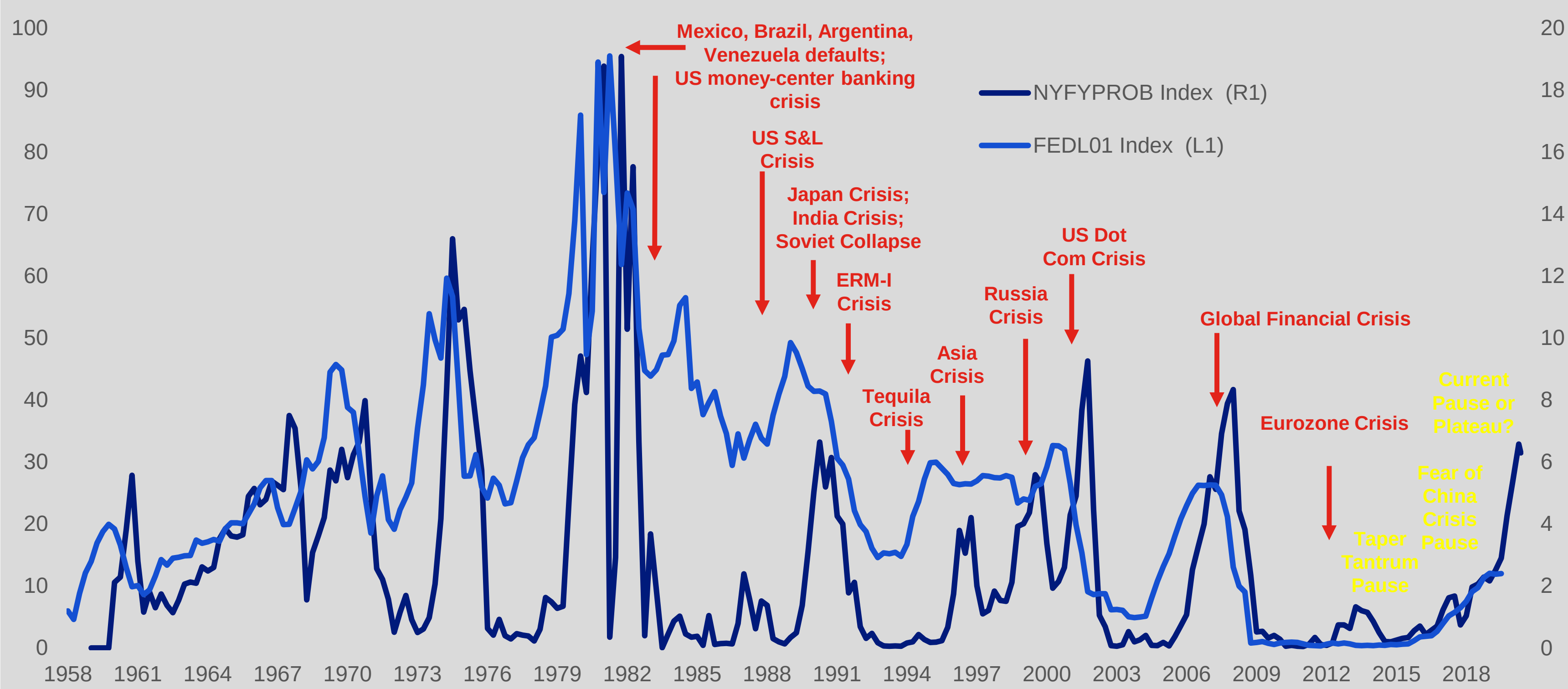
- **Paul Samuelson: "The [US] stock market has predicted nine of the last five [US] recessions"**
- **The US yield curve inverted before most of the post-War *and* pre-War/pre-Fed recessions**
- **Yield curves around the world tend to flatten (steepen) ahead of slowdowns (accelerations) including in EM, but US curve inversion (steepening) tends to be more pronounced and sustained**
- **Yet this time may be different, given vanishing term premium, ultra-low/negative nominal/real yields**

Source: Eurosystem / National Bank of Belgium, Invesco. Data reflect averages during 1953-2016.

The Yield Curve and the Fed are saying, "This time *is* different"

Fed hiking cycles end in systemic financial crises and recessions; This time, Fed policy shifts are forestalling crises, yet recession risk is up

US Fed Funds Rate, % RHS and NY Federal Reserve One-Year Ahead Recession Probability Indicator, % LHS



- **US expansions do not die of old age but are serially murdered by the Fed – in justifiable "cyclicides" – to curb inflation**
- **This cycle has see less credit growth, less wage growth, smaller supply–demand imbalances, moderate inflation**
- **Central bank mandates once again include financial stability as well as price stability and employment/growth**
- **Monetary policy may be able to smooth demand shocks, but is less suited to supply shocks or geopolitical risks**

 Source: Bloomberg, Federal Reserve Bank of New York , Invesco. Data through August 2019.

Agenda

Growth, Inflation and Policy

Industrial Revolutions 1.0 – 4.0
    History suggests transitional macro challenges are already underway

Trade War & Geo-Economics

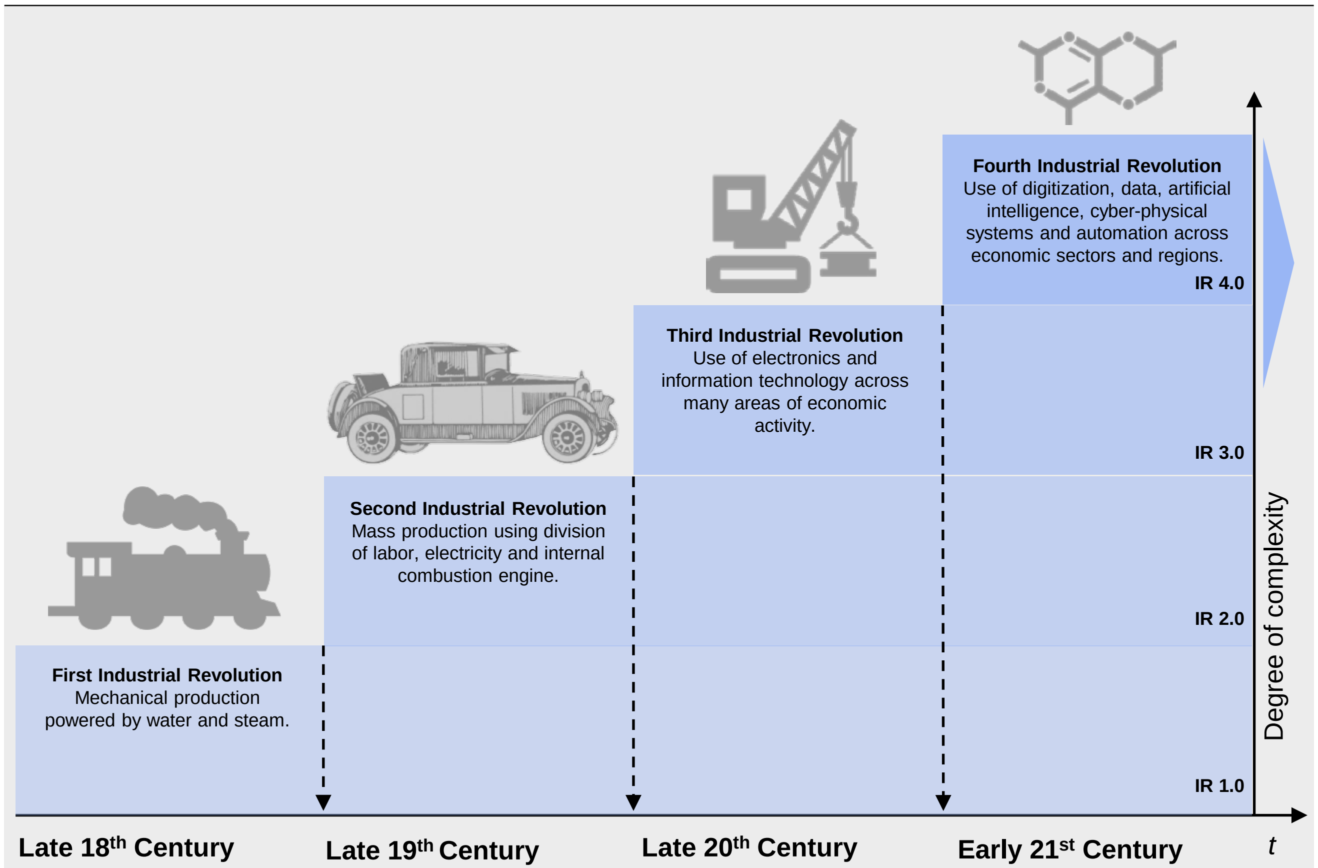
Tech War & Geopolitics

The Future of the EU, EZ and EM

Conclusion – Macro & Markets

Appendix

The Fourth Industrial Revolution in Historical Context:
Messages from Ghosts of Disruption – Past, Present and Future



1 *Economics:*
The data suggest we are already in a difficult transition

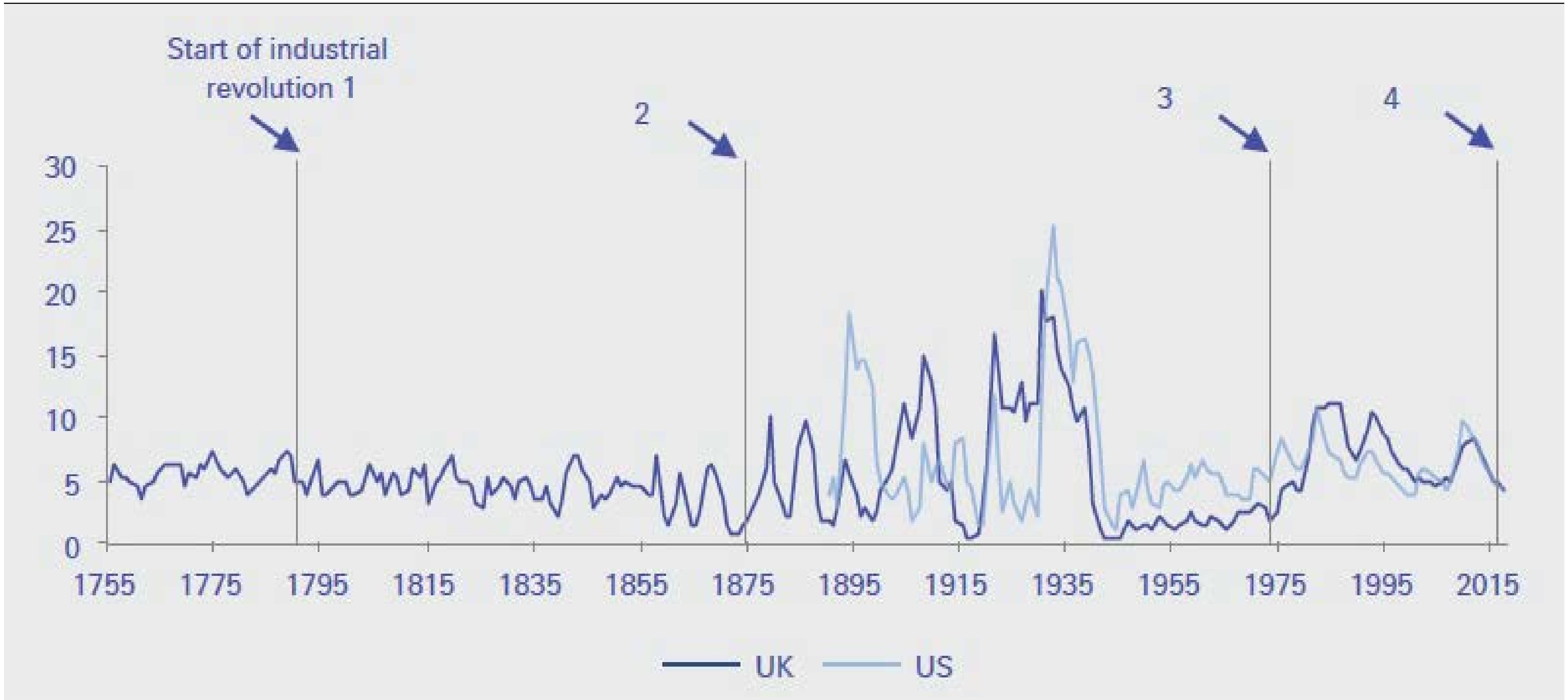
2 *Politics:*
Domestic and global tensions to stay high during this transition

3 *Geopolitics:*
Trade/tech rivalry more 19th Century balance-of-power than bipolar Cold War

Source: Accenture, Invesco.

Cycles, Shocks drove Unemployment – until IR 3.0 and 4.0

UK and US unemployment failed to rise in three industrial revolutions over three centuries – but rose in the mid-1970s, going into IR 4.0



- Changes in unemployment have been associated with economic cycles. Sustained surges in unemployment have accompanied financial crises and economic depressions
- However, average unemployment levels rose in the mid-1970s – when DM labor market liberalization, financial and corporate deregulation, globalization and IR 4.0 all began

Source: Bank of England, Thomas & Dimsdale – A Millennium of Macroeconomic Data, 2017 BoE dataset for the UK back to 1036 AD; US Bureau of Labor Statistics; Barclays Research; Deutsche Securities; Invesco.

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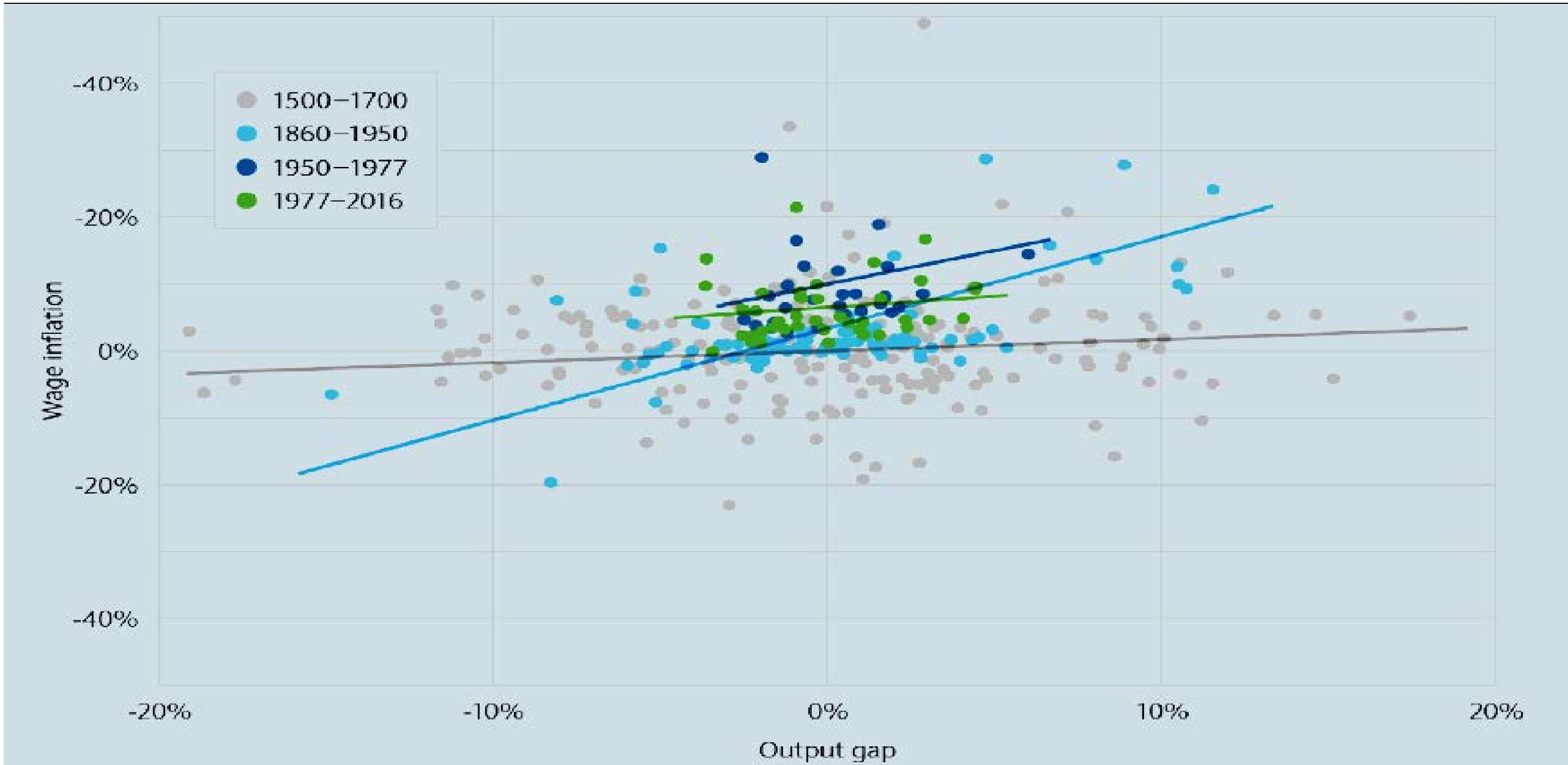
Is Technology Flattening the Phillips Curve?

UK Wage Phillips Curve IR 4.0 flat as pre-IR 1.0



Source: Bank of England – *Work, Wages, Monetary* Policy, Speech by Andy Haldane, Chief Economist, Bradford 2017; Thomas & Dimsdale – A Millennium of Macroeconomic Data, 2017 BoE dataset for the UK back to 1036 AD; Invesco.

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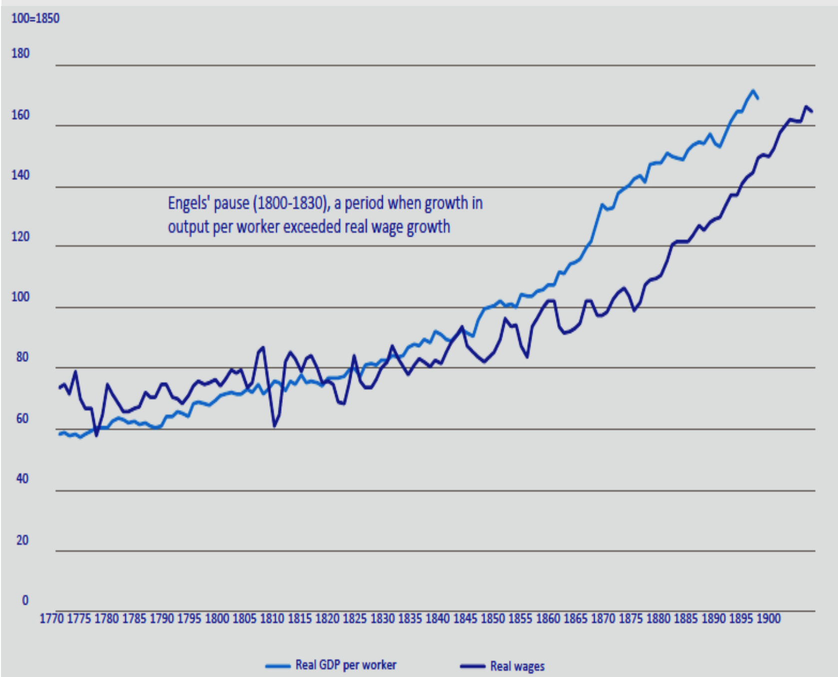
“Engels’s Pause” or an Engel Paradigm?

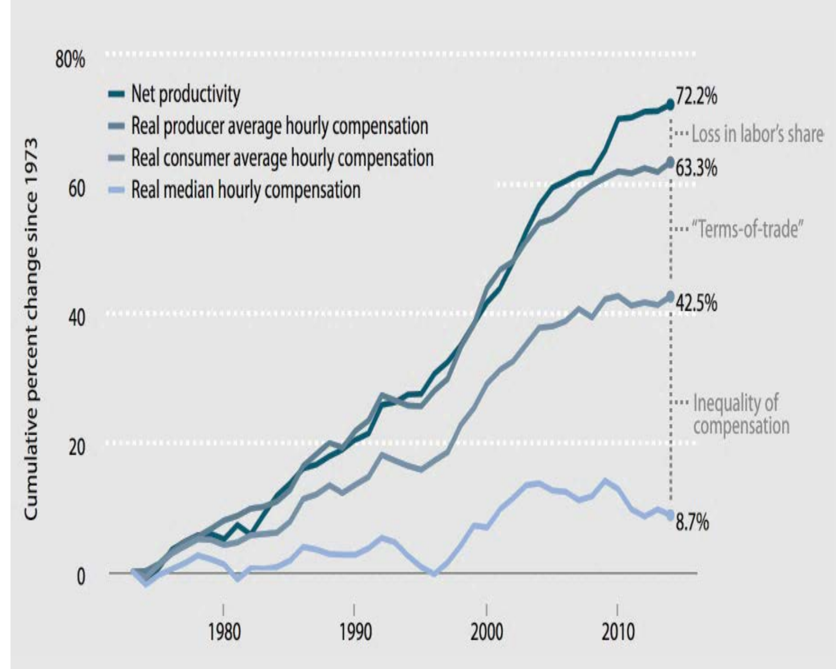
Wages Diverge from Productivity Gains during IR 1.0 *and* IR 4.0

Invesco

The Original Engels’ Pause: Wages & Productivity diverge



Median severely lags Average Hourly Compensation and Net Productivity



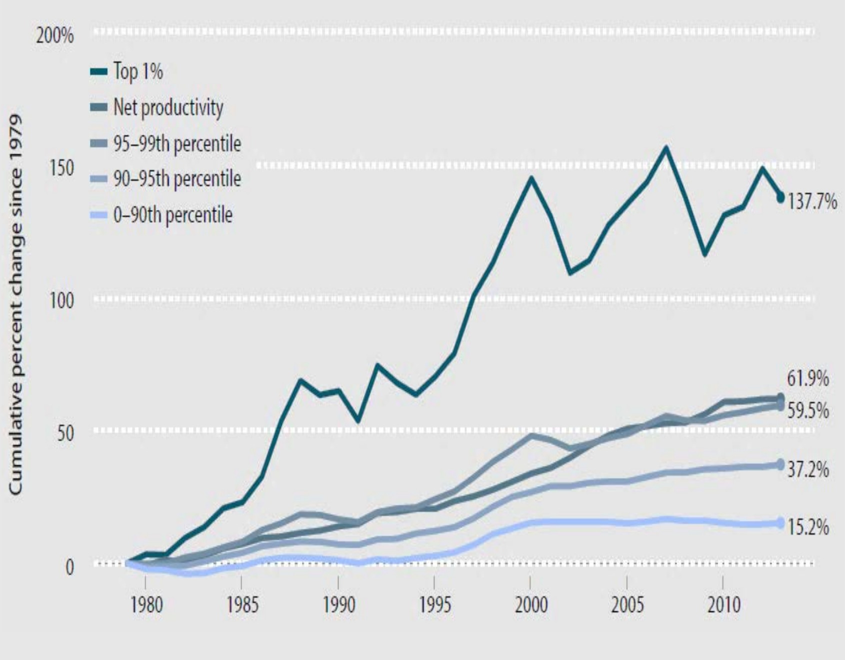
- Distribution of US labor share of income across income percentiles shows top 1% taking off relative to the rest and relative to productivity gains
- Median and Average Hourly Compensation severely lags productivity gains; effect exacerbated when divergence between producer prices and consumer prices is considered

Source: Bank of England, Thomas & Dimsdale – A Millennium of Macroeconomic Data, 2017 BoE dataset for the UK back to 1036 AD; Deutsche Bank Research; Bivens & Mishel (2015), Economic Policy Institute Briefing Paper #406, “Understanding the Historical Divergence between Productivity and a Typical Worker’s Pay: Why It Matters and Why It’s Real;” Invesco.

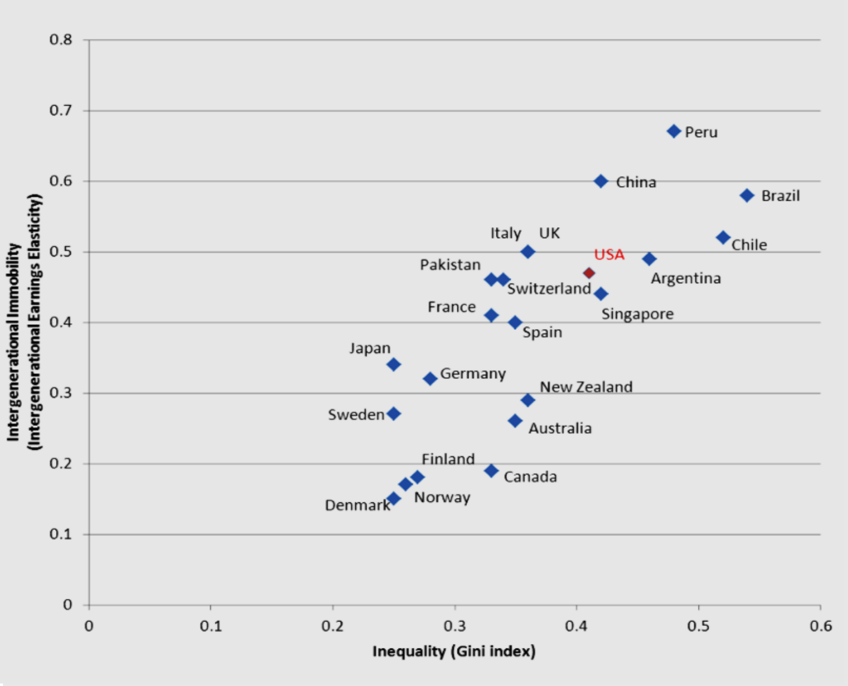
The Rich Get Richer, and Stay Richer: The "Great Gatsby Curve"

Challenges to the American Dream?

Compensation of top 1% far outstrips Net Productivity gains; lines up with financial cycles



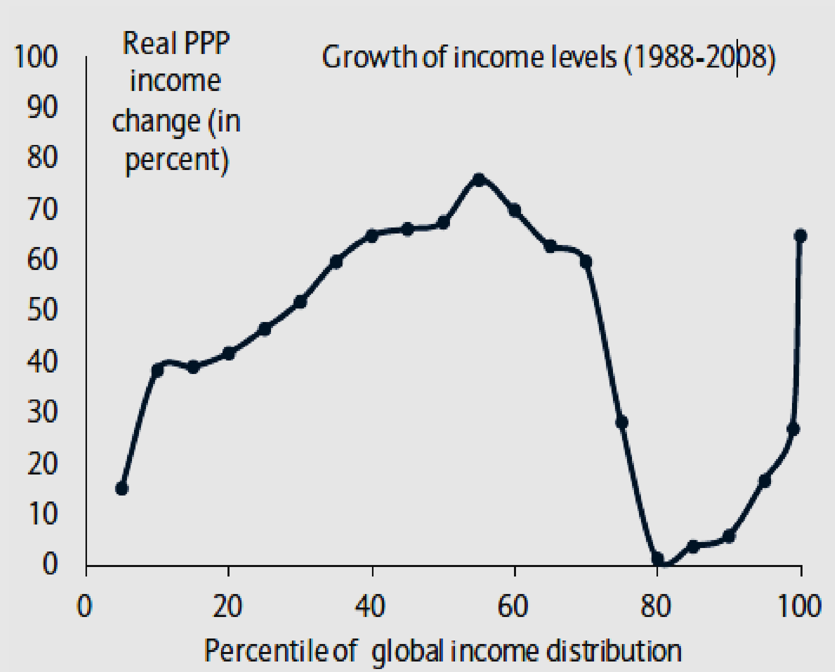
Great Gatsby Curve: Inequality breeds inequality



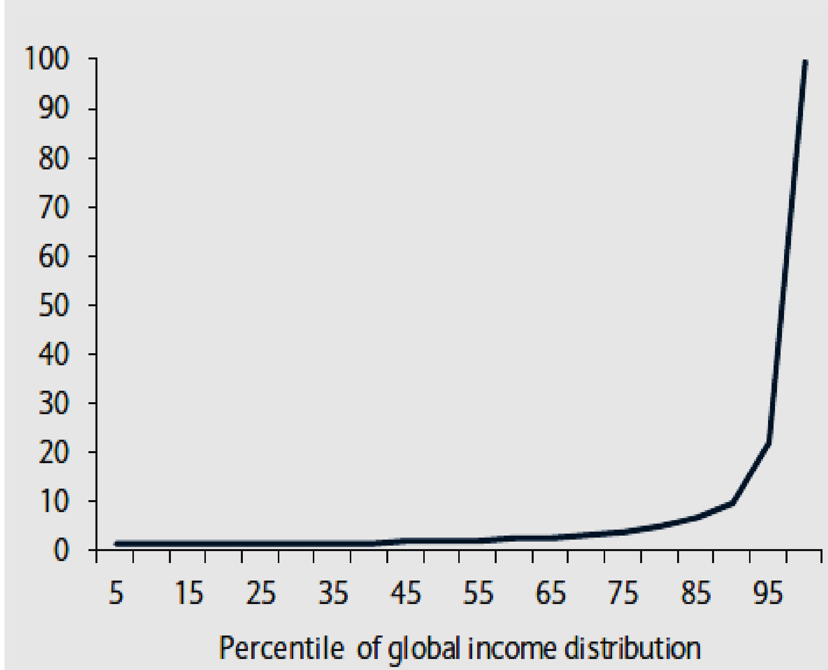
Source: *OECD Skills Outlook 2013, First Results from the Survey of Adult Skills*, Paris: OECD, 2013. http://dx.doi.org/10.1787/9789264204256-en; the Great Gatsby Curve – Chairman of the Council of Economic Advisors Alan Krueger, The President's Economic Report to Congress, 2012; Invesco.

The Elephant in the Room:
Winners and Losers in the global distribution of income

What if the Famous "Elephant Chart" gives way…



…to a Gini Coefficient that shifts towards Unity?



- The heyday of globalization was associated with declining inequality across countries, and rising inequality within countries (left-hand side chart – the Branko Milanovic "Elephant Chart")
- Technology and disruption could dramatically skew the global distribution of income towards the top

Source: Branko Milanovic, 2012; Barclays Research; Invesco.

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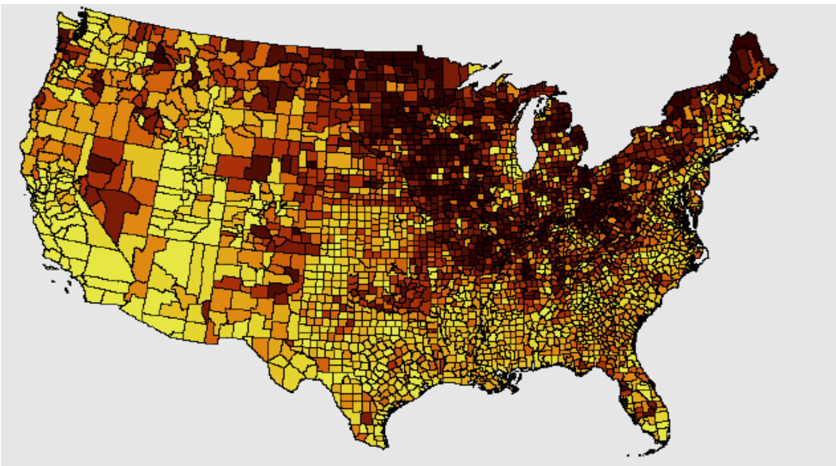
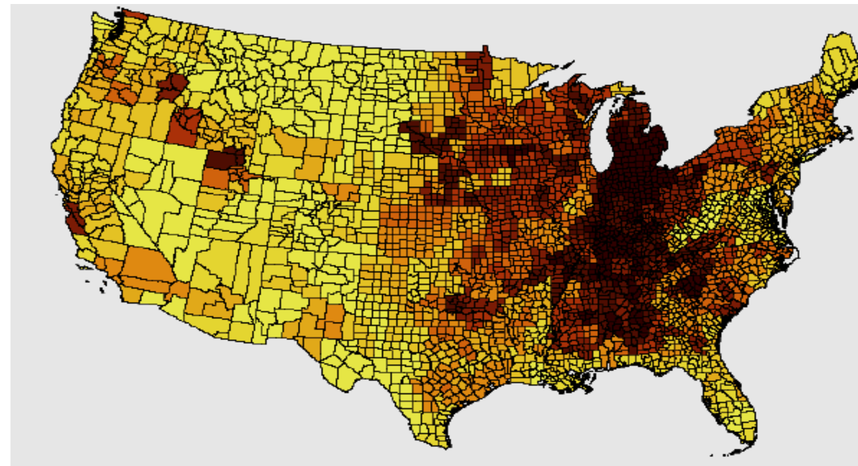
Whodunit – The Russians or the Robots?

Globalization and automation may be contributing to shifts in voting

Geographic change in Republican Vote Share: 2012 Romney defeat vs. the 2016 Trump victory



(a) Changes in the Republican two-party vote share



(b) Changes in the exposure to robots

- **Greater regional intensity of exposure to robots associated with a shift from Romney in 2012 to Trump in 2016**
- **Vote shift less pronounced in relatively high-skill, high-education, high-income US states**
- **Are Globalization and IR 4.0 already changing the geo-political economy of the West?**
  – Similar shifts in geographic/socio-economic voting patterns in, e.g., Brexit, the Italian elections

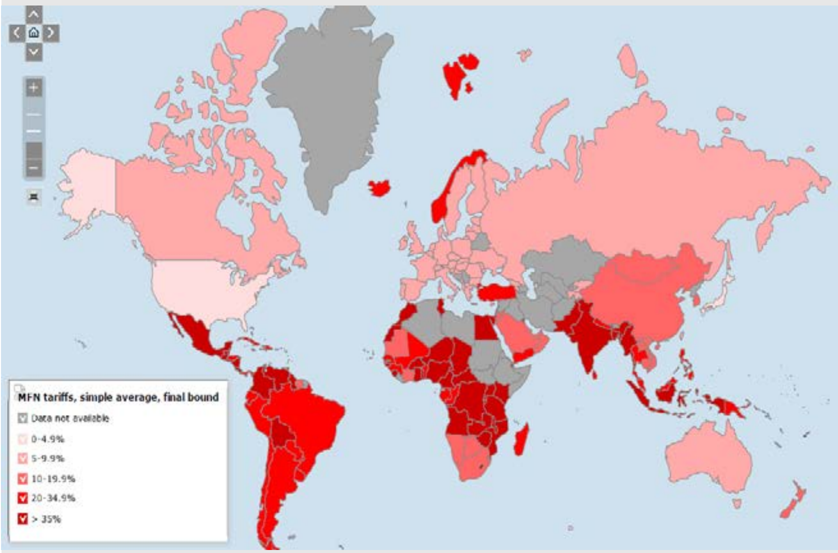
Source: Frey, Berger & Chen (2018) "Political Machinery: Did Robots Swing the 2016 US Presidential Election;" Invesco.

Agenda

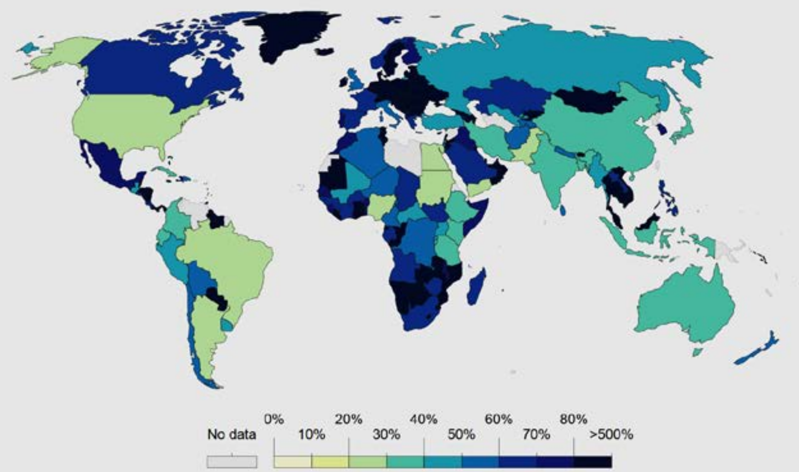
America First in Barriers to International Trade?

Invesco

Average tariffs of WTO members, 2015



Trade ratios: (Exports + Imports / GDP), 2015



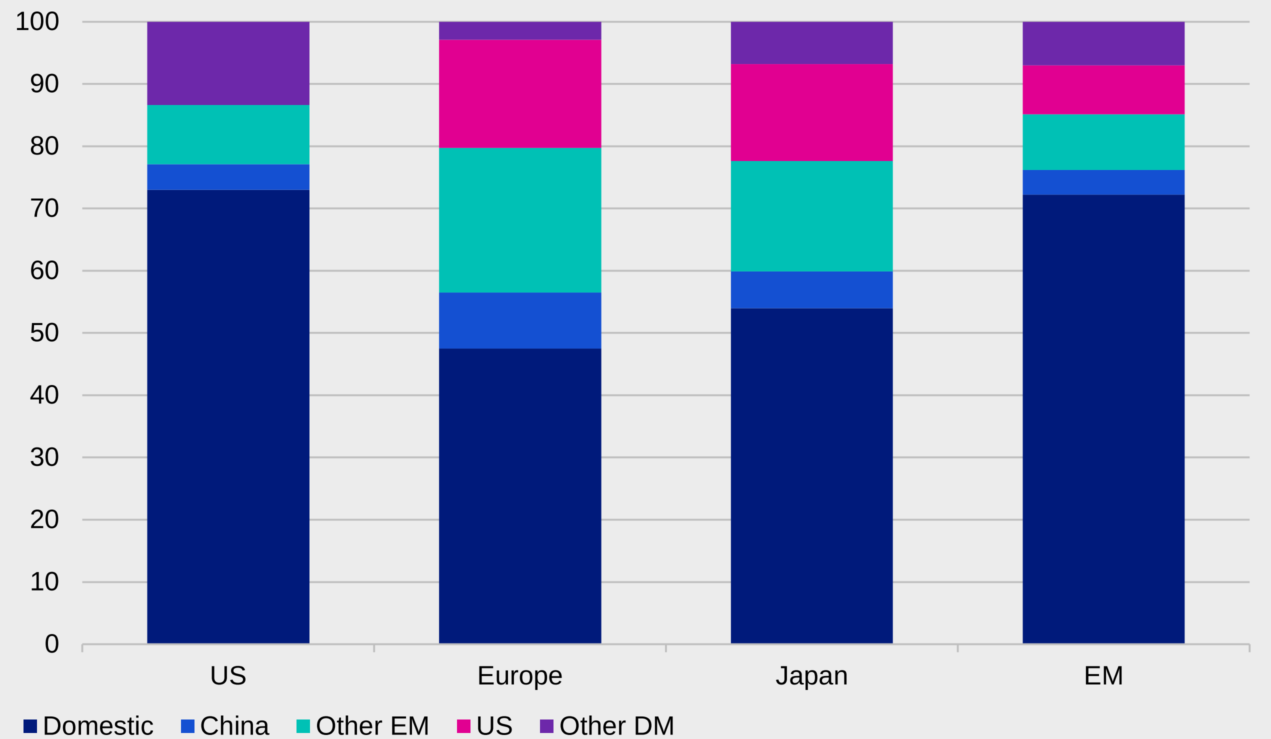
- **Of all major economies, the United States has been the most open to trade, and yet also the least dependent upon trade**

Source: World Trade Organization; Crowley; OurWorldInData.org; Invesco

America First, China Second, then Europe, Japan. EM Last…

US listed-firm revenues are more domestic than trading partner firms

Domestic and international exposure of listed firms, % of firm-level revenue



70% local

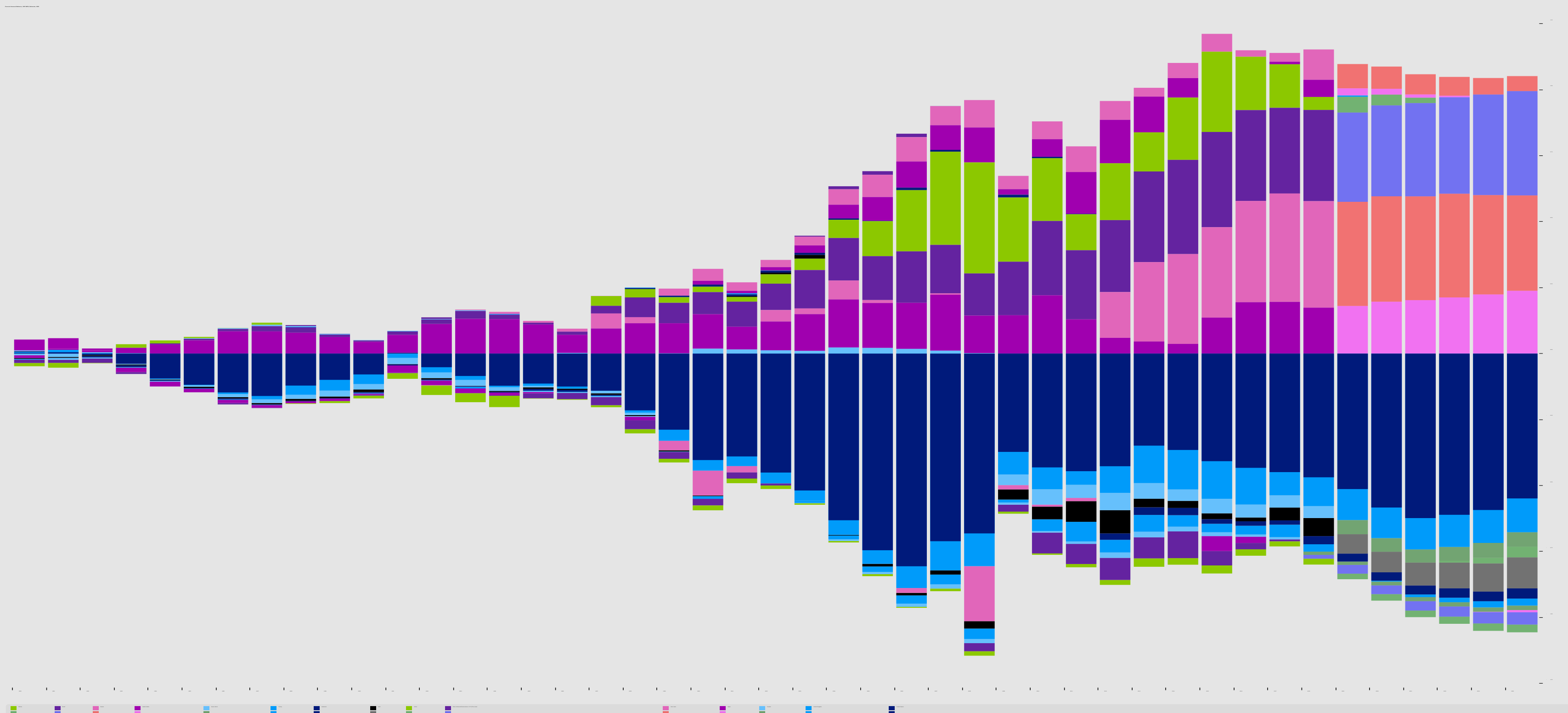
- US firms least exposed to global revenue sources across major economies
- US firms least exposed to EM of all major economies
- US economic exposure is also lowest when factoring in that 70% of US GDP is generated by SMEs, many of which are domestic

Source: Oxford Economics, Morgan Stanley, Invesco as of September 2018.

America First in Extracting Concessions from Trading Partners?

The United States is the world's only consistent, large importer
Rest of the World needs US to underpin free trade, or everyone loses

US deficits uniquely elevated and sustained in a world of large, surplus economies



- **Other deficit economies – UK, Australia, EMs – have far smaller, more variable deficits**
- **The idea of surplus economies coming together to sustain globalization without the US is a "fallacy of composition" –**
    - **The world economy simply would no longer add up; there would be a deflationary shortfall in demand**

Source: IMF WEO Database, Macrobond, Invesco as of September 2019.

Agenda

Growth, Inflation and Policy

Industrial Revolutions 1.0 – 4.0

The Future of the EU, EZ and EM

Trade War & Geo-Economics

Tech War & Geopolitics:
The keys to the Middle Kingdom, the Republic or the World?

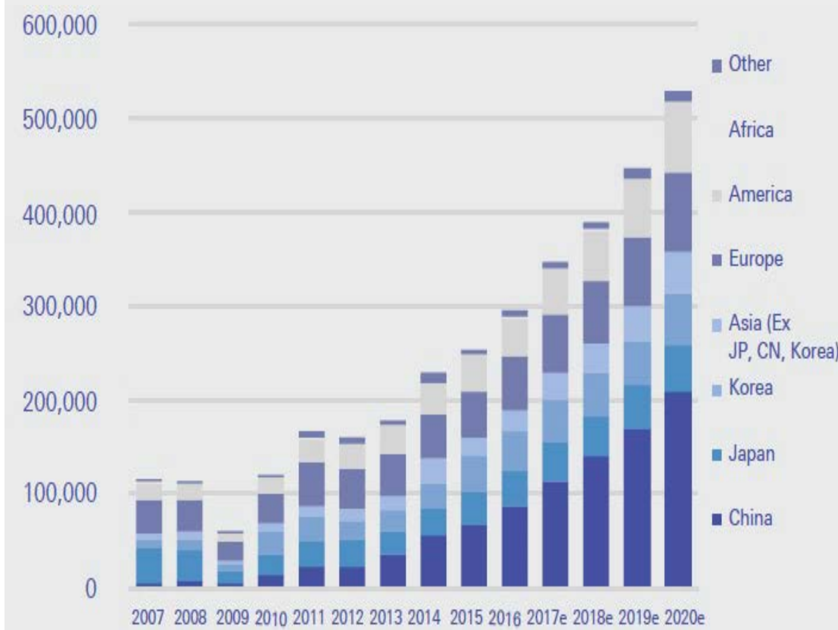
Conclusion – Macro & Markets

Appendix

China is rapidly taking the global lead in robot usage

Major Economy Robot Usage (1,000s of units)

Global Robot Shipments (units)



- **China's use of robots is already taking off, and is expected to continue to lead other major economies**

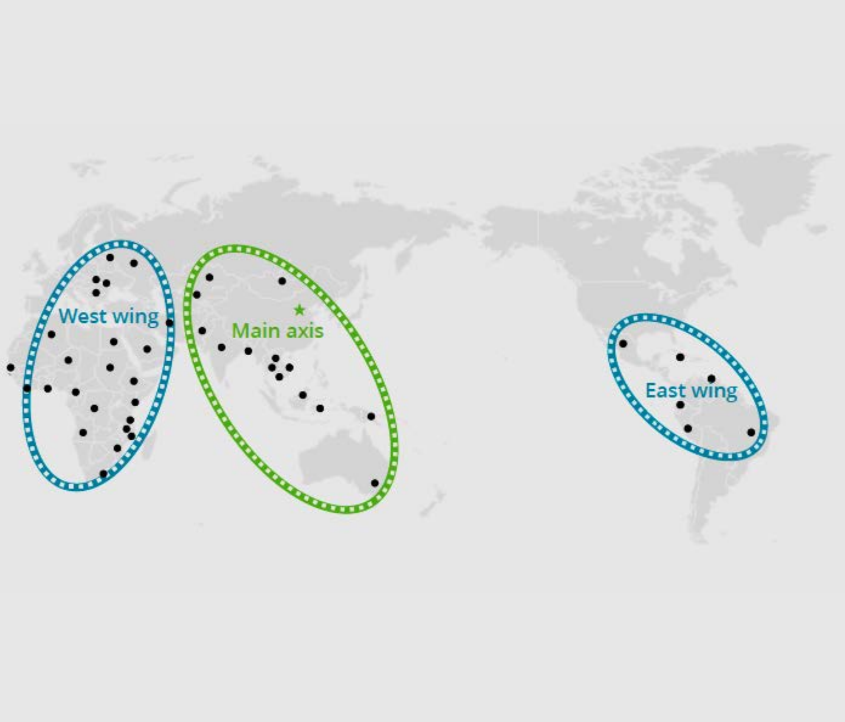
Source: International Federation of Robotics, World Robotics 2017, Deutsche Securities, Invesco. As of Aug 2018.

The Keys to the Middle Kingdom, the Republic or the World?

China's Belt-and-Road Initiative would re-integrate Eurasia and Africa

China's Near-Abroad Now Extends Across Eurasia

BRI East Wing Extends to the Americas



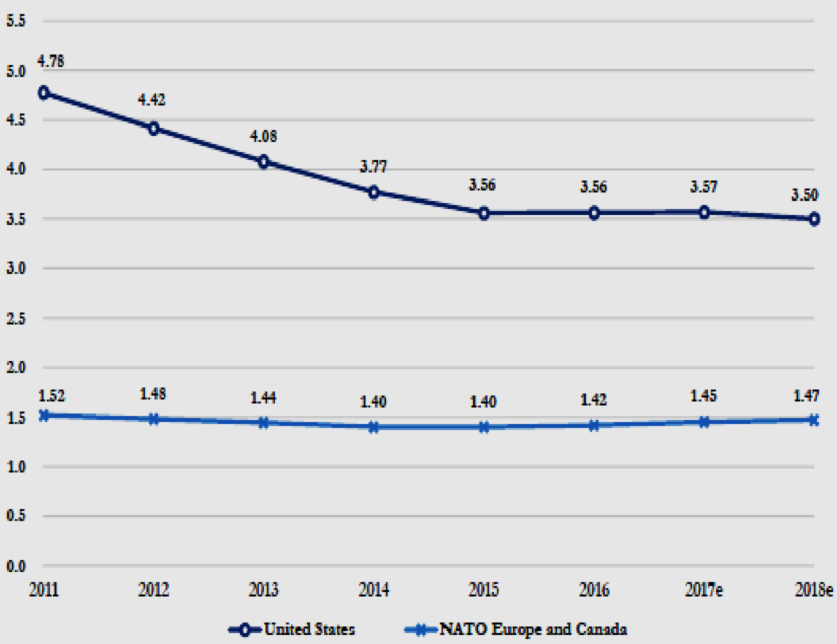
- **Primacy in Eurasia is a central tenet of geopolitical and geo-economic influence for many US geo-strategists**
- **US insecurity about China's rapidly rising economy, technology and global influence are likely to persist**
- **Such insecurity is likely to be shared by other major economies and would-be great powers**

Source: BRI Website; Deloitte and the Lowy Institute; *The Grand Chessboard* by Zbigniew Brzenzinski; Invesco as of January 2018.

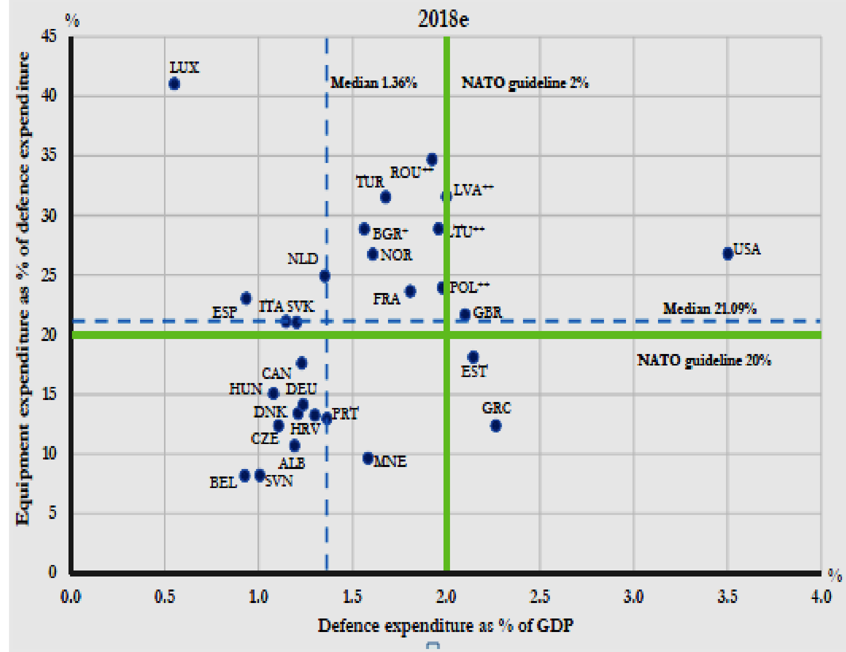
Trump Links Trade and Investment to NATO

Germany as a "captive" of Russia

US Defense Spending More than Double Rest of NATO
% of GDP



European NATO Defense Programs: Really Just Jobs Programs?
Total Defense vs. Equipment Spending,
(% of GDP vs. % of total defense spending)



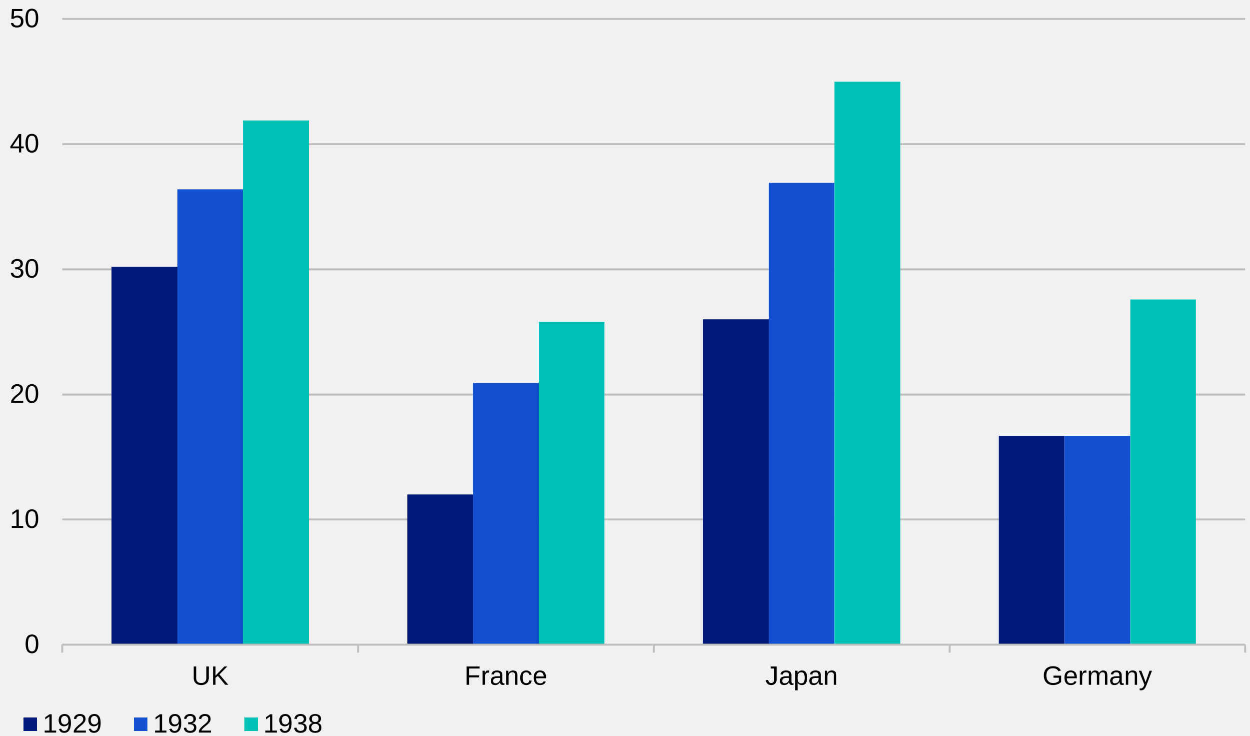
- **US, UK only NATO members to exceed 2% of GDP in defense spending and 20% of defense spending on equipment**
- **Other NATO defense programs smack to Trump of jobs / social security programs, and of an American transfer…**
- **Hence, calls for more "burden-sharing" – a view expressed by every US president since JFK in the 1960s**

Source: NATO, Besch, Invesco as of July 2018.

Geopolitics can change Geo-Economics

Trade shift – from comparative advantage to "You're with-us-or-against-us"

Share of imports from colonies and spheres of influence, % of total



1.3-2x rise

- Trade war during the Great Depression led to significant trade diversion
- Competitive devaluations, tariffs, non-tariff barriers caused trade to shift along political axes, away from comparative advantage
- Trade diversion along geopolitical fault lines would imply greater home bias and political selectivity than a more fully open world economy enjoying stability in trade barriers

Source: League of Nations; Oxford Economics; Invesco as of September 2018.

Agenda

Growth, Inflation and Policy

Industrial Revolutions 1.0 – 4.0

Trade War & Geo-Economics

Tech War & Geopolitics

The Future of EU, EZ and EM:
- UK: Brexit calling
- EZ: From convergence, via divergence to diversity and variability
- EM: Threats to the catch-up growth model

Conclusion – Macro & Markets

Appendix

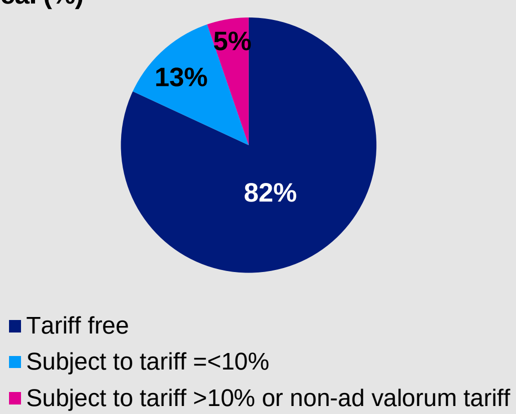
Brexit: Managing the Rising Risk of No-Deal

Higher trade barriers; lower human/financial/corporate capital inflows: Weaker growth and a shift in policy focus to (re-)distribution

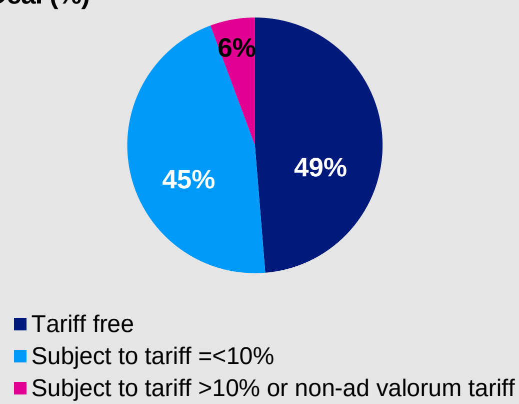
Brexit options, ranged from negative (left) to positive (right) for growth, sterling and credit and equity

No-Deal Brexit	Second, Early General Election	Second Referendum	Negotiate a new deal	Cancel Brexit

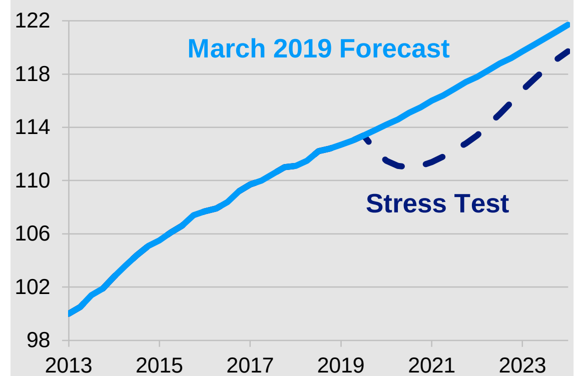
UK import tariffs from the EU27 post No Deal (%)*



EU27 import tariffs from the UK post No Deal (%)*



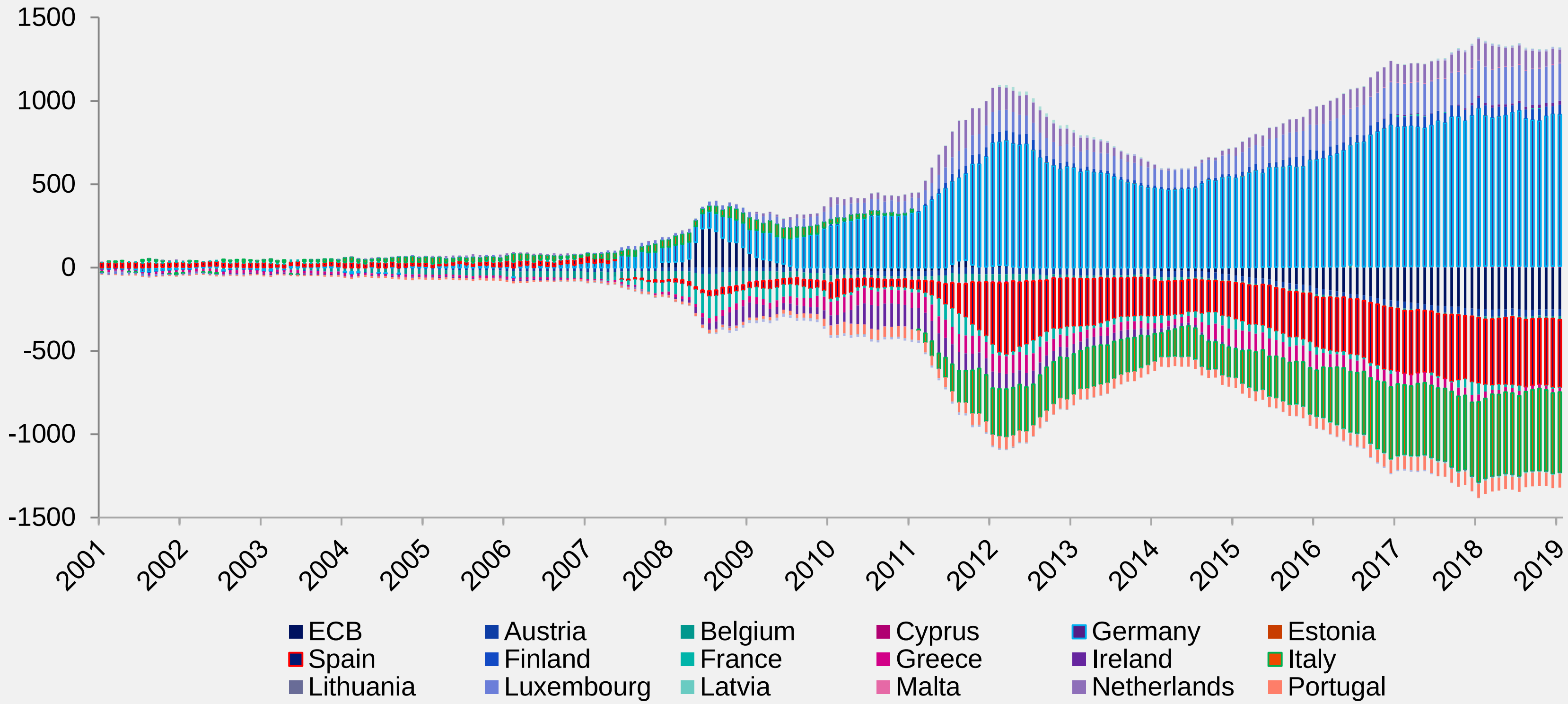
No Deal Brexit Real GDP stress test*



Source: Top chart: Invesco for illustrative purposes only. Bottom LHC and MC: Dmitry Grozoubinski of ExplainTrade.com as at July 2019. *Based on average imports 2016 – 2018. UK data based on UK's temporary No Deal tariff regime. Bottom RHC: OBR as at 17 July 2019.

EZ Divergence: From Private-Sector to Public-Sector Imbalances

Eurosystem TARGET2 Balances, billions of euros

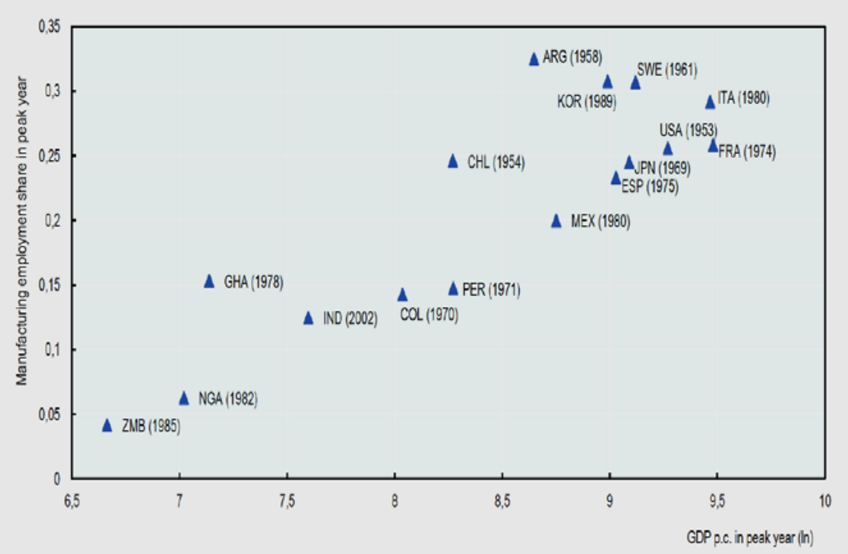


Source: Eurocrisismonitor.com; ECB; Invesco. Data through June 2019.
Note: TARGET 2 is the real time, gross settlement system of the Eurozone

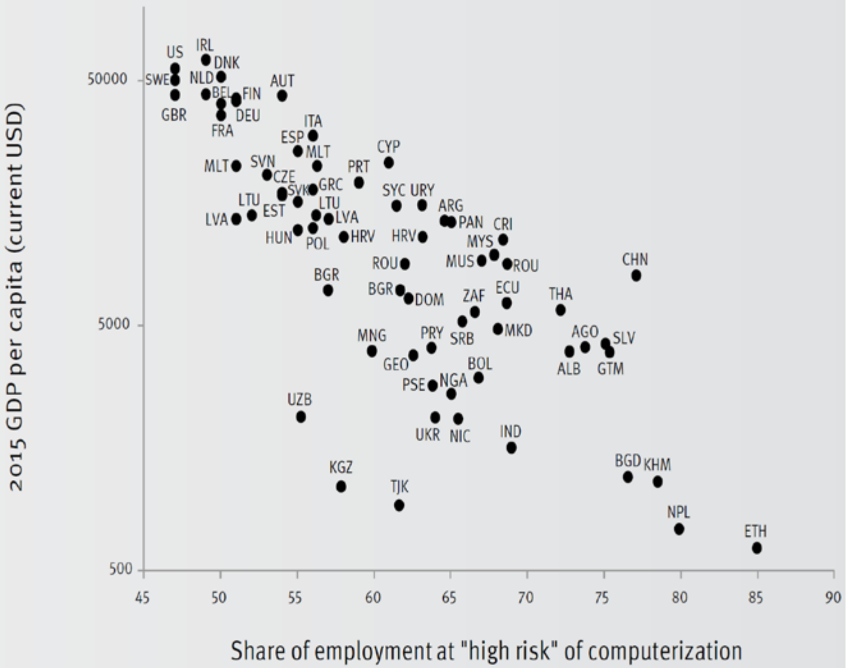
The Sum of All Fears: Mass Unemployment?

"Premature De-industrialization" in EM countries and high exposure to automation in global labor markets

Manufacturing employment already peaking at lower levels of per capita income



Low-income countries highly exposed to automation, but high-income countries also face major challenges



- IR 4.0 is a challenge to the traditional emerging market "catch-up" model of industrialization
- Automation and computerization poses unprecedented challenges for employment in both developed and emerging markets

Source: Berger, T. and C. Frey (2016), "Structural Transformation in the OECD: Digitalisation, Deindustrialisation and the Future of Work", *OECD Social, Employment and Migration Working Papers*, No. 193, OECD Publishing, Paris. http://dx.doi.org/10.1787/5jlr068802f7-en; Invesco.

Why Limited Catch-Up, Despite Perennial Potential?

EM countries experience mainly boom–bust cycles; DM economies – mainly business cycles

- **DM economies spend a supermajority of years clocking up decent GDP growth, and a minority of years in relatively shallow recessions**

Number of countries		Category	Per Capita GDP (PPP basis)	Upturns: Proportion of Years	Upturns: Average Annual Growth	Recessions: Proportion of Years	Recessions: Average Annual Growth
27	**DM**	High-Income	US$20,000+	84%	3.9%	16%	-2.3%
12	**EM**	Upper to	US$15-2000	76%	5.6%	24%	-4.3%
14	**EM**	Lower-	US$10-15,000	71%	5.3%	29%	-4.1%
37	**EM**	Middle-	US$5-10,000	73%	5.3%	27%	-4.6%
46	**EM**	Income	US$2-5,000	66%	5.4%	34%	-4.8%
44	**Frontier**	Low Income	<US$2,000	56%	5.4%	44%	-5.4%
	Average of EM and Frontier		<US$20,000		5.4%		-4.6%

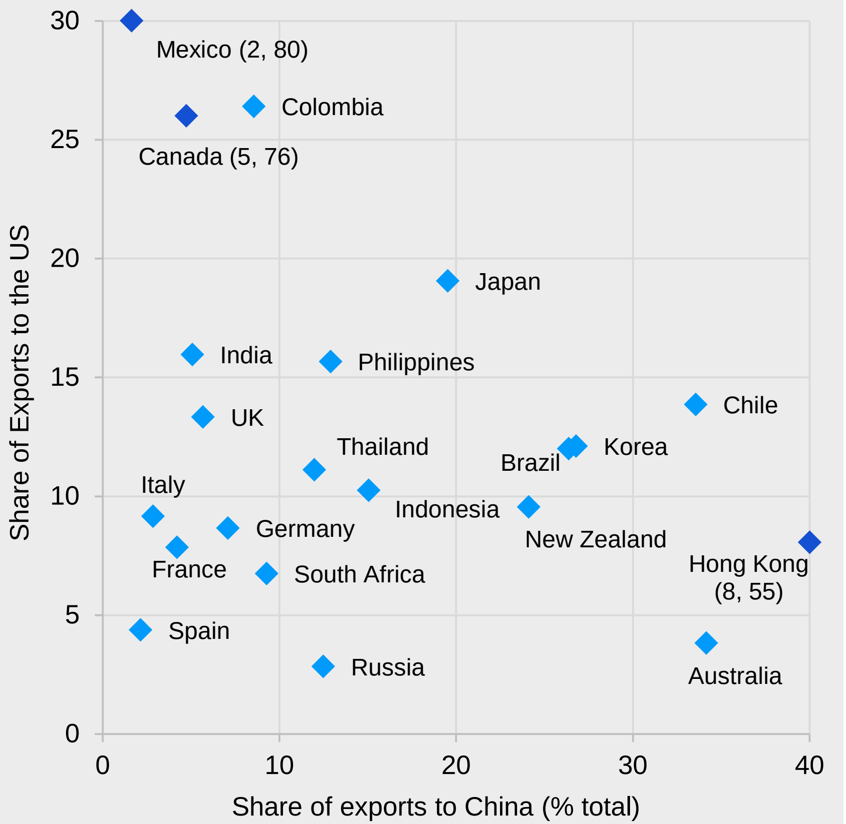
- EM and Frontier (FM) growth cycles tend to be 1.5x as fast as DM; but EM and FM spend fewer years in upturns
- EM and FM tend to spend 1.5–2x as long in recessions which are on average about 2x as deep as DM countries
- The lower are per capita incomes, the more years are spent in recession – and the deeper recessions tend to be
- Causes: Macro mismanagement, structural issues, weak institutions; politicized/personalized governance
- Consequences: Most EM countries remain undiversified, far from the technological frontier, and far behind DM countries

Source: North, Wallis & Weingast, *Social Order: A Conceptual Framework for Interpreting Recorded Human History,* 2009; Invesco.

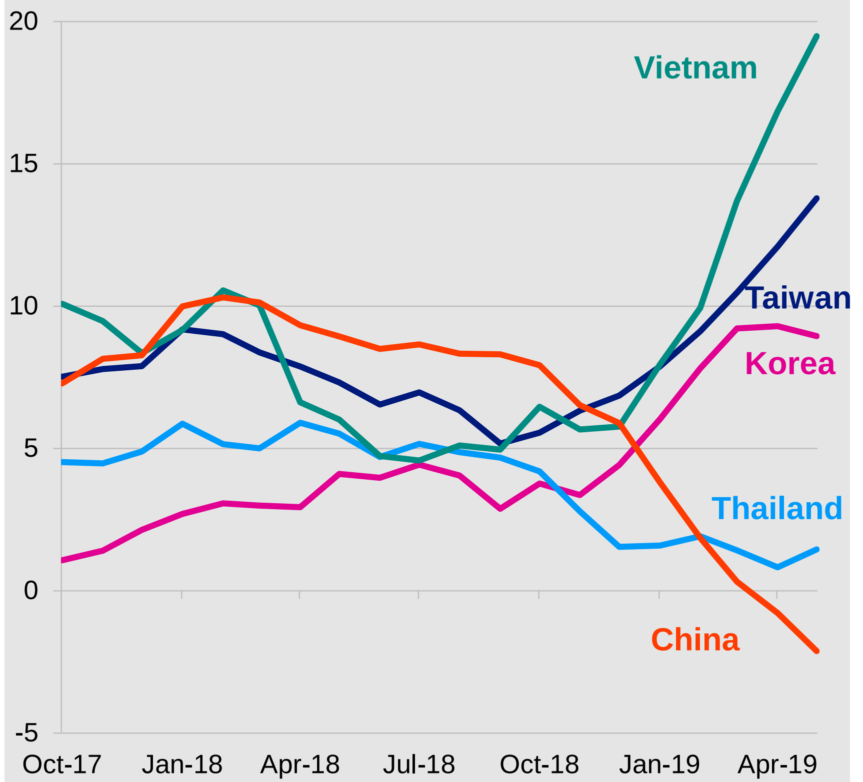
Trade War is already causing Economic Divergence

Exposure to US / China trade tensions varies significantly…
Effects likely to show up in both trade and investment diversion

Share of country exports to China and US (%)



Asian exports to US (yoy%)



Source: LHC: Source: HSBC as at 27 July 2019. Note that Mexico, Canada and Hong Kong figures have been adjusted to appear in the scatter chart – actual numbers are shown in parentheses). RHC: Source: Datastream as at 1 August 2019.

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Agenda

Growth, Inflation and Policy

Industrial Revolutions 1.0 – 4.0

Trade War & Geo-Economics

Tech War & Geopolitics

The Future of the EU, EZ and EM

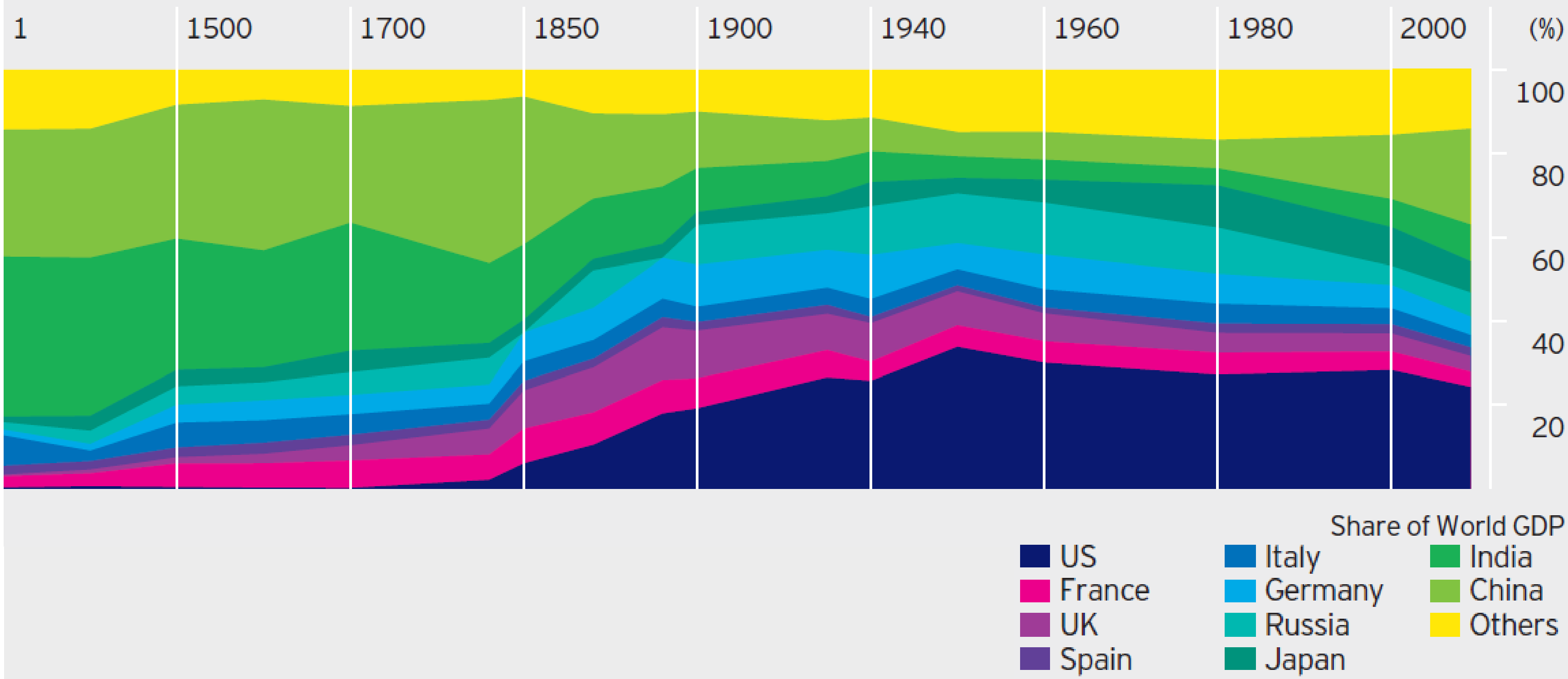
Conclusion – Macro & Markets
From Convergence to Diversity; from Beta Domination to Alpha

Appendix

2,000 Years of Hindsight:

Three Industrial Revolutions changed the global balance of activity and power
IR 4.0 is already changing the world, all over again

Geo-Economics and Geopolitics Since the Birth of Christ

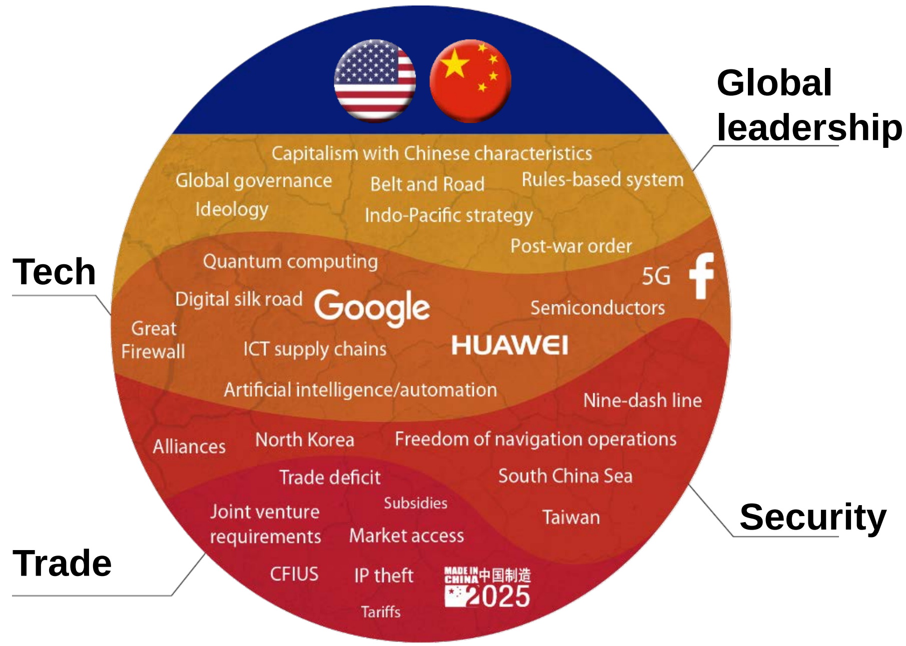


- **Pre-IR 1.0, demographics was destiny, population drove potential because productivity was similar everywhere**
- **During IR 1.0 – 3.0, the United States surged, due to size and productivity, dominating the world economy**
- **After the Cold War, globalization spread IR 1.0- 3.0, making the world economy multi-polar**
- **The 21st Century is set to be driven by IR 4.0 and its geo-economic and geopolitical implications**

 Source: The Angus Maddison Project Database; Invesco. Maddison dataset release as of January 2018.

Rogue Nations – Peak, Plateau or Plunge?

The resurgence of (geo-)politics in all walks of policy:
Focus is shifting from risk to uncertainty in markets and businesses



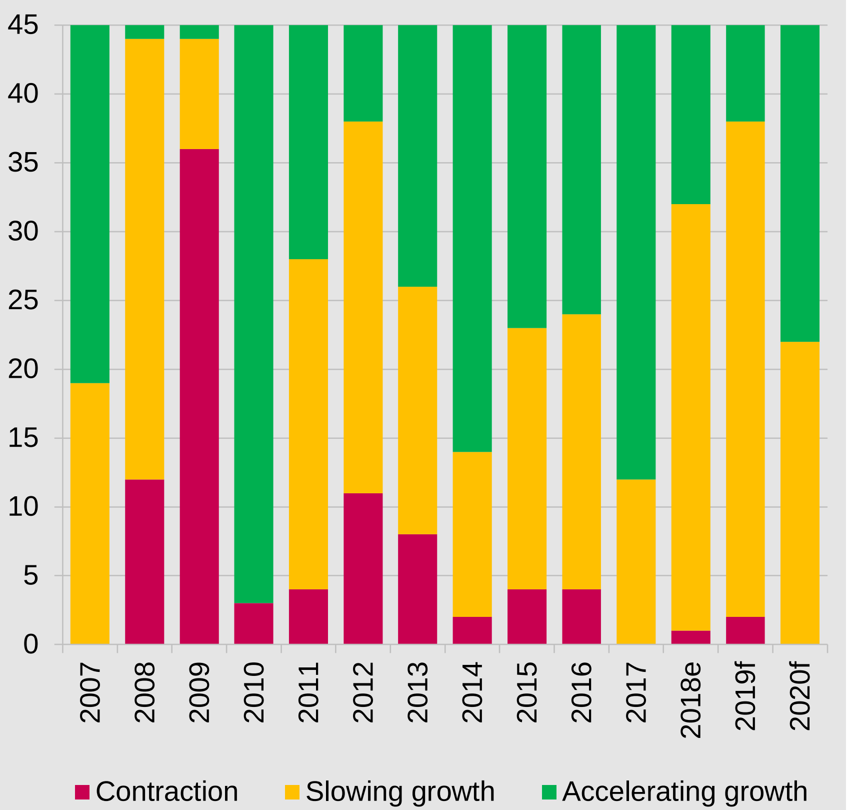
- **Trade / investment barriers and political shifts in economic policy point to divergent growth models, potential growth rates and economic cycles**
- **As economic performance becomes more idiosyncratic, beta dominance will likely give way to alpha, calling for greater discrimination in investment portfolios**

Source: Eurasia Group, *Politics First, Top Risks 2019* (right hand side); Invesco.

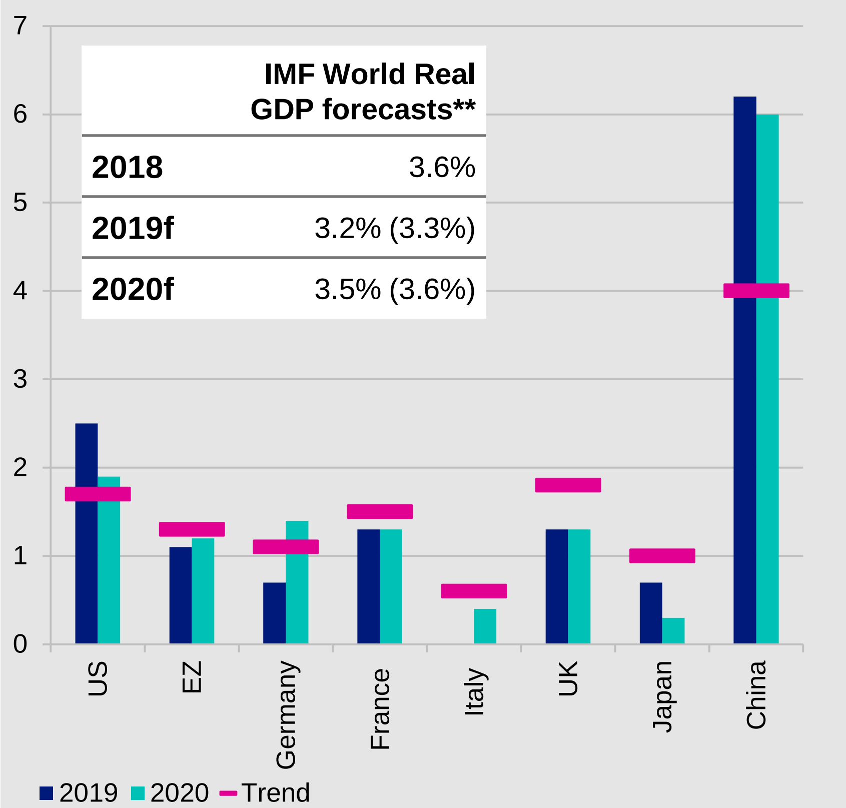
Global economic cycle is becoming less synchronized

2019 slowdown to give way to faster, but less synchronized global growth in 2020

Country GDP growth performance (number)

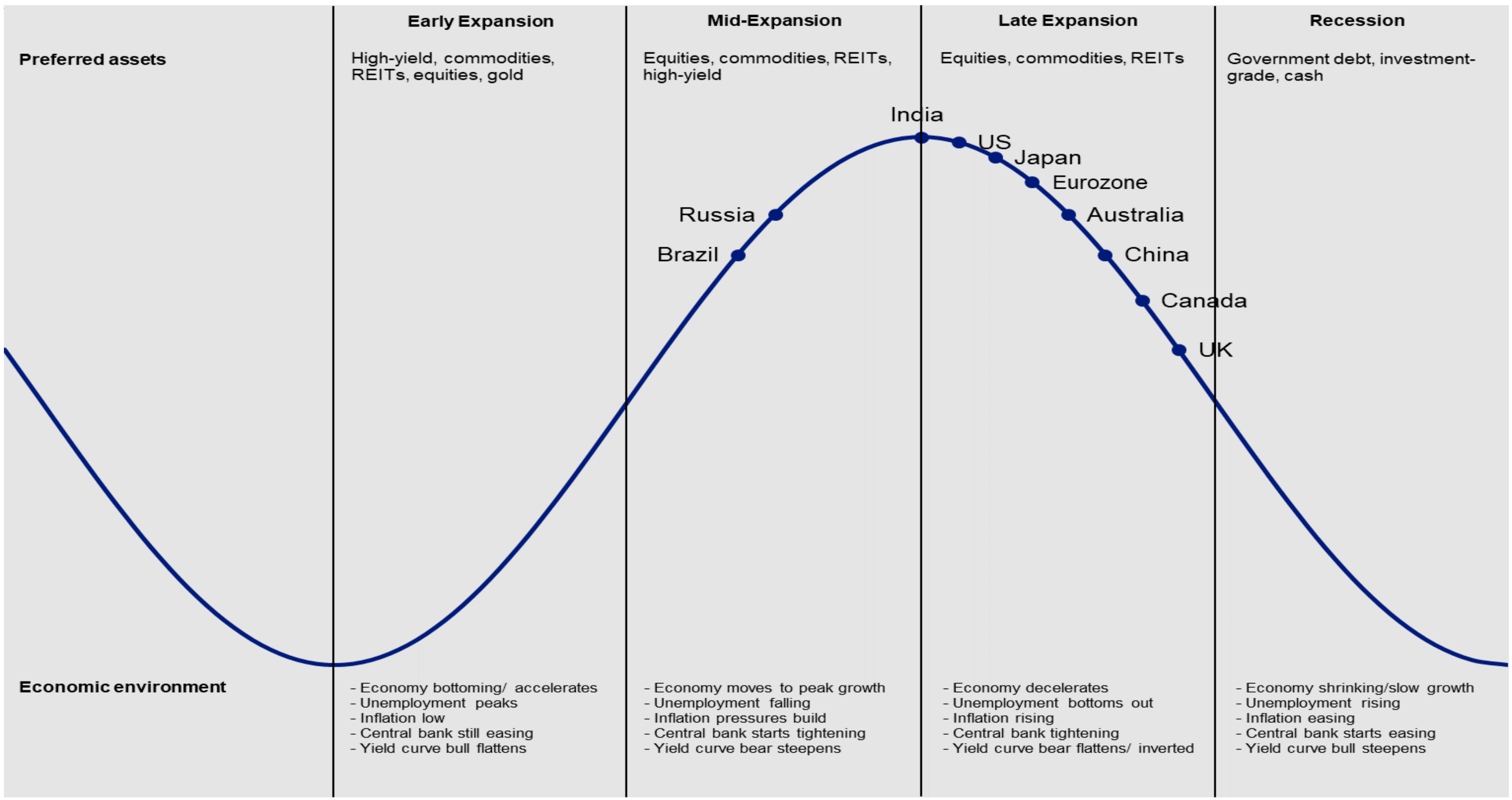


Consensus GDP forecasts for 2019 and 2020 (%)*



Source: LHS: OECD Economic Outlook 2018 as at 20 May 2019. e = estimate f = Forecast. *Brackets show OECD November 2018 Economic Outlook forecasts. RHS: Consensus Economics and OECD as at 12 July 2019. * Trend growth is the 10yr CAGR for the period 2020 – 2030 calculated from the OECD'S Long-term baseline real GDP projections from Economic Outlook – July 2018. **IMF WEO, July 2019. Brackets show April 2019 Economic Outlook forecasts.

Asynchronous Cycles across Major DM and EM Economies
An interesting world for asset allocation and country selection



Source: Invesco, as of April 2019

Agenda

Appendix:

Economic outlook
Summary

US Economy
- Still fastest growing major DM by a significant margin.
- Slowing growth from a high level as fiscal stimulus eases
- Longest modern expansion; few recessionary imbalances
- First rate cut since GFC. QT ended early
- Trump policy unpredictability creates uncertainty

Eurozone Economy
- Growth outlook challenging with Germany and Italy the laggards
- Export rather than domestic led weakness
- Political risks remain elevated
- Inflation struggling to hit target
- ECB pointing to renewed policy easing

UK Economy
- Economy struggling against Brexit uncertainty
- Consumer backdrop remains mixed
- BoE likely to normalise monetary policy slowly
- Brexit by 31 October whether deal or no-deal?

Japan Economy
- Growth remains weak relative to other major economies
- Inflation struggling to hit 2% target
- Stimulative monetary policy remains in place
- Abenomics drives change

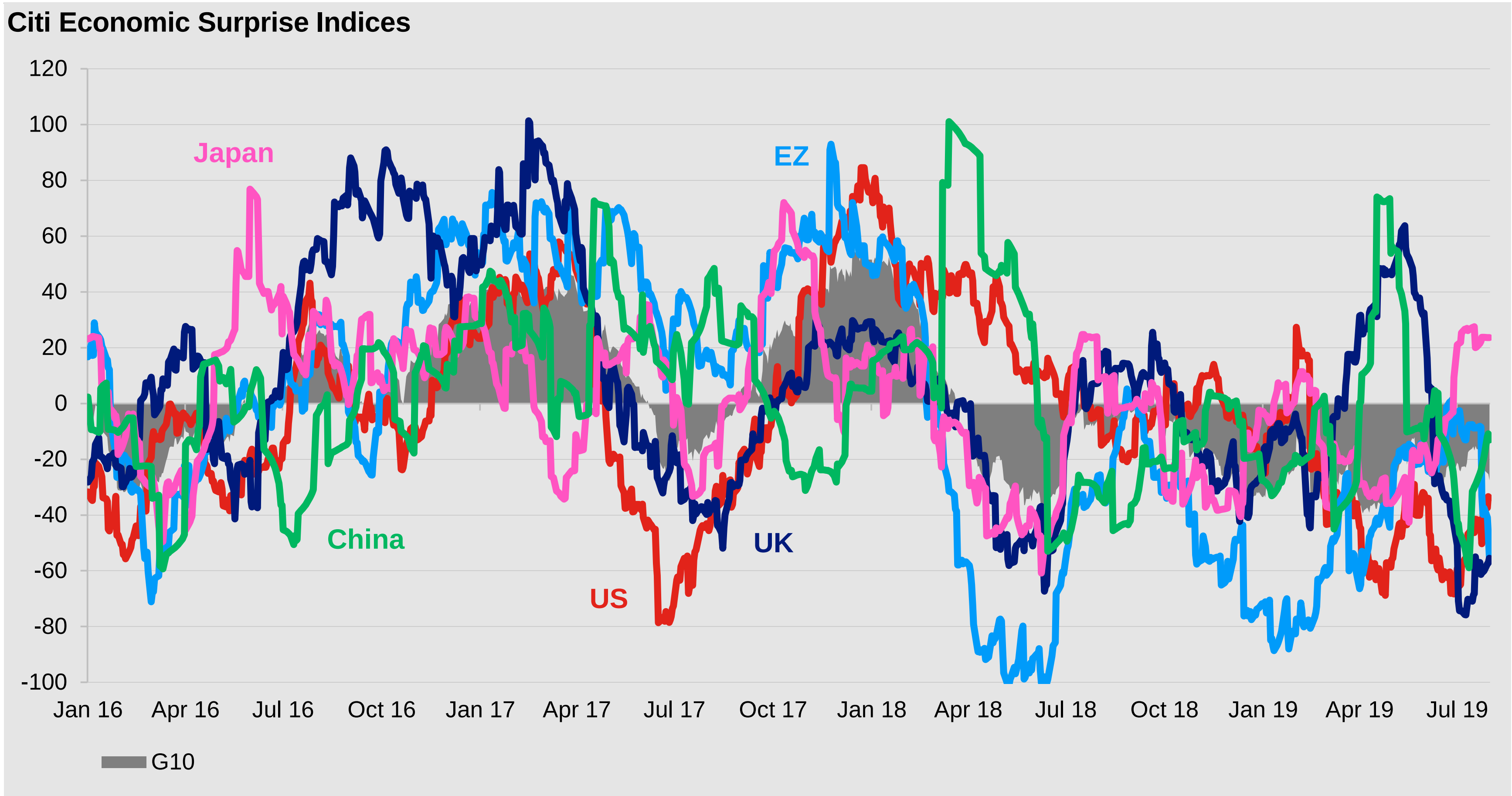
China Economy
- Growth slowing under restrained, targeted stimulus
- Trade diversion from the US a drag on net trade, growth
- Investment growth under pressure on trade, tech rivalry
- Rebalancing to services, consumption continues

EM Economies
- Growth performance *and* potential under pressure
- Idiosyncratic risks weigh on a number of economies
- China stimulus focused on stabilisation – not reflation
- US$ stabilisation and a more dovish Fed helpful

Source: Invesco as at August 2019. Where Invesco has expressed views and opinions these may change.

The global macro backdrop

…and a record period of negative G10 economic newsflow

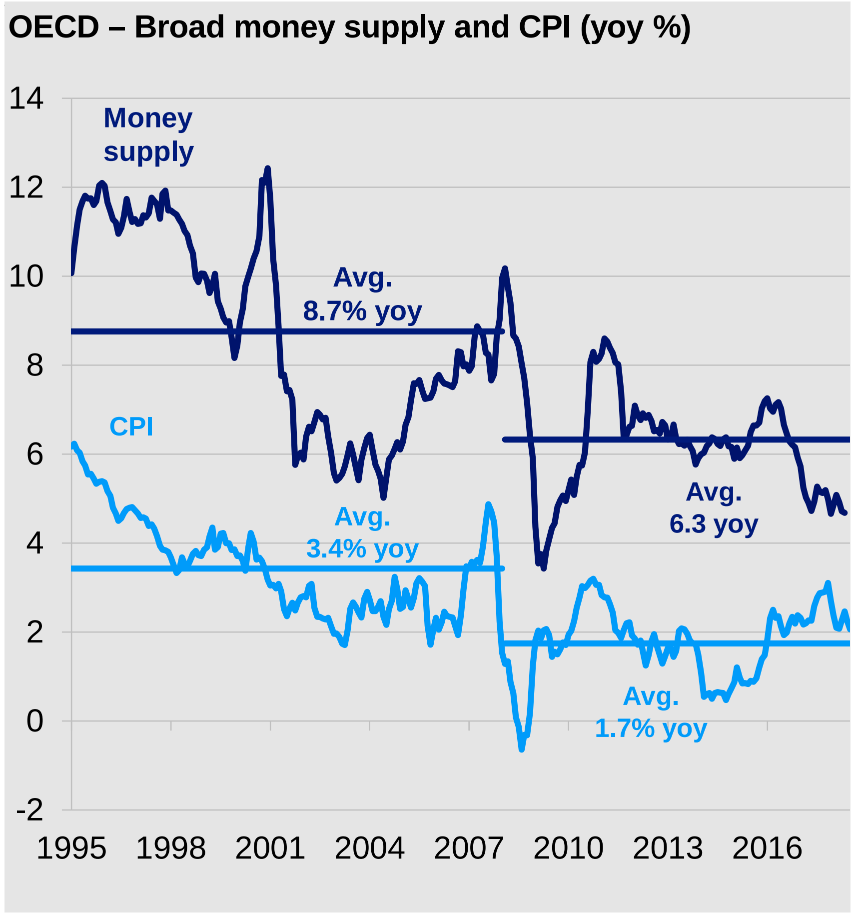


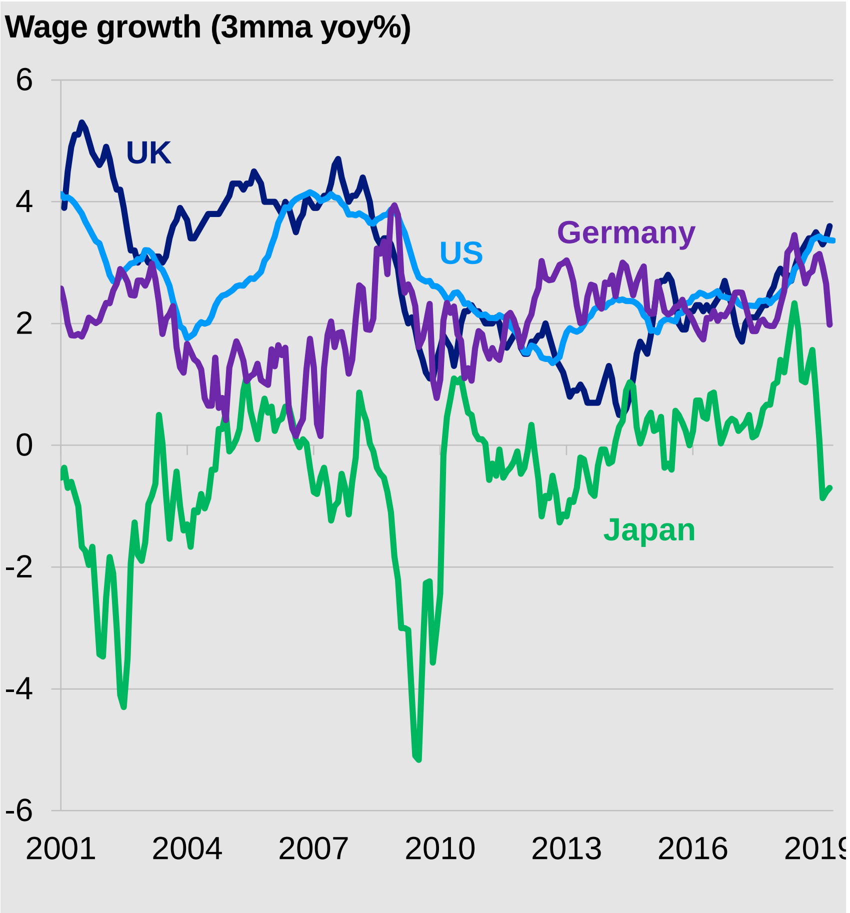
Source: Datastream as at 1 August 2018.

Inflation outlook

…as monetary pressures remain muted…while wage growth is only accelerating slowly…

Invesco

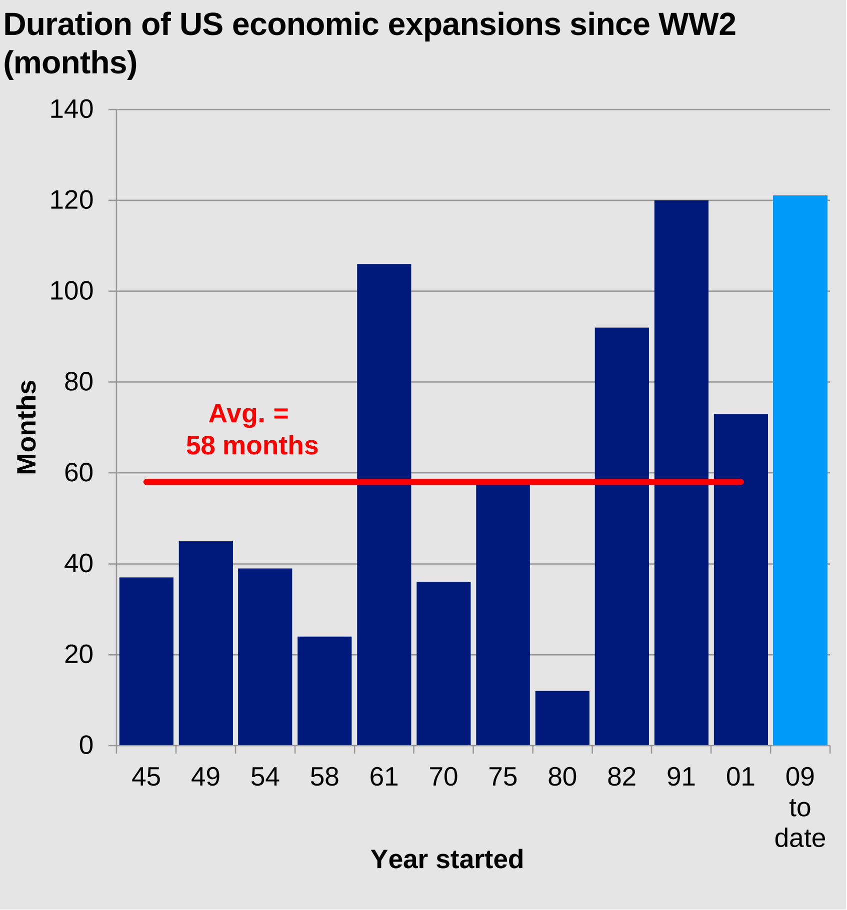


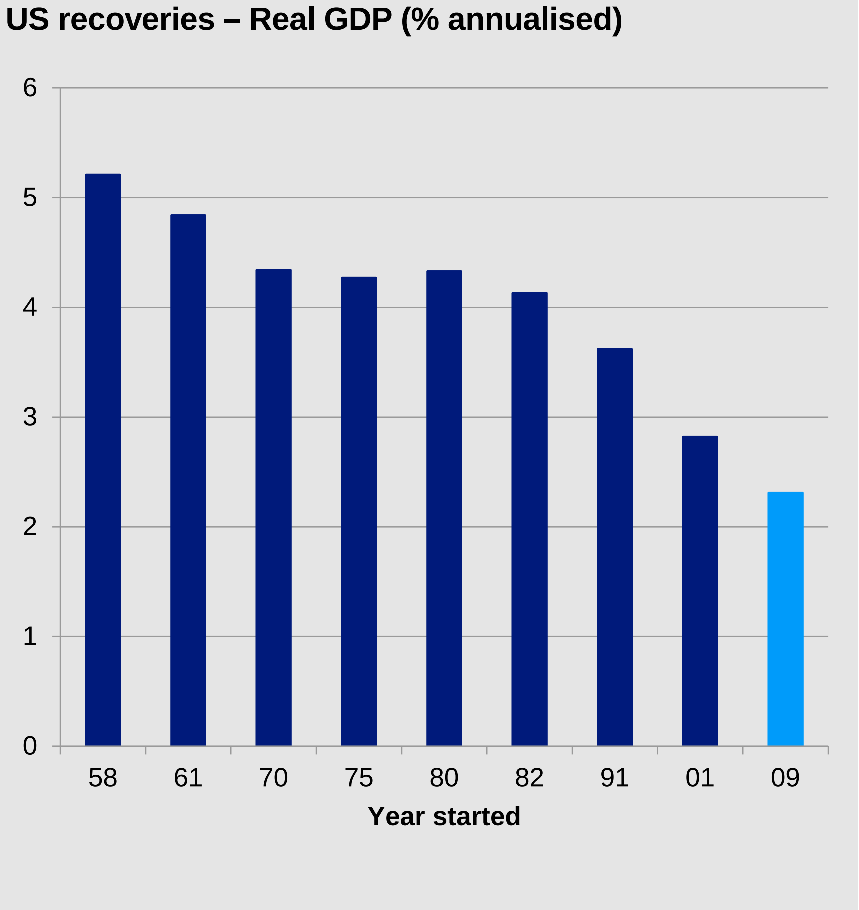


Source: LHC: Datastream as at 1 August 2019. RHC: Source: Datastream as at 1 August 2019. OECD = Organisation for Economic Co-operation and Development.

US recession risk

A record US recovery…but at much slower growth rates than in previous cycles



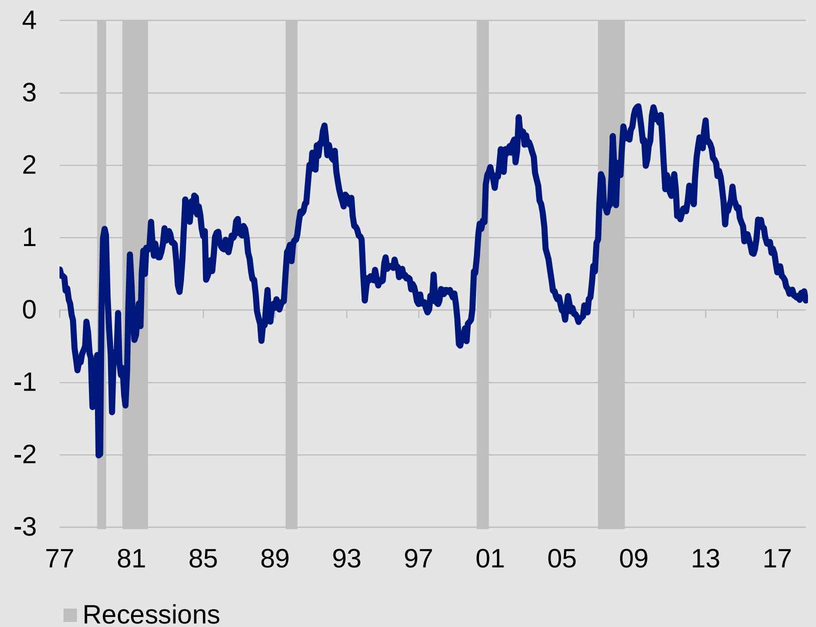


Source: LHC: NBER (National Bureau of Economic Research) as at 1 August 2019. RHC: NBER and Datastream as at 1 August 2019.

US recession risk

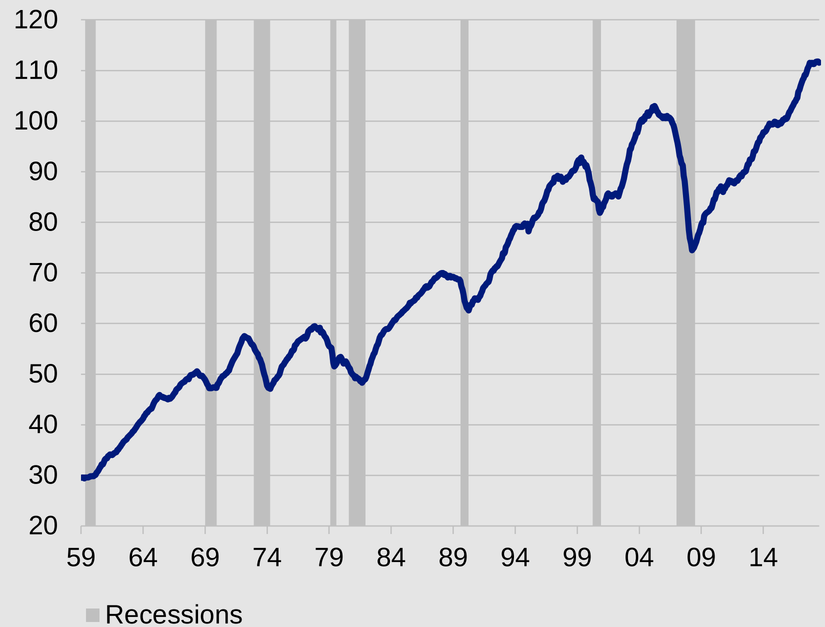
Near-term recession risks appear low currently (1/2)

Yield curve inversion – 10yr-2yr UST spread (%)



- Historically an inversion of the yield curve has been the most consistent lead indicator of a recession with an average 21 month lead (10 – 34m range) over the past 40 years
- Not yet inverted this cycle, but at 12bp back close to flattest it has been (11bp)

Conference Board Lead Indicator (CLI)*



- The CLI has historically peaked on average 15 month ahead of a recession (9 - 22m range)
- Currently the CLI has declined marginally from its recent peak

Source: Datastream as at 1 August 2019. *The CLI is the composite average of the following: Average weekly hours, manufacturing; Average weekly initial claims for unemployment insurance; Manufacturers' new orders, consumer goods and materials; Vendor performance, slower deliveries diffusion index; Manufacturers' new orders, nondefense capital goods; Building permits, new private housing units; Stock prices, 500 common stocks; Money supply, M2; Interest rate spread, 10-year Treasury bonds less federal funds; Index of consumer expectations.

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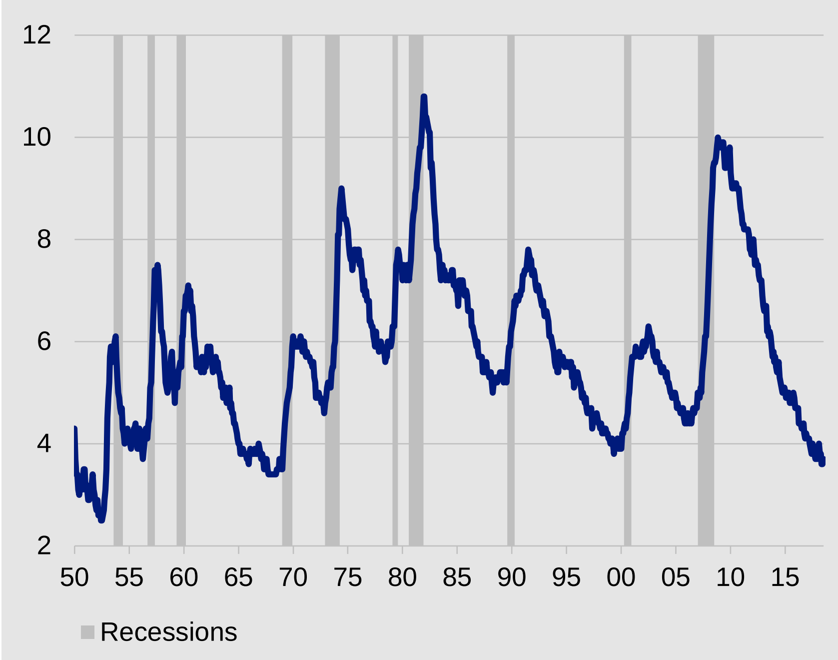
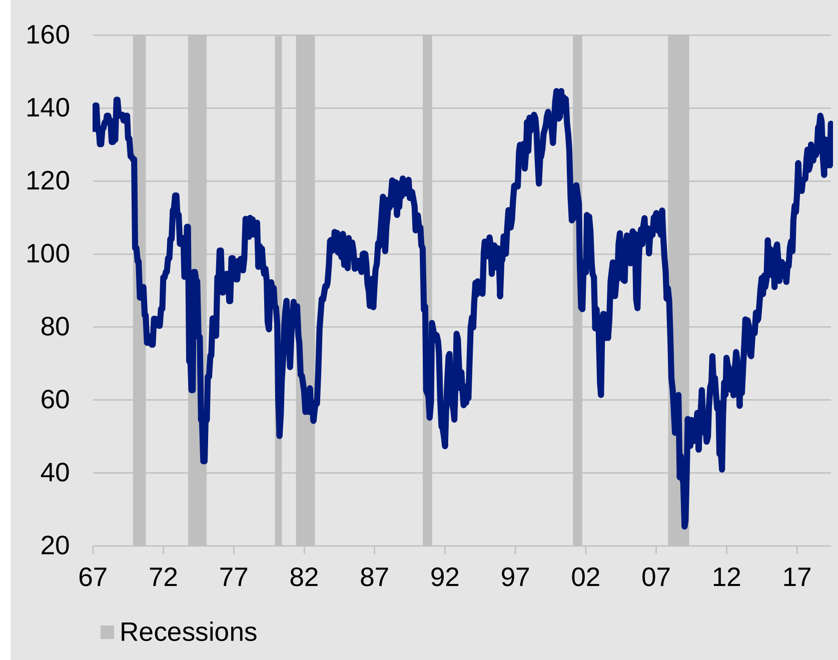
US recession risk

Near-term recession risks appear low currently (2/2)

Unemployment (%)



Conference Board Consumer Confidence Index (CCI)



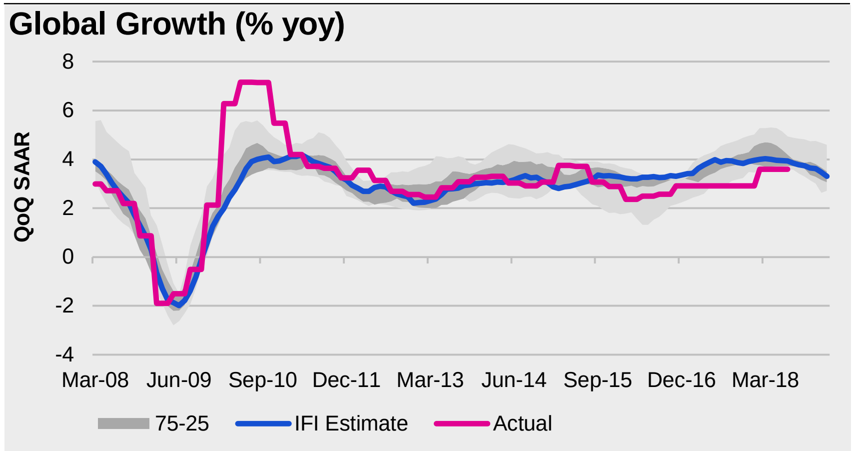
- Unemployment has historically troughed on average 10 months ahead of a recession (2 - 17m range)
- The latest unemployment figure shows a rise from cyclical low of 3.6% to 3.7%.

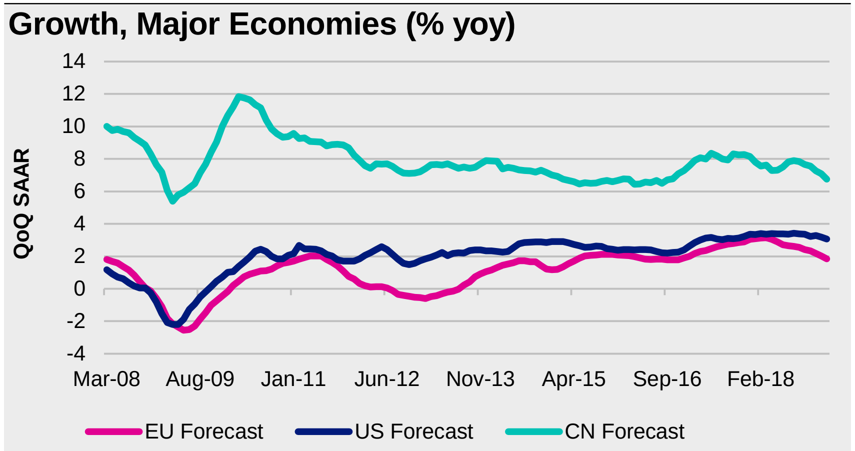
- The CCI has historically peaked on average 15 month ahead of a recession (6 - 22m range)
- Currently the index is rising and close to cycle highs

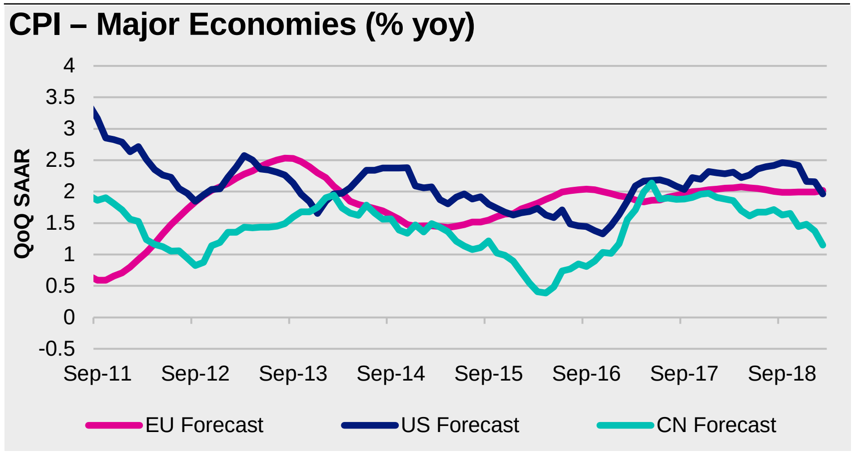
Source: Datastream as at 1 August 2019.

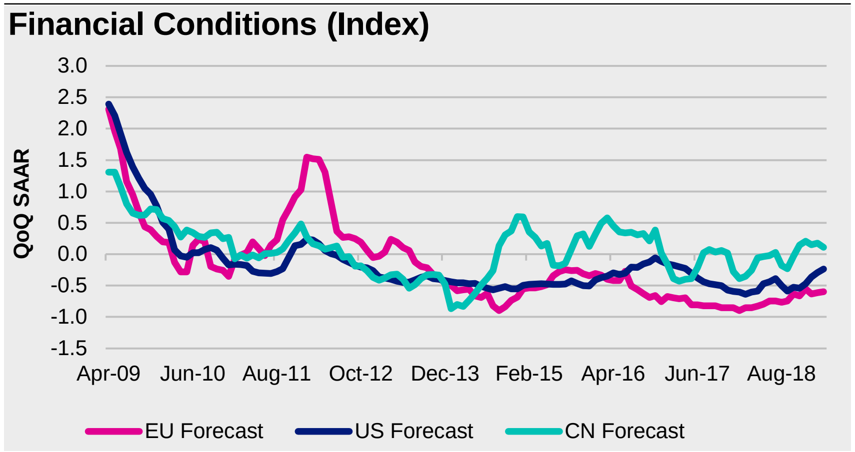
2019 Unlikely to Repeat 2017 Synchronized Rebound, even if 2018 was Reminiscent of 2015-16

Invesco FI NowCasts: Slow growth, inflation; mixed financial conditions







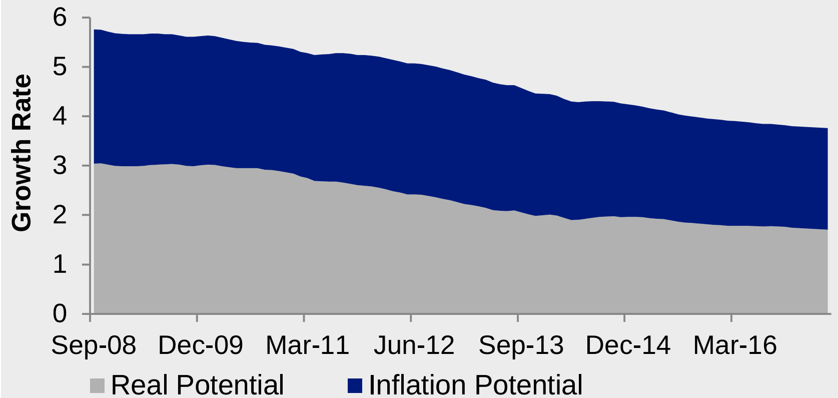


Source: Invesco as of April 2019

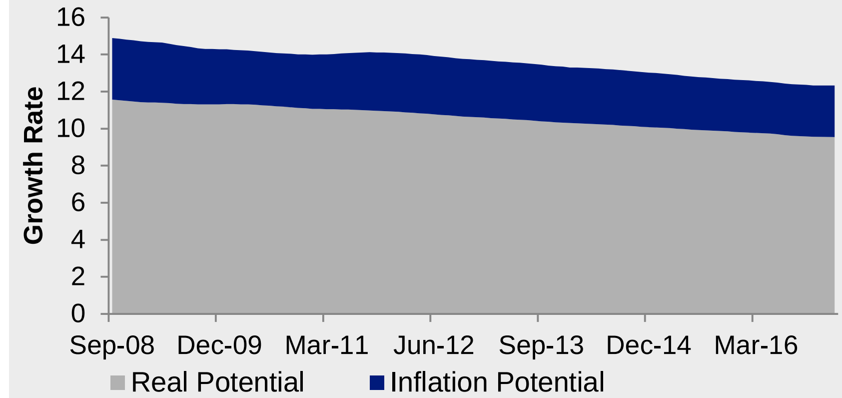
Worldwide Slide in Trend growth – Friend or Foe?

Declining & diverging trend growth: especially DM, less EM

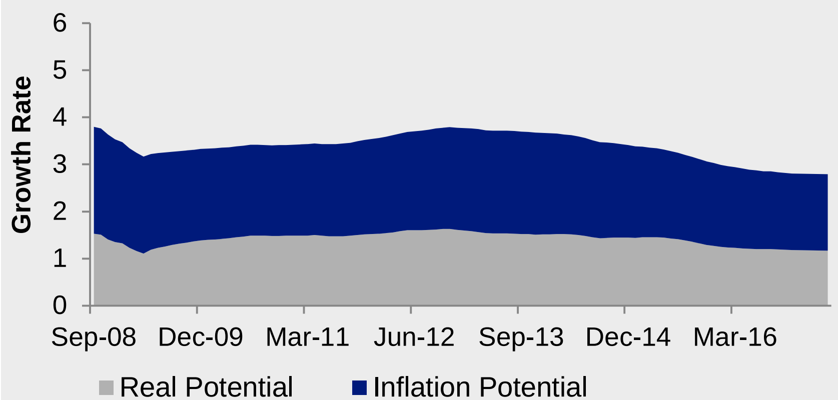
US Potential (%)



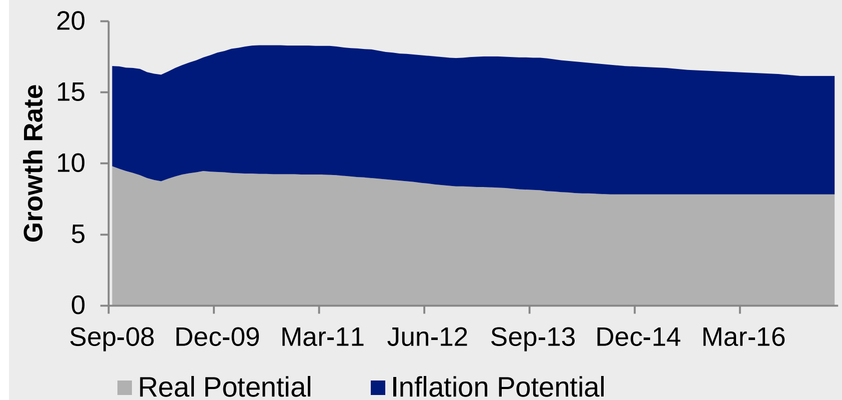
China Potential (%)



EZ Potential (%)



India Potential (%)

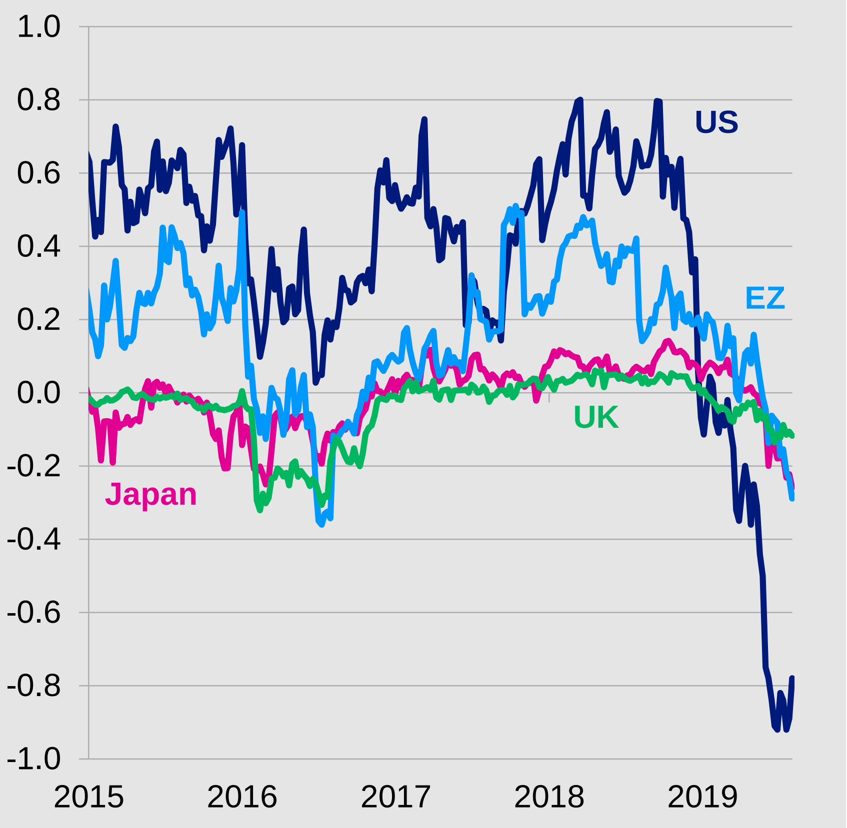


Source: Invesco as of December 2018

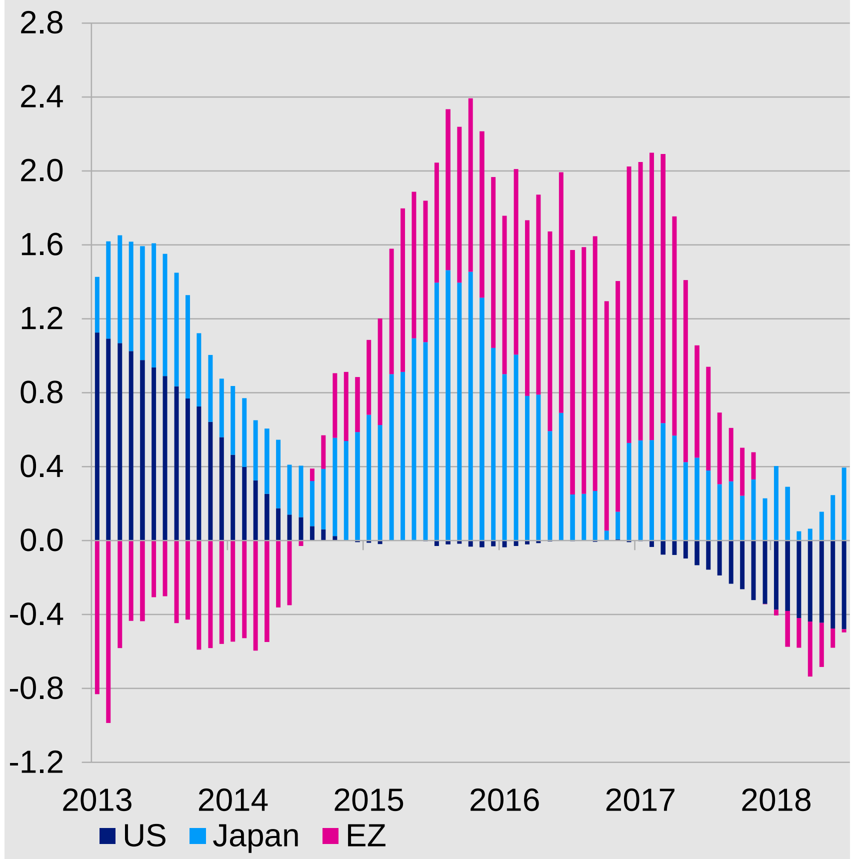
Positive developments?

Markets expecting more easing by major Central Banks, especially the Fed, but no balance sheet change is on the agenda – yet

Expected interest rate change over next 12 months (%)*



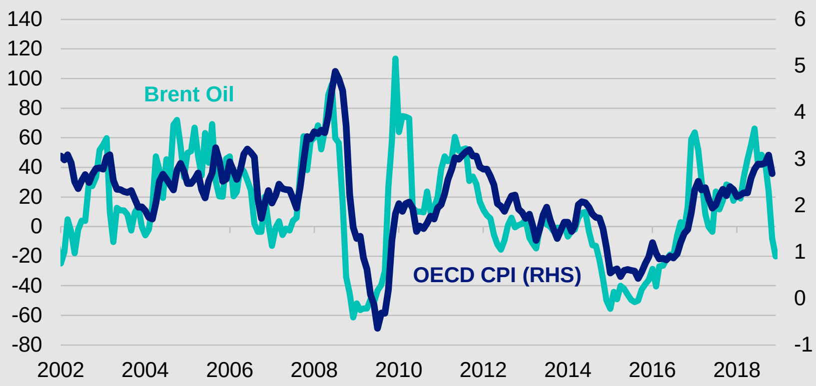
Major DM Central Bank balance sheets (yoy $trn)**



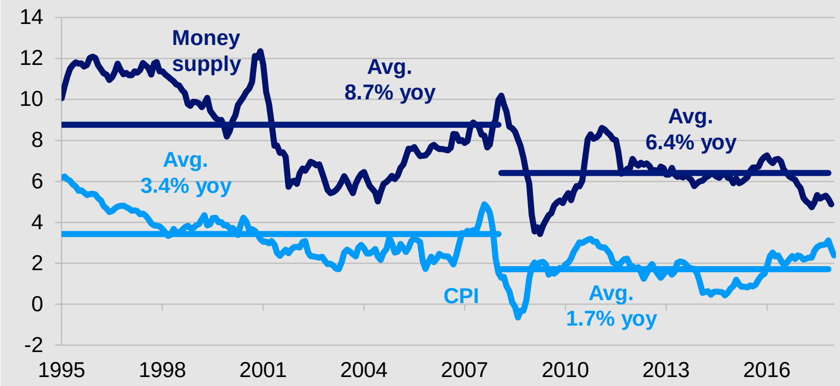
Source: LHC: Bloomberg as at 1 August 2019. *US – USD OIS Forward Swap 1y 1m minus US Fed Funds Effective Rate, Japan – JPY Forward Swap 1y 1m minus Bank of Japan Estimate Unsecured Overnight Call Rate, EZ – Eur Eonia Forward Swap 1y 1m minus EMMI Euro Overnight Index. RHC: Source: Datastream as at 1 August 2019. **US, EZ and Japan in US$.

Inflation risks tilted to the downside
Moderating growth, inflation – with downside risks

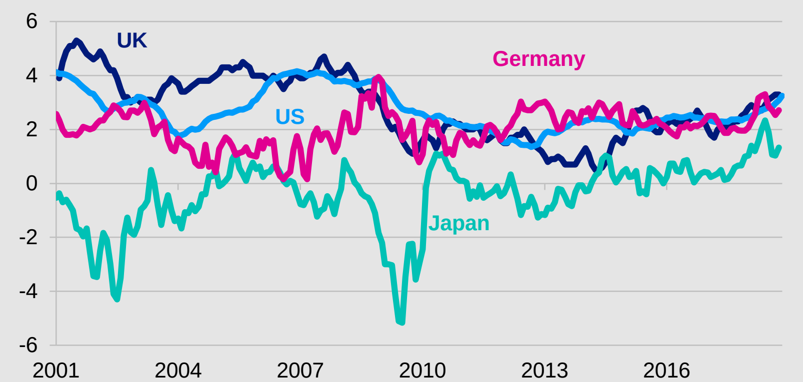
Oil Prices a Drag on Headline CPI



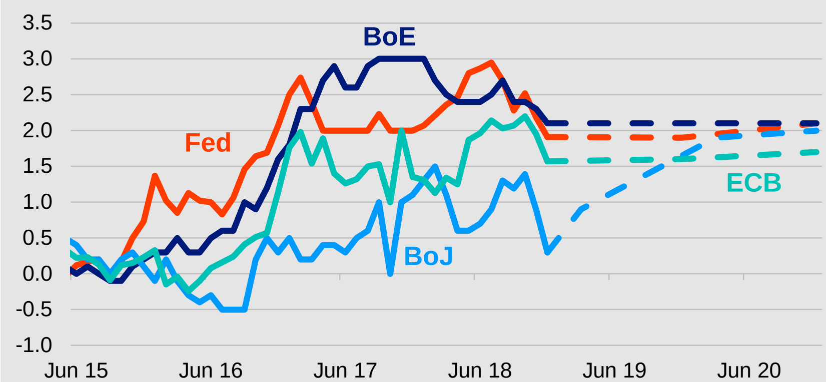
OECD money growth, CPI moderate



Wage growth also moderate (Wage growth (3mma yoy%)



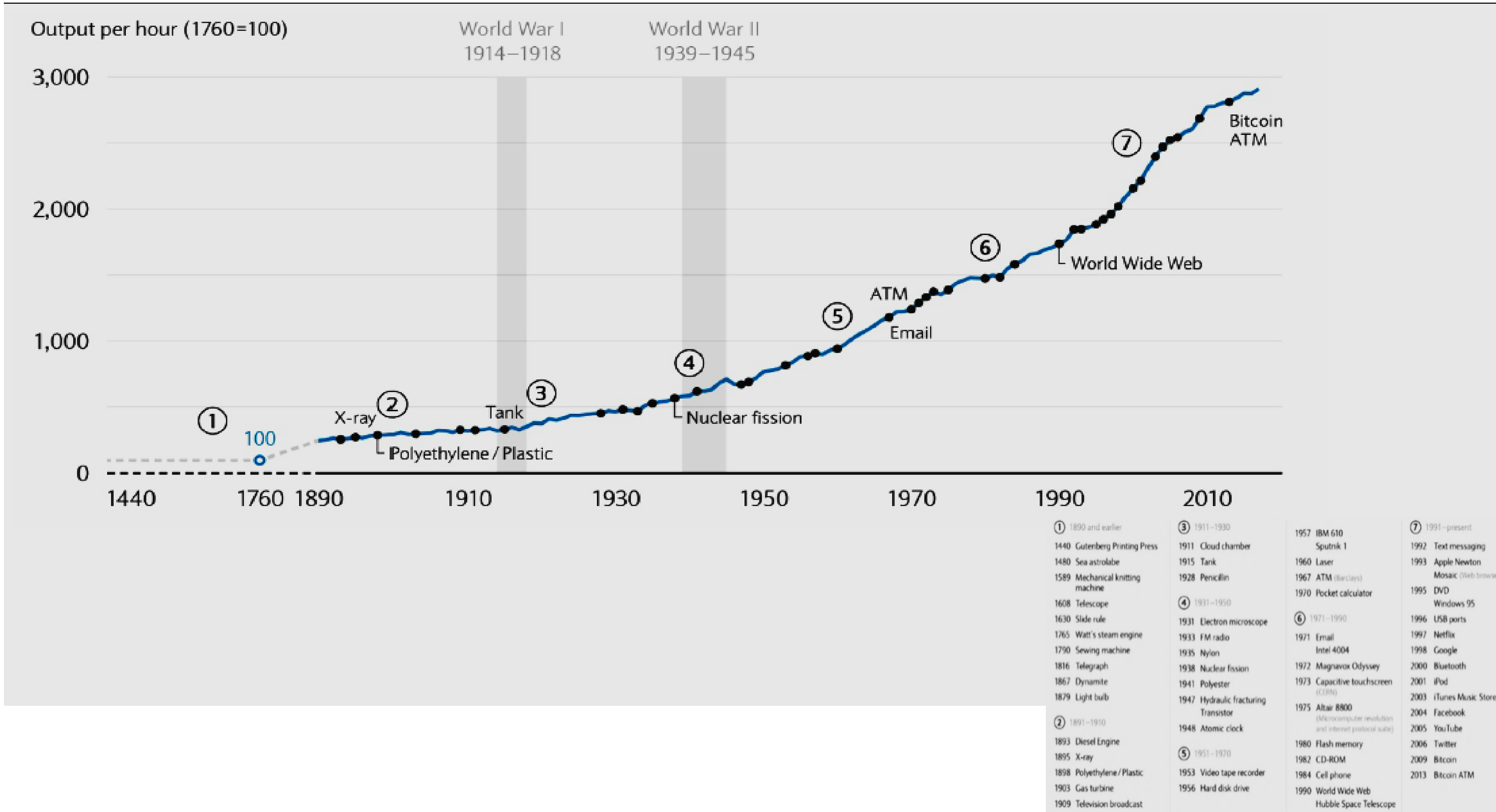
Central Banks see low inflation risk



Source: OECD, National Authorities, Bloomberg, Macrobond, Invesco as of February 2018

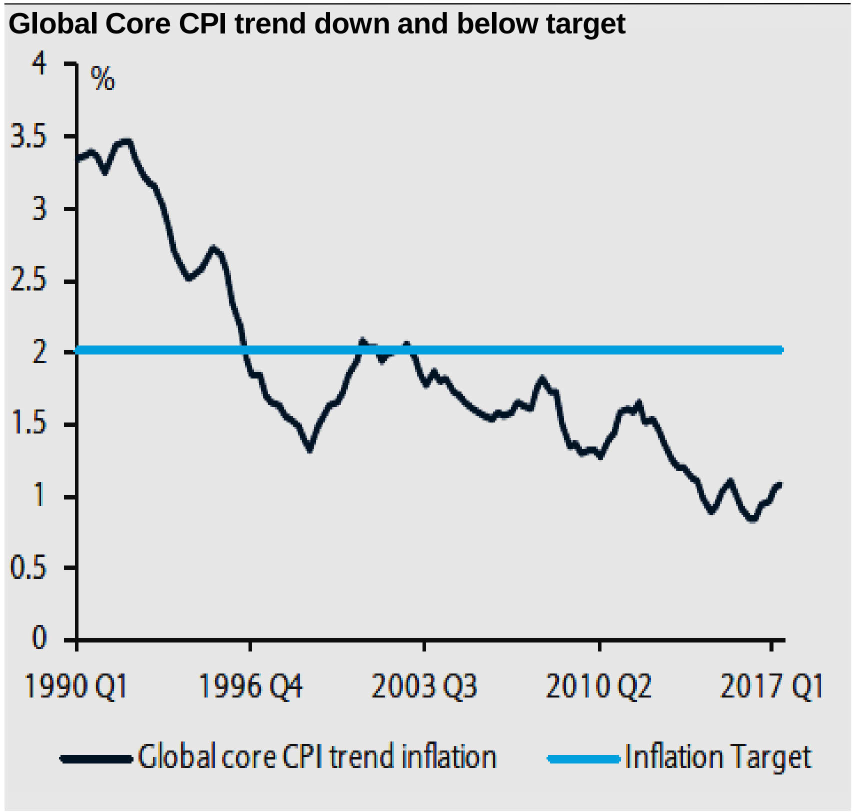
Three Centuries of Innovation Underpin Productivity Growth

Real Growth ~ Productivity Growth + Demographics



Source: Bank of England, Thomas & Dimsdale – A Millennium of Macroeconomic Data, 2017 BoE dataset for the UK back to 1036 AD; US Bureau of Labor Statistics; Barclays Research; Invesco.

Global Core CPI and (Manufacturing) Wage Growth: Secular Downtrend amid Cyclical Upswings

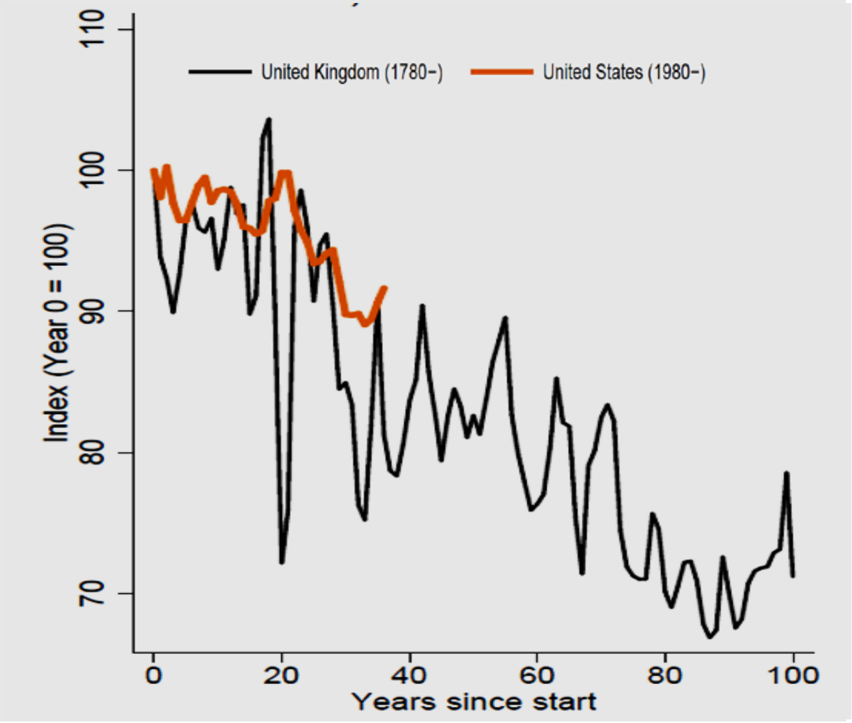


- Global decline in core inflation precedes GFC and constrained credit growth; coincides with globalization; follows IR 4.0

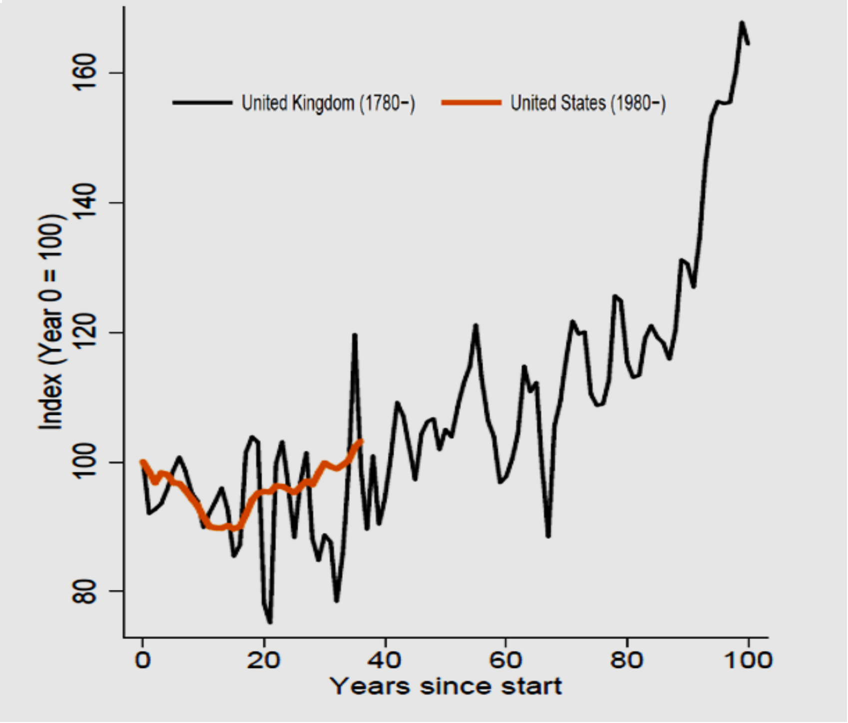
Source: OECD Main Economic Indicators; Invesco. Left chart as of Q1 2017; right chart as of Q2 2017.

Three centuries, three Industrial Revolutions
Labor Share of Income falls, Real Wages weak

Labor Share of National Income



Real Wages



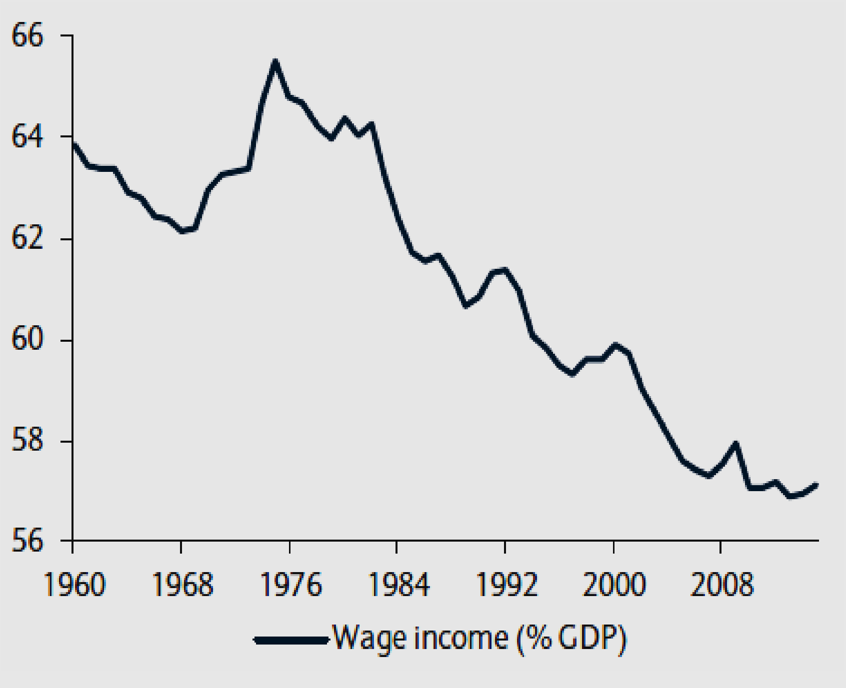
- Since 1980, when IR 4.0 was well underway, the US labor share of national income has been in secular decline even as real wages have been weak, which is line with IR 1.0 UK experience

Source: Frey, 2016.

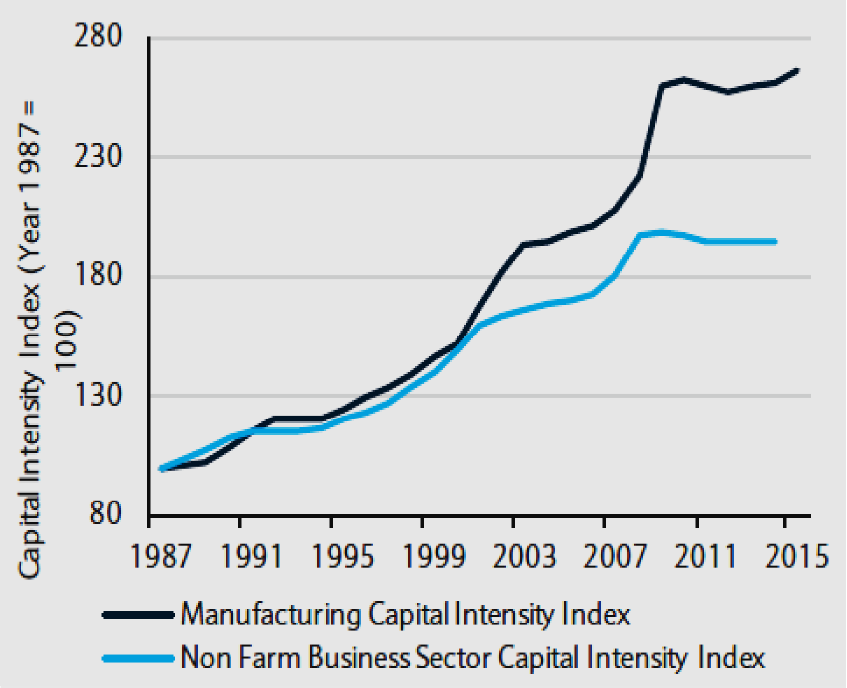
Labor Losing as Capital Dominates Activity, Growth

Liberalization – globalization, labor market flexibilization associated with falling labor income, rising return on capital

Labor Share of US National Income in Sustained Decline



US Manufacturing Capital Intensity Rising



- US labor share of national income has been on a secular downtrend since the mid-1970s. Plus, labor income is actually overstated; includes stock/options – which should more accurately be accounted as return on capital
- US capital intensity has risen in tandem with surges in globalization – e.g., Soviet collapse; India's economic opening; China WTO

Source: Bivens & Mishel (2015), Economic Policy Institute Briefing Paper #406, "Understanding the Historical Divergence between Productivity and a Typical Worker's Pay: Why It Matters and Why It's Real;" Barclays Research; Invesco.

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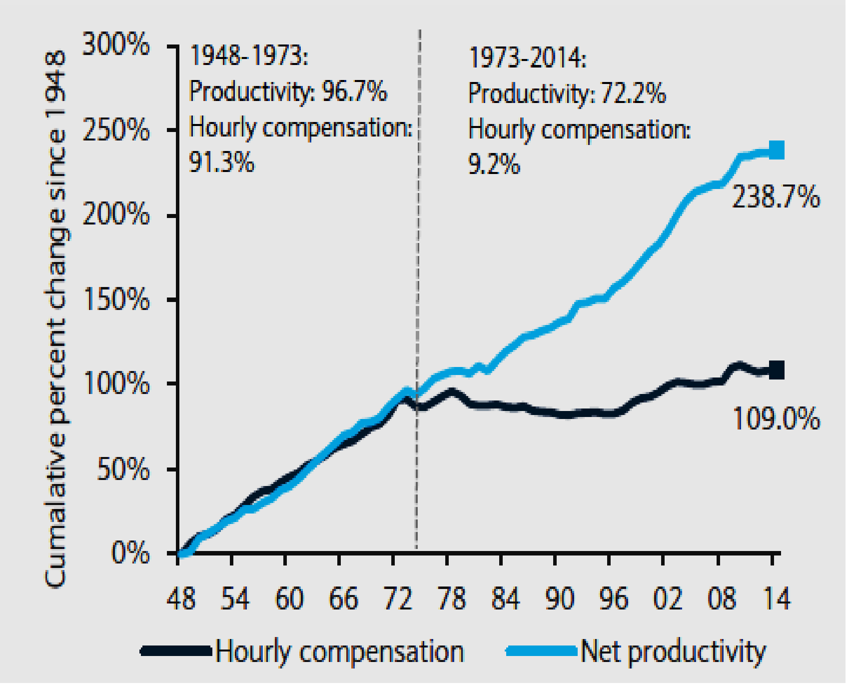
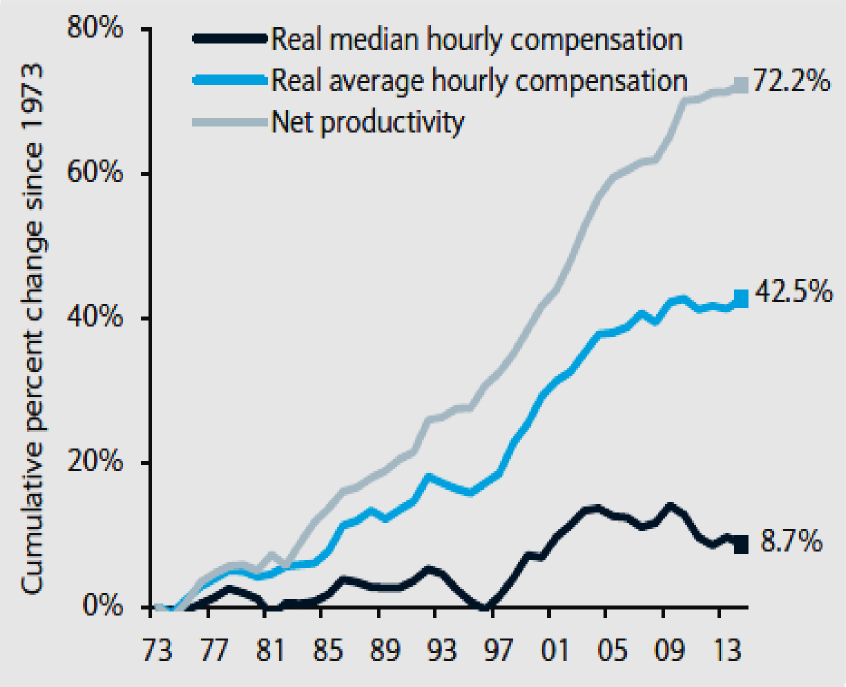
"Engel's Pause" Revisited – An Engel's Paradox?

Productivity diverging from real wages during IR 4.0

Hourly compensation has stagnated since 1973, even as productivity gains continued unabated



Median real wages have stagnated compared to average real wages and productivity gains



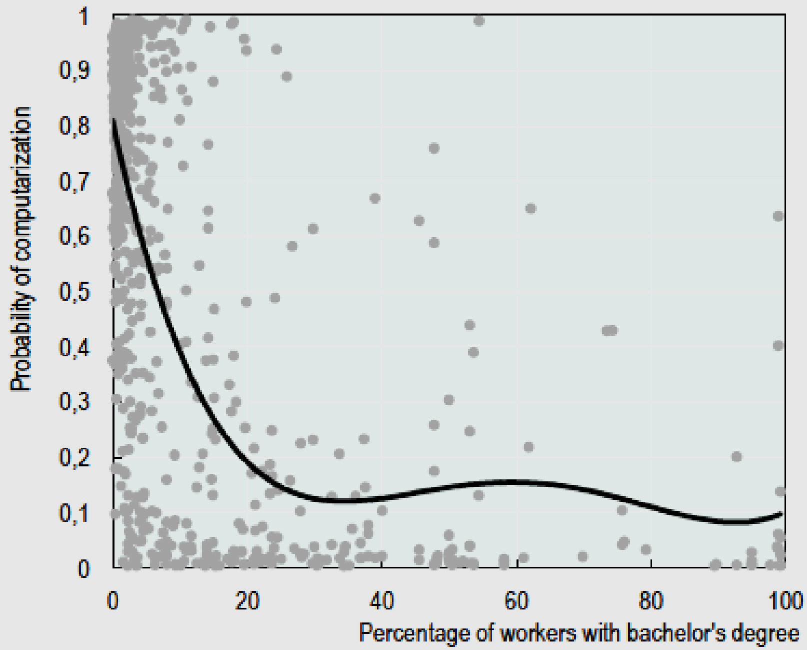
- US labor share of national income falling; overall real wages rising in line with the UK during the first Industrial Revolution

Source: Bivens & Mishel (2015), Economic Policy Institute Briefing Paper #406, "Understanding the Historical Divergence between Productivity and a Typical Worker's Pay: Why It Matters and Why It's Real;" Invesco.

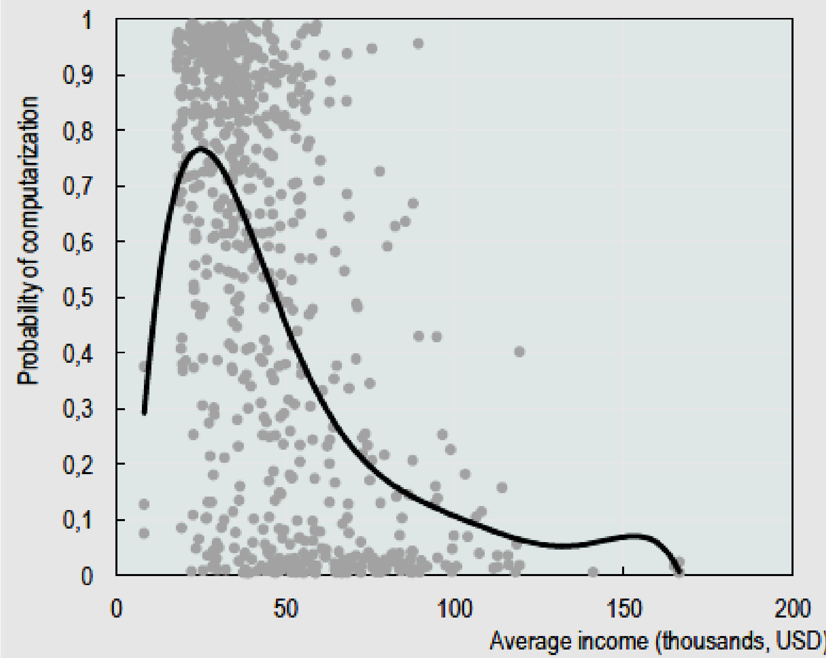
The Rich Get Richer Still?

IR 4.0 to hit jobs and income of the less educated/well-off

Probability of automation of occupations by degree level



Probability of automation of occupations by income level



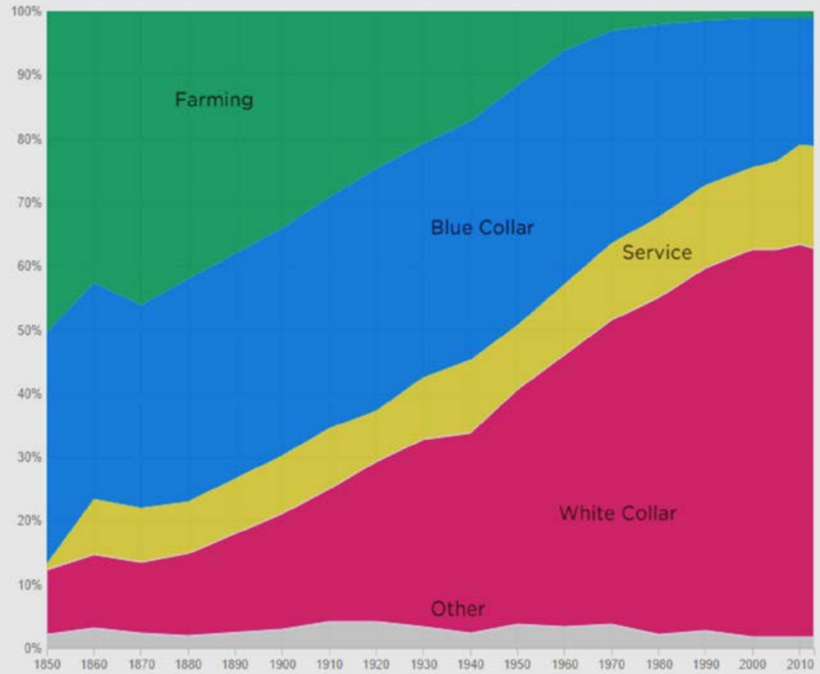
- Job automation likely to depend on education level required across occupations
- Job automation likely to affect low-middle compensation levels much more than low- or high compensation occupations

Source: Berger, T. and C. Frey (2016), "Structural Transformation in the OECD: Digitalisation, Deindustrialisation and the Future of Work", *OECD Social, Employment and Migration Working Papers*, No. 193, OECD Publishing, Paris. http://dx.doi.org/10.1787/5jlr068802f7-en; Invesco.

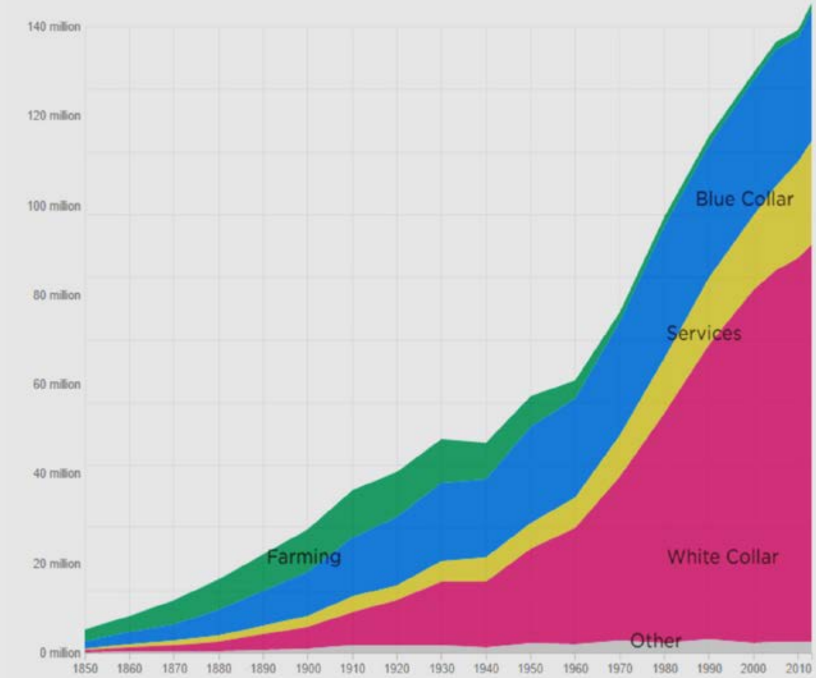
Changing Composition of the US Labor Market

White collar, blue collar and farming jobs already giving way to service sector

Sectoral shares of US civilian workforce, %



Numerical shares of US civilian work force



- High quality, high productivity jobs giving way to service sector jobs

Source: Visual Capitalist; Invesco as of September 2018.

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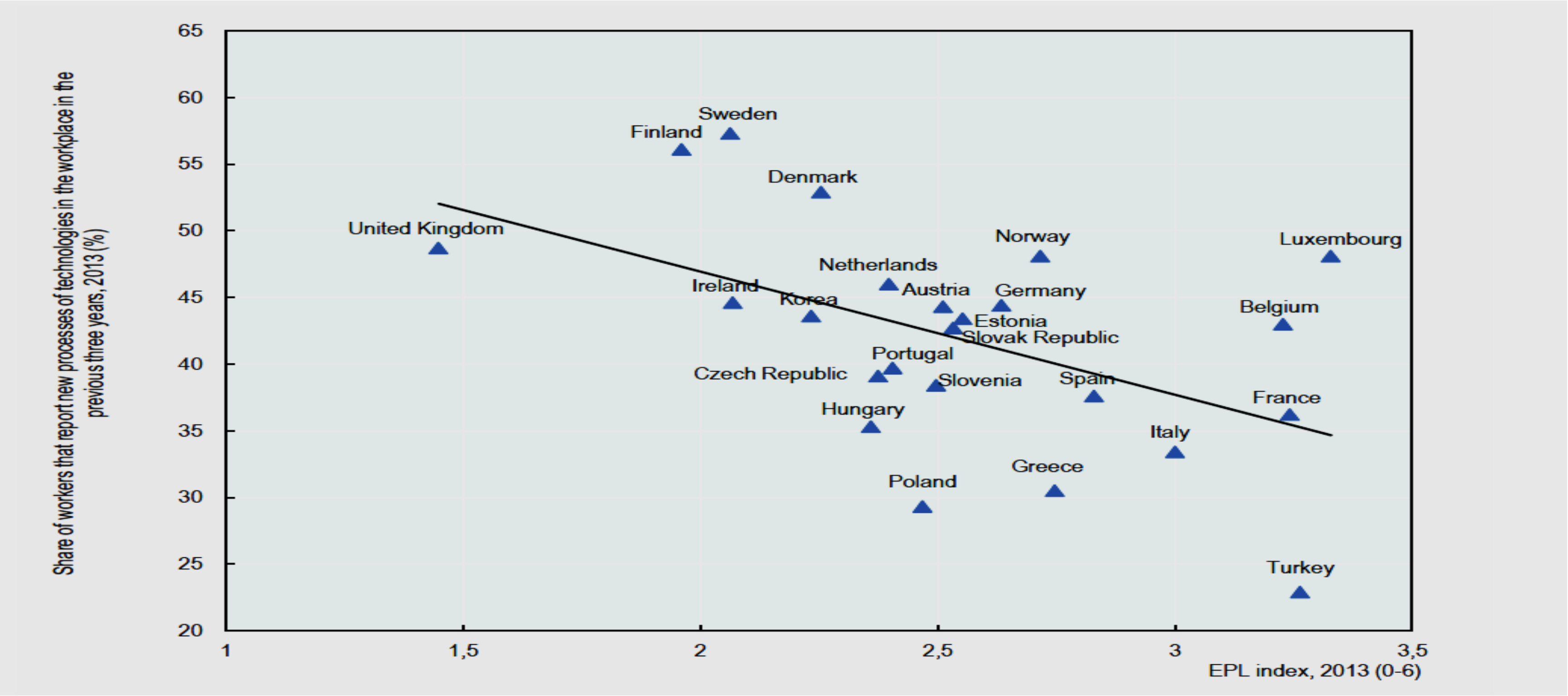
Countries with Flexible Labor Markets Tend to be Early Adopters of New Workplace Technologies



- The stronger (European) Employment Protection Legislation (EPL), the less competition that labor faces from new technology/capital

Source: OECD, Invesco.

The Road from Trade Liberalisation to Trade War

Invesco

1 Issues

World Trading System

Overlapping / Interlocking global, regional, multi-lateral and bilateral arrangements – but with serious issues

- DM – low overall barriers but high targeted barriers
- EM – high overall barriers
- Field seen to be tilted to China, away from DM
  - EM self-declaration
  - MNCs worry about protection of assets, IP

2 Disruption

Trump Trade Terror

From multilateralism via bilateralism to unilateralism!

- US pulls out of TPP
- US threatens tariffs all over – China, EU, etc.
- US challenges WTO
  - Appellate chokehold
- US singles out China
- US re-does NAFTA
  - Canada dairy sector
  - China "poison pill"

3 History

We have seen this before

Successive globalization episodes started after wars and ended with conflicts

- Raising trade barriers lowers growth
  - Directly via trade
  - Financial conditions
- Closing down the world economy lowers growth
  - Directly via trade
  - Financial conditions
- Reducing trade barriers once raised takes years

4 Endgame

America First?

US holds trump cards

- Major deficit economy
- Largest, most sustained bilateral trading partner
- Lowest tariff barriers yet most closed economy, closest to self-sufficiency
  - Water
  - Energy
  - Technology
  - Capital – financial, physical, human
  - Only true market for goods, services, labor; even for corporate control

Source: Crowley; Invesco.

DMs apply targeted protection with very high trade barriers
EMs apply wider protection with somewhat lower barriers
China is a bit less protectionist than Brazil, India or South Africa

	MFN simple average	WTO binding rate simple average	Products binding coverage	Products with tariffs over 15%	Products binding rates over 15%	Maximum MFN applied rate
G20 High-Income DMs						
Australia	2.7	10	97	0.1	13.4	140
Canada	4.2	6.8	99.7	6.8	7.3	484
EU	**5.5**	**5.2**	**100**	**5.1**	**4.8**	**511**
Japan	4.9	4.7	99.6	3.7	3.7	736
Korea	13.3	16.6	94.6	10.4	20.5	887
United States	**3.4**	**3.5**	**100**	**2.7**	**2.7**	**350**
G20 Middle-Income EMs						
Argentina	13.4	31.9	100	36	97.8	35
Brazil	**13.5**	**31.4**	**100**	**36.2**	**96.4**	**55**
China	**9.9**	**10**	**100**	**15.6**	**16.4**	**65**
India	**13.5**	**48.6**	**74.4**	**19**	**71.5**	**150**
Indonesia	6.9	37.1	96.6	1.7	90.7	150
Mexico	7.9	36.2	100	15.7	98.7	210
South Africa	**7.6**	**19**	**96.1**	**20.7**	**39.6**	**1000**
Turkey	**10.8**	**28.6**	**50.3**	**13.6**	**28.9**	**225**

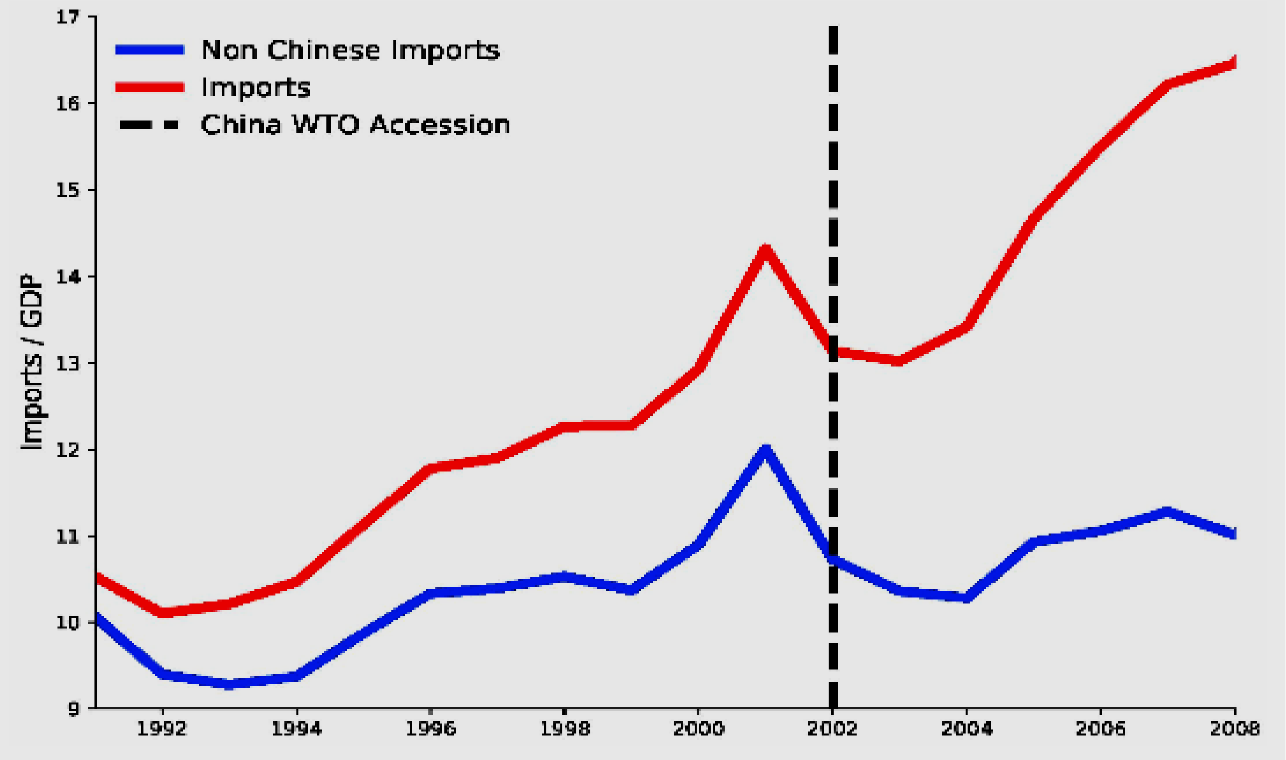
Source: Bown & Crowley, 2016; Invesco.

NB: The Bown-Crowley work did not cover Russia. Russia significantly lowered trade barriers after the Soviet collapse and today has the same general structure as the other major EMs, though the effectiveness of Russia's trade policies has varied widely through the post-Soviet era

The China Syndrome: US import diversion from other countries

WTO caused substantial trade and investment diversion –
Not simply a US competitiveness problem, as Chinese officials argue

Share of US imports in GDP from China relative to the Rest of the World



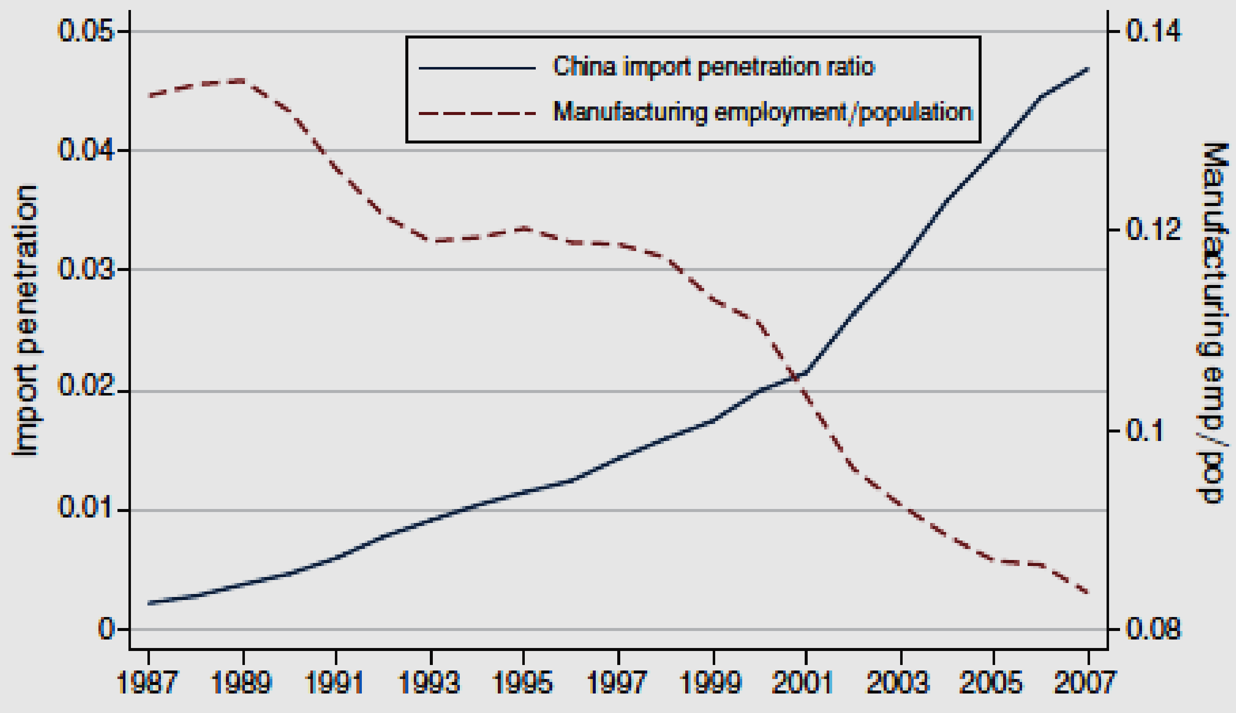
Tenfold

- Globalization 3.0, between the Soviet collapse and the GFC, US imports rose by 5% of GDP
- China's market share in US imports rose tenfold
- Imports from the Rest of the World and from China followed a similar path through China's WTO accession and the post-Tech Bubble recession
- Between the 2001-02 recession and the GFC, China gained US market share rapidly

Source: Lyon & Waugh Pro-Market Blog, Stigler Center, University of Chicago Booth School, 2018; Invesco.

The China Syndrome: US Manufacturing Employment Collapsed as China's Import Penetration Ratio went Ballistic

Ratios: US Manufacturing Employment to Population; China's Share of Imports



40% drop

- US manufacturing output has stayed roughly stable at ~20%+ of GDP
- However, manufacturing employment has collapsed to just over 8% of the civilian workforce
- The shift of manufacturing to greater capital-intensity reflect the Fourth Industrial Revolution as well as the China Syndrome…

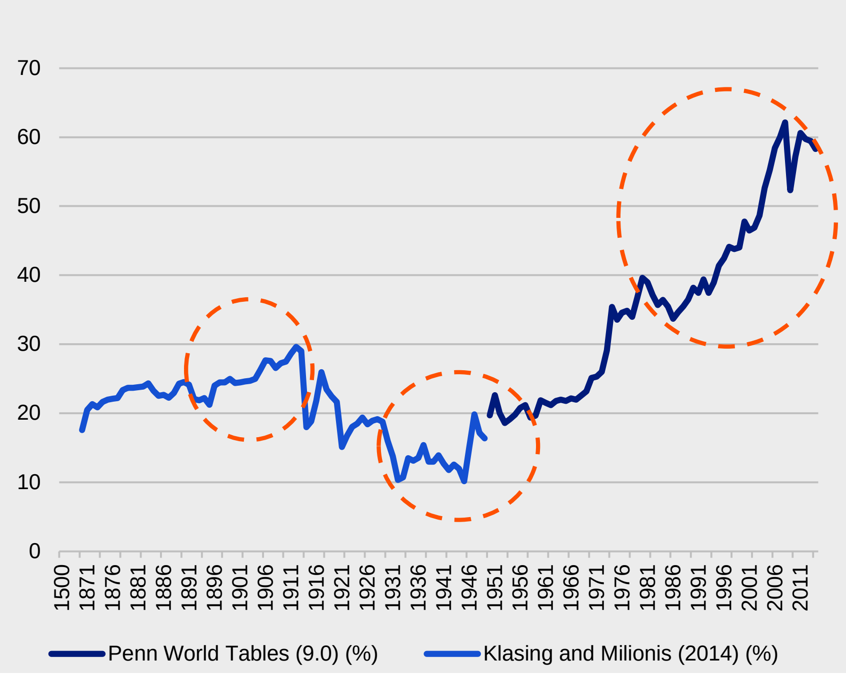
Source: Autor, Dorn and Hanson, Local Labor Market Effects of Import Competition in the United States, American Economic Review 2013; Bown & Crowley, 2016; Invesco.

Comparing Three Waves of Globalization

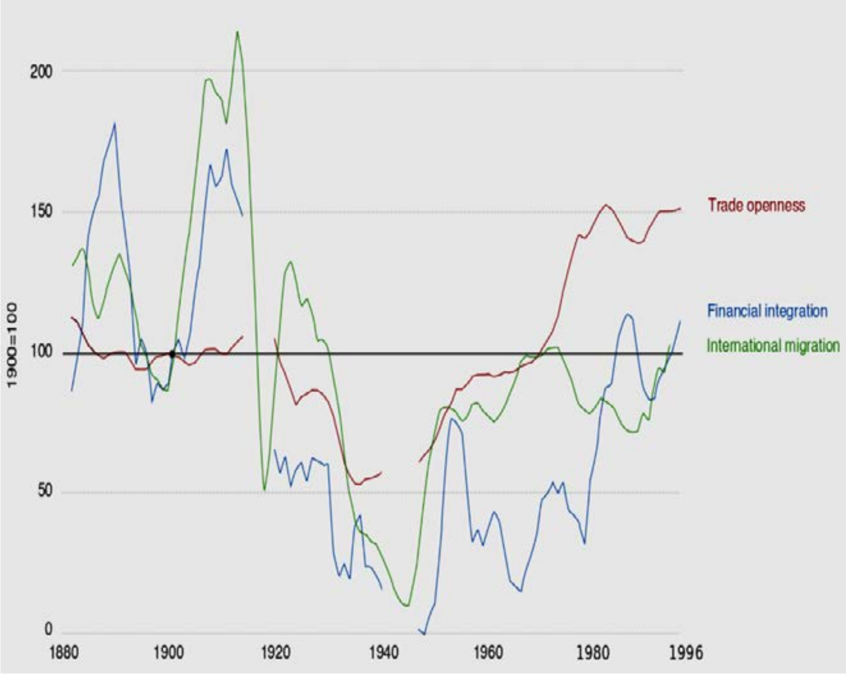
Trade more important than migration or finance today; and much more than in the late-19th or mid-20th Centuries

Invesco

Global Trade Ratio: (Exports + Imports) / Global GDP, %



Indices of trade openness, financial integration and international migration, index levels

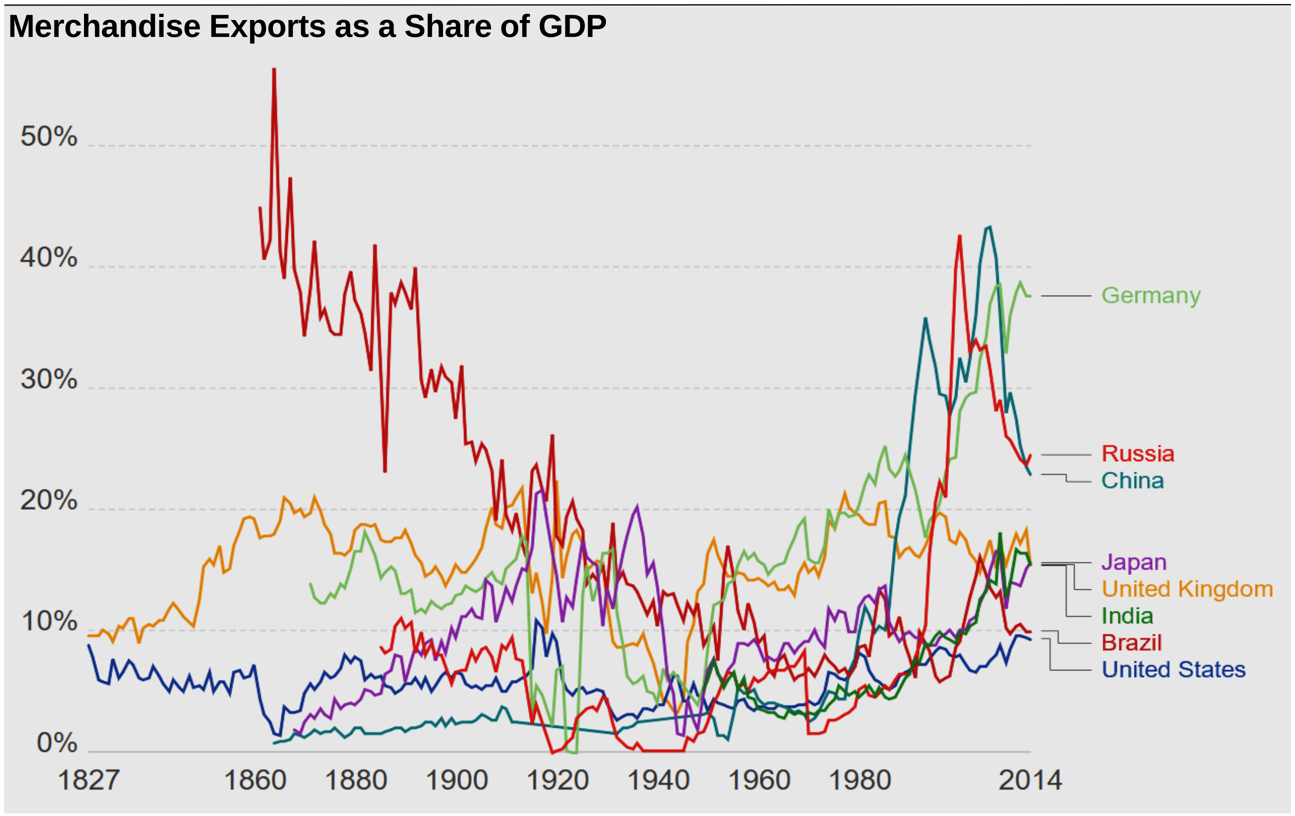


- Three major waves of globalization, bounded by geopolitical conflict: US Civil War – World War I; after World War II; after the Cold War
- It used to be more efficient to move labor and funding; now it's more efficient to move goods and services, and corporate capex

Source: OurWorldInData.Org; Oxford Economics; Penn World Tables/Macrobond; Klasing and Milionis, 2014; Ortiz-Ospina & Beltekian; Broadberry & O'Rourke The Cambridge History of Modern Europe, Volume 2; Invesco.

The China Syndrome: The most open continental economy ever

China export ratio has been in line with small, open Germany…
Russia had comparably high trade ratios only during economic crisis



40% X

- Export Shares of GDP have been volatile over time but have trended up in recent decades around the world
- US exports are a relatively low share of GDP
- China is the only large, continental economy with sustained X/GDP > 20%

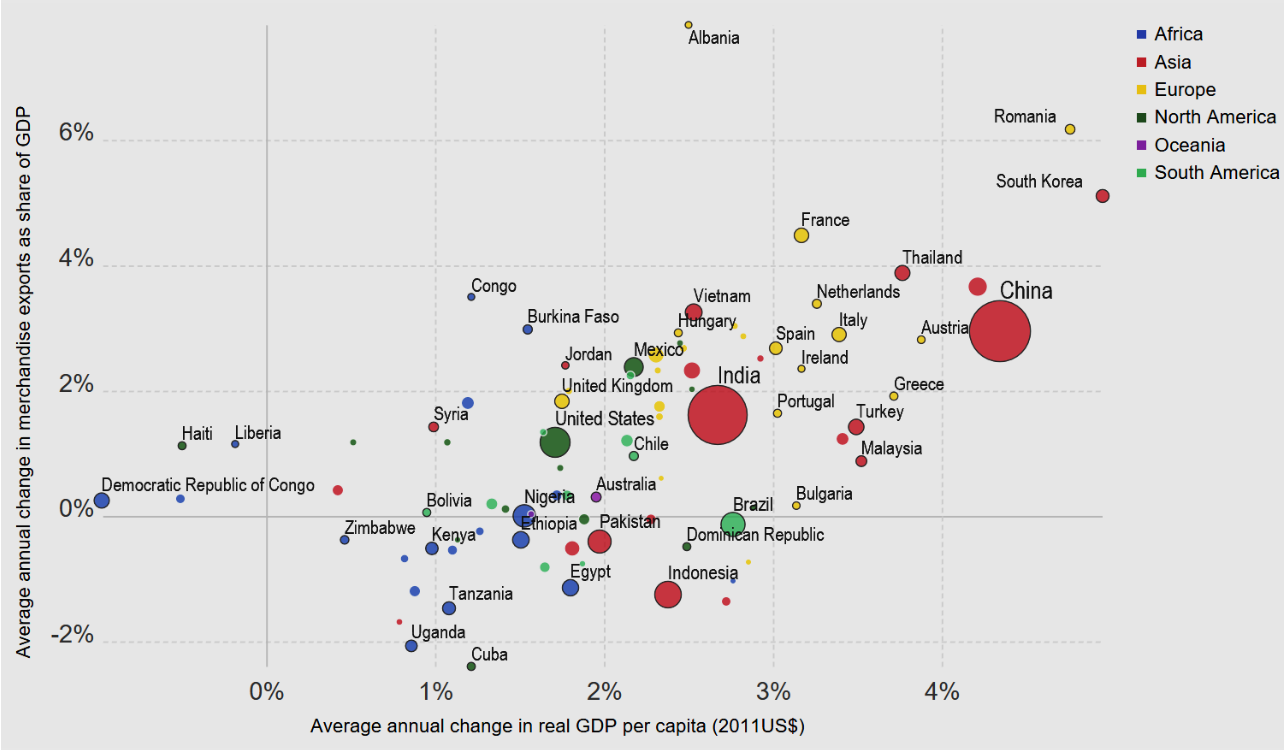
Source: CEPII Two Centuries of Bilateral Trade and Gravity Data 1827-2014; OurWorldinData.org; Invesco.

Globalization 3.0 Benefitted Asia and Europe more than others

Liberalizing trade has been the single most effective economic reform
China has been the standout beneficiary of Globalization 3.0

Invesco

Real per capita growth aligned with trade liberalization in Globalization 3.0, 1945-2014



- Asia, especially China, and Europe have been the main beneficiaries of trade liberalization since WWII
- China is the only major economy with rapid growth in pc GDP *and* X/GDP
- China's trade liberalization and other economic reform began in 1978; India,1991
- US, LatAm and Africa benefitted far less
- Has lack of other reforms held back other regions – or do Europe, Asia enjoy unfair trade advantage?

Source: Source: CEPII Imports – Two Centuries of Bilateral Trade and Gravity Data: 1827-2014 (2016); The Maddison Project Database (2018).

NB: Bubbles represent relative population, reflecting the relationship between trade opening and productivity growth (rather than sheer economic size or growth)

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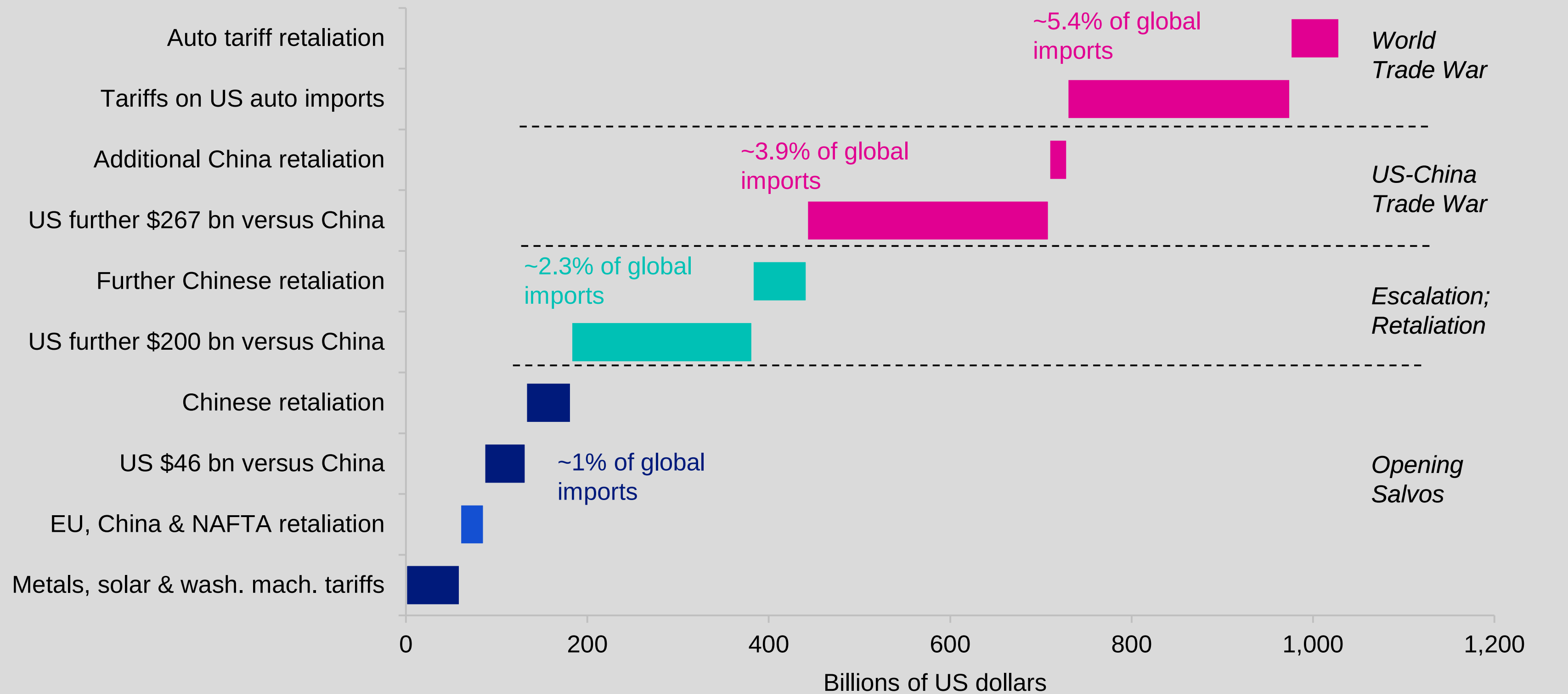
Road Map: Skirmishes to Trade War; Allies to Rivals/Adversaries

Trump tough trade talk disguises chicken-feed impact on allies;
The bulls eye of tariffs is clearly China – unless Trump hits the EU too

The Drumbeat of Trade War

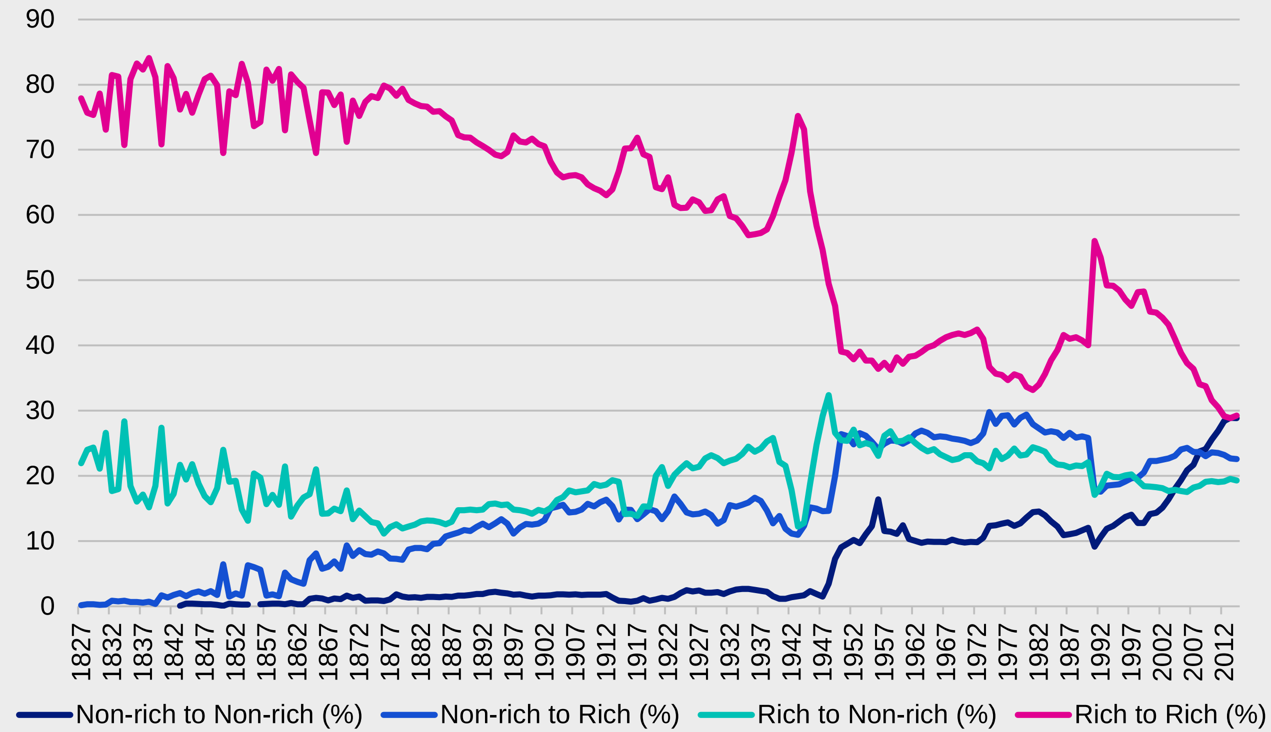


Source: Oxford Economics, OECD Value Added Trade Database, IMF, Invesco as of September 2018.

South-South Trade in line with North-North Trade during Globalization 3.0

Invesco

Proportion of trade across per-capita national income categories, % of total trade



30%,2012

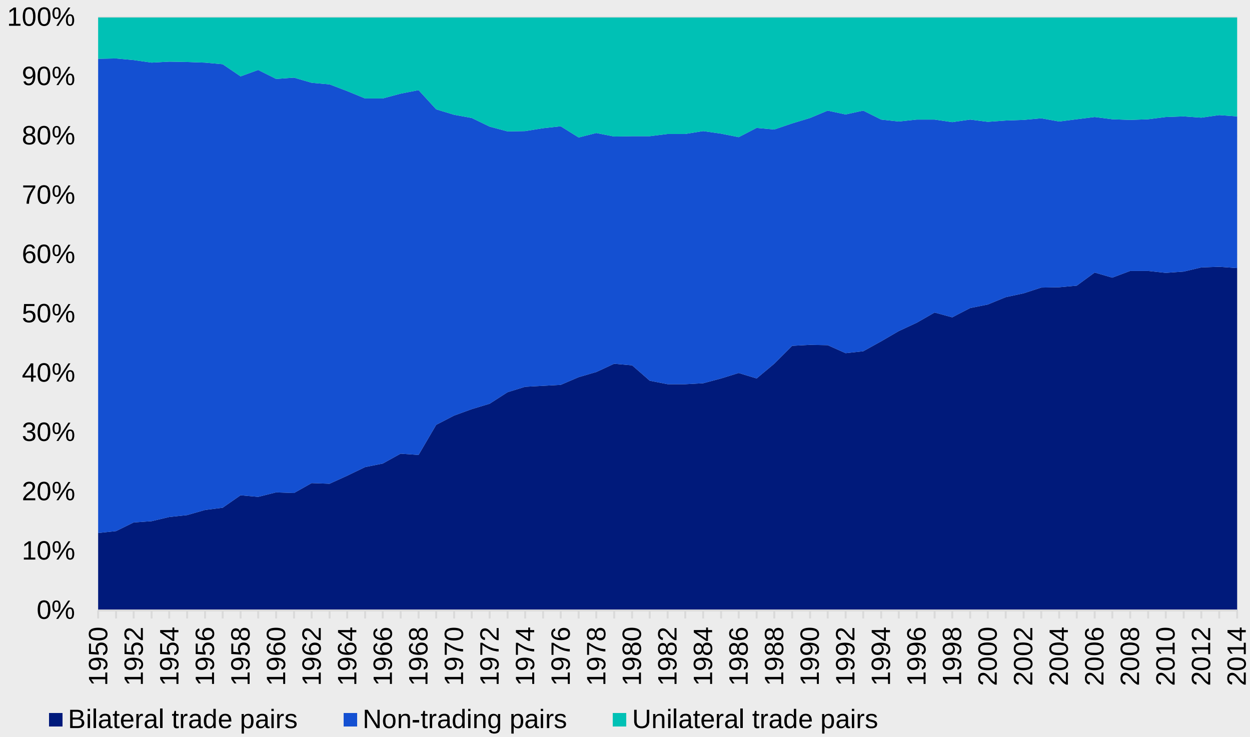
- 30% of global trade was between high-income DM economies and between low-/middle-income EM and frontier economies
- “South-South” trade now exceeds “North-South” and “South-North” trade
- These data reflect trends in 2012 and have likely shifted since then:
- The EZ crisis boosted North-North trade, as intra-EZ imbalances collapsed
- China’s rapid growth and rebalancing has boosted both South-South and North-South trade

Source: Fouquin and Hugot, CEPII 2016.

NB: The “North” or Rich Countries comprise the United States, Canada; Austria, Belgium, Cyprus, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxumbourg, Netherlands, Norway, Portugal, Spain, Switzerland, the United Kingdom; Japan and Australia

Globalization 3.0 – Boosting Two-Way Trade across Countries
Economic integration has both increased and widened

Bilateral trading relationships trending up; Non-trading relationships declining



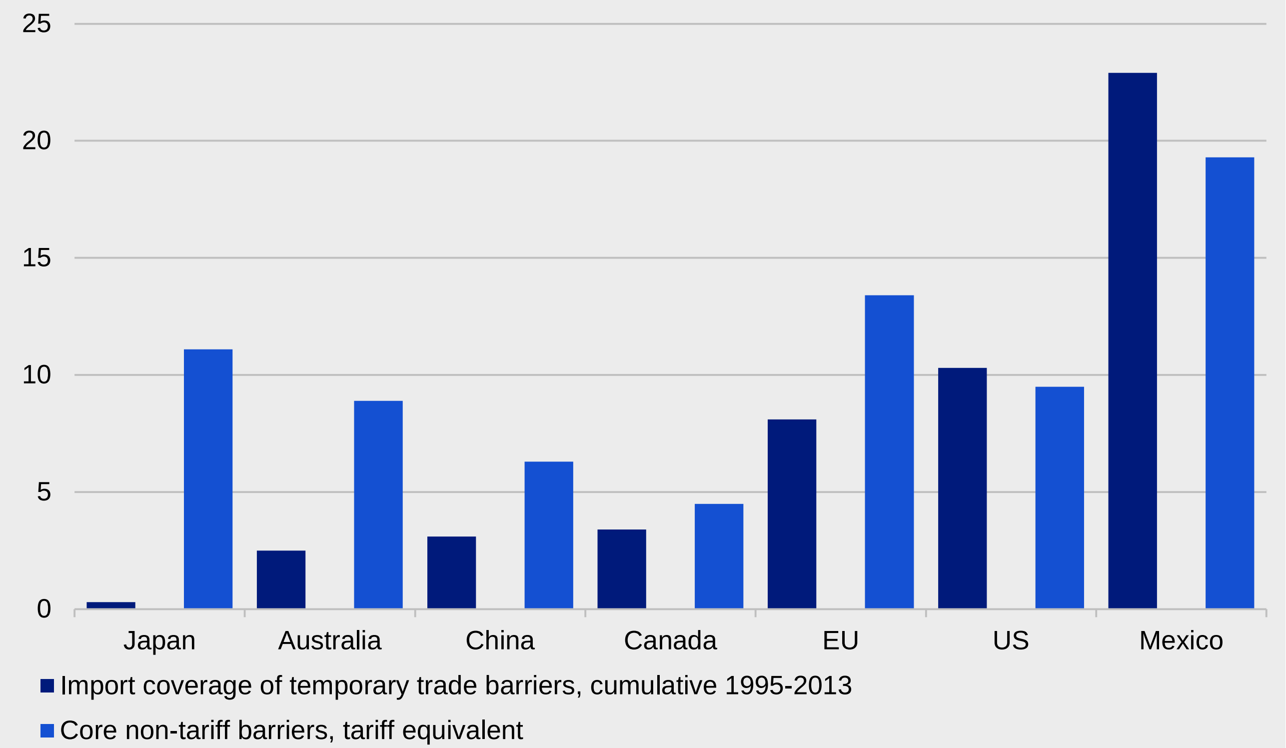
50%; 20%

- Half of all possible country trading pairs are bilateral
- Non-trading pairs have fallen significantly
- Unilateral – one-way trade pairs are roughly stable at about one-fifth
- These shifts reflect both an open world economy and the spread and shift of cross-border supply chains
- Widening trade and investment reflect dynamic comparative advantage – and international trade preferences under WTO; and domestic structural and industrial policies

Source: Fouquin and Hugot, CEPII 2016.

Non-Tariff Barriers Add Significantly to Low Explicit Tariffs

Non-Tariff Barriers of Selected Major Trading Nations, %



15-20%

- Economies to which US exports are significant – the EU and Mexico – have high non-tariff barriers that increase low tariff rates to the 15-20% area
- US would argue that its NTBs represent offsets to high effected protection by its major trading partners, especially NAFTA, Japan and China
- China has lower non-tariff barriers as well as lower proportions of its imports subject to NTBs

Source: Bown & Crowley, 2016; Oxford Economics; Invesco.

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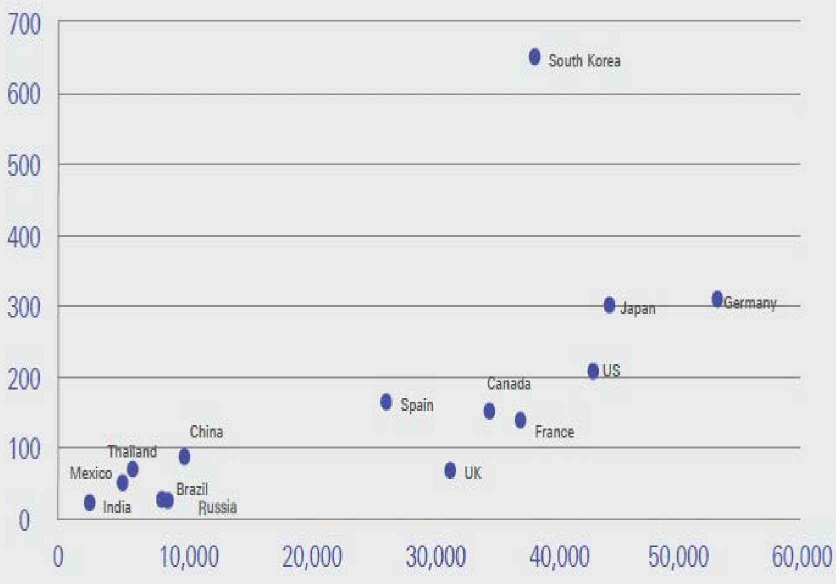
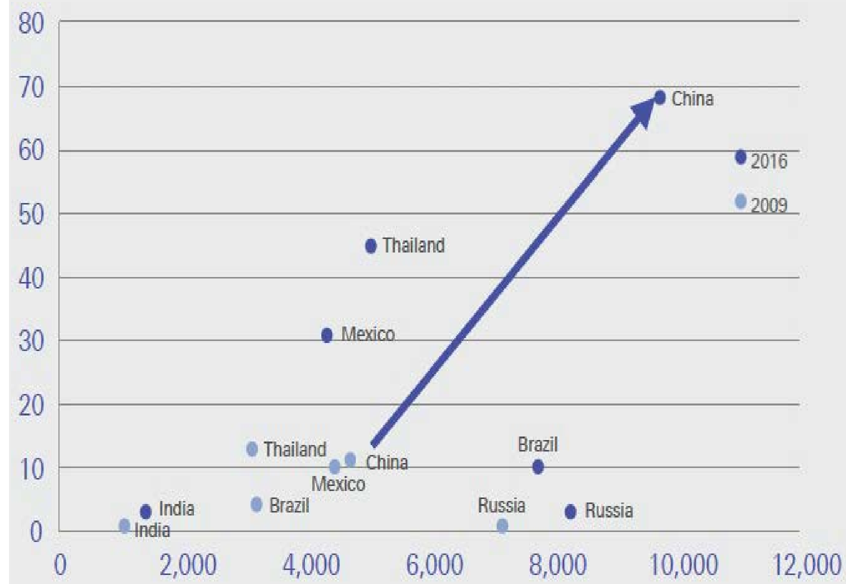
Robot Usage Largely a Function of Wages

South Korea is an outlier; China taking off

Global Robot Density (Robots per 10k manufacturing workers, vs. US$ manufacturing wage, current prices)



EM Robot Density (Robots per 10k manufacturing workers, vs. US$ manufacturing wage, current prices)

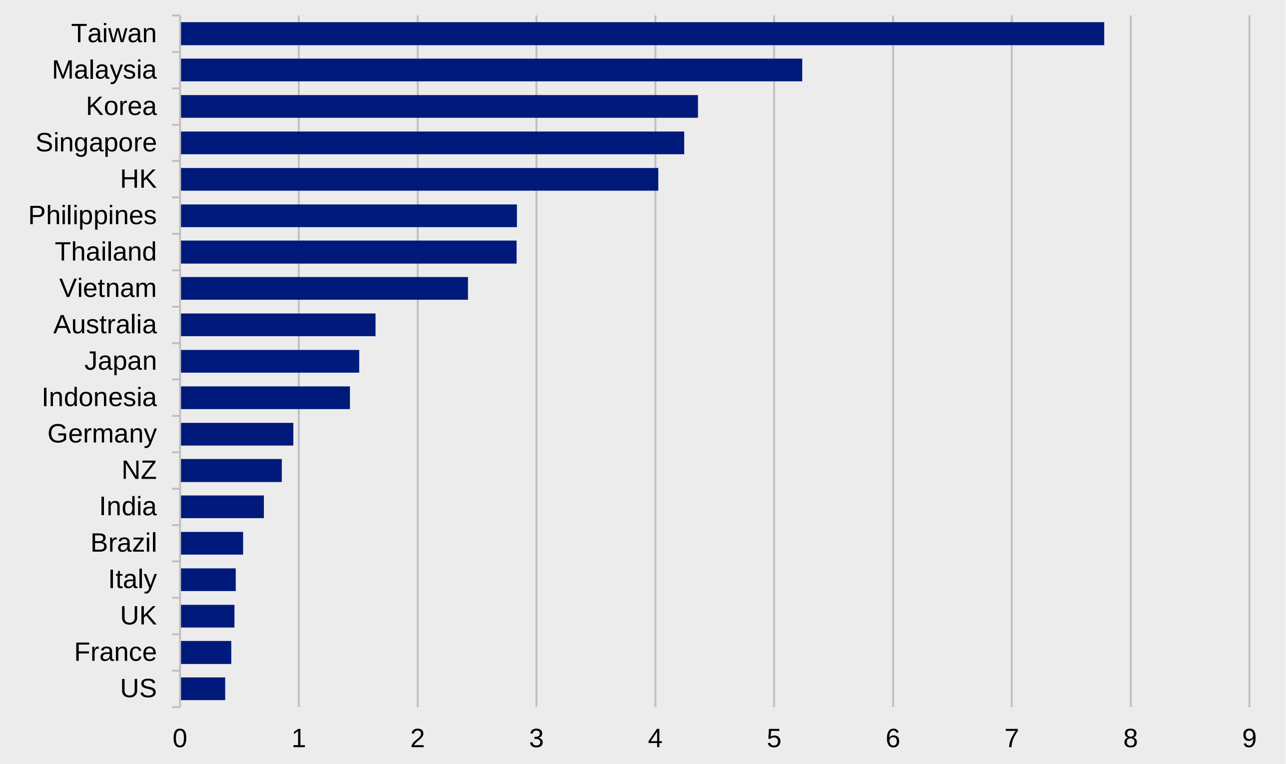


- Real manufacturing wages in China have taken off; so has robot usage
- China's national development goals include plans to attain the technological frontier

Source: International Federation of Robotics, National Authorities, Deutsche Securities, Invesco. As of 21 Aug 2018.

Trade Diversion: Collateral Damage or (Un-)Friendly Fire – If the trade war persists, investment diversion is very likely

Supply chain contribution to value added in exports from China, % of GDP



2-8% of GDP

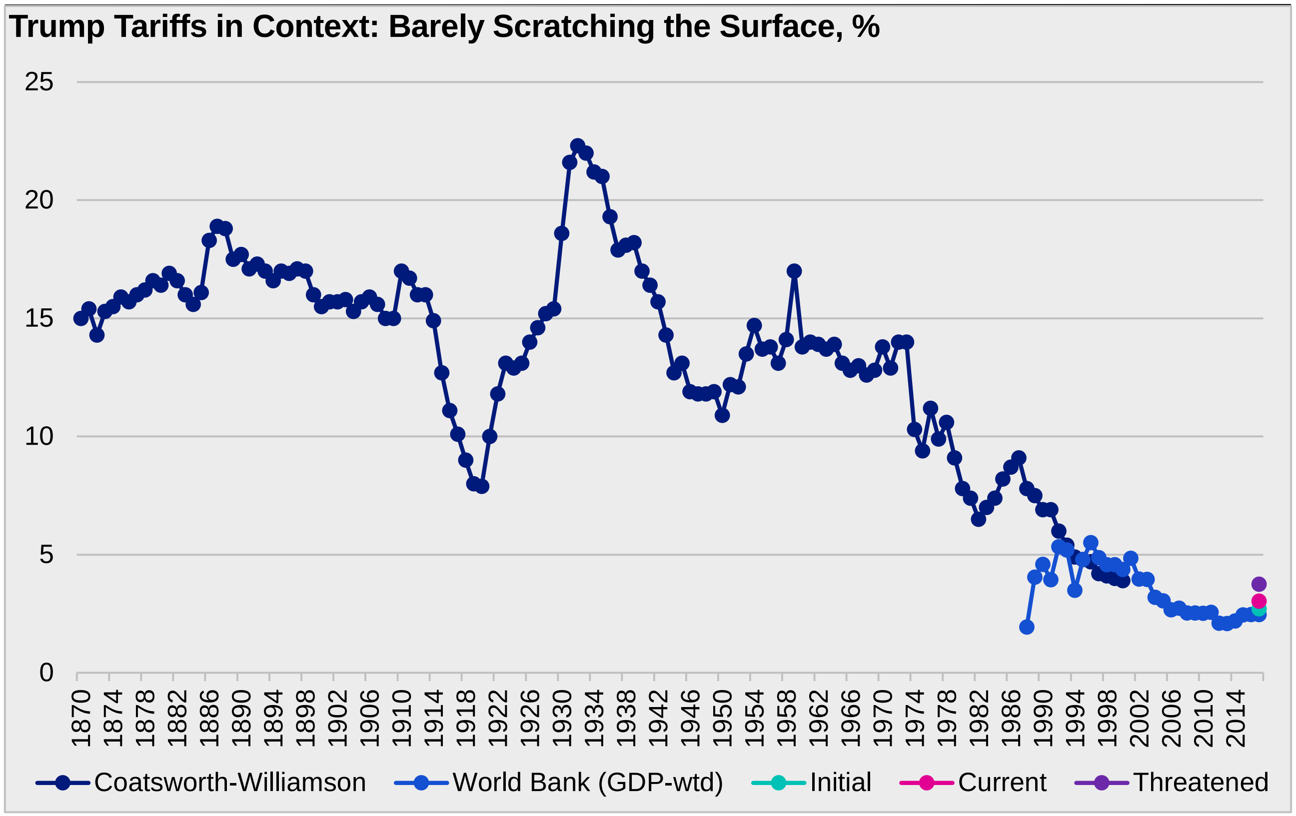
- China's Asia supply chain, long a source of strength within EM, now a risk
- Commodity price, terms of trade, financial conditions shocks matter hugely
- Japan most exposed then Germany, within DM
- Other EMs much less exposed – at least directly

Source: OECD Value Added Database, Oxford Economics, Invesco as of September 2018.

NB: Trade Ratios can introduce red-herring analysis – comparing apple and origin: X and M are gross revenue numbers reported by firms to their national customs and tax authorities. GDP is a value added number derived by statistical agencies using national accounts methods

Tariffs could rise much further in a traditional Trade War

Trump tariffs and coverage take the world back to 2010 levels…



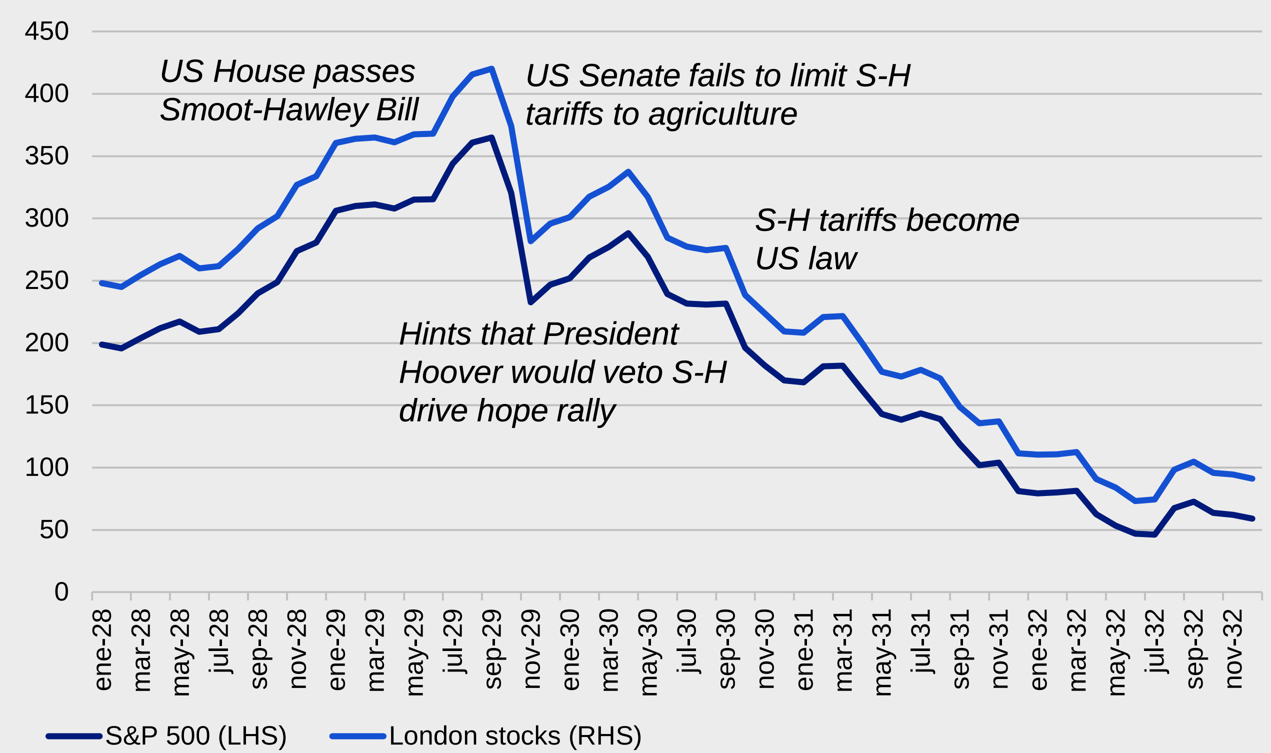
3% v 23%

- Tariffs have been reduced since their highs in the interwar period through successive rounds of multilateral trade talks
- Tariffs have generally gone up or down for many years at a time
- Even if Trump threats are implemented, tariffs would be about 1/8th of their historic, interwar peak

Source: Coatsworth-Williamson; World Bank World Development Indicators; Oxford Economics; Macrobond; Invesco as of September 2018.

History Lessons from the [Last] Great Depression:
Global financial conditions tightened in a sustained manner; Trade wars begat currency wars, which begat a big shooting war…

Successive legs in stock markets reacted to shifts in trade policy in the 1930s



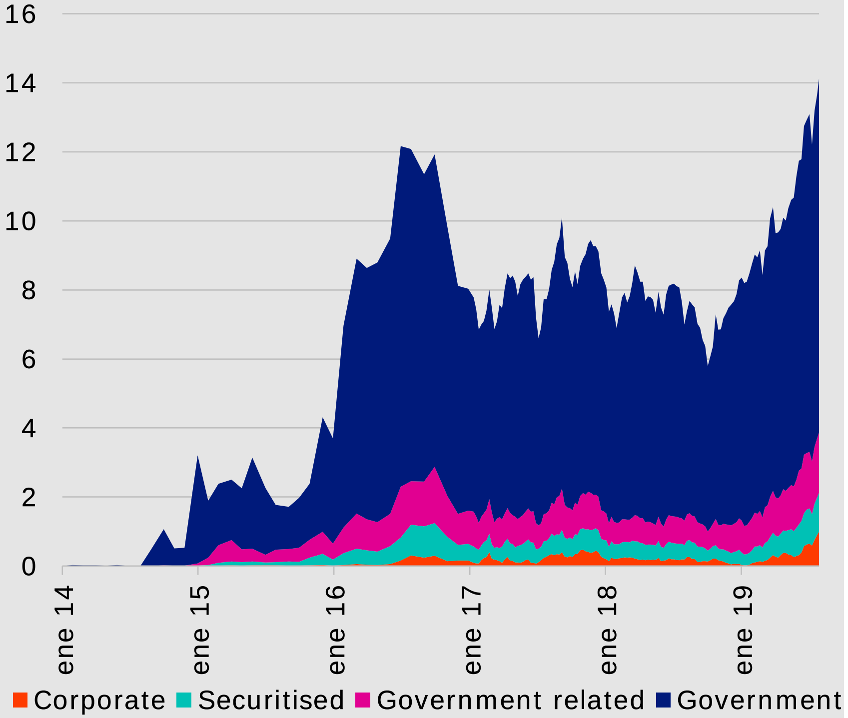
90% fall

- Global stock markets in the late 1920s were driven by trade policy and politics
- Hope rallies accompanied hints that Smoot-Hawley might be restricted to agriculture or be vetoed
- Correlations across risky and growth-geared asset markets were high
- There were successive, large legs down while Great Britain held to the gold standard; the United States the Gold Clause

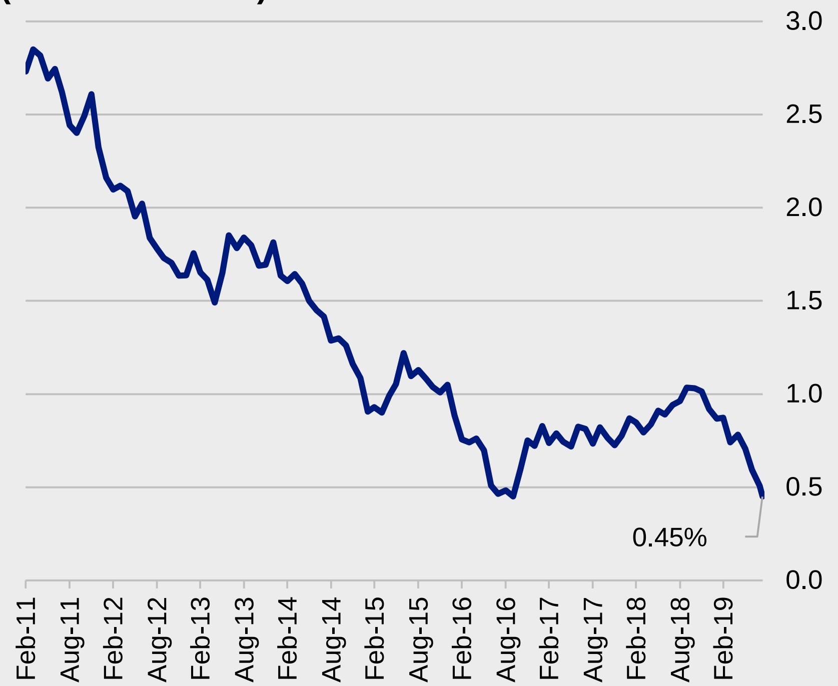
Source: Oxford Economics, Invesco as of September 2018.

Challenges - record levels of negative yielding bonds

Bloomberg Barclays Global Aggregate Index Negative Yielding Debt Value (US$trn)



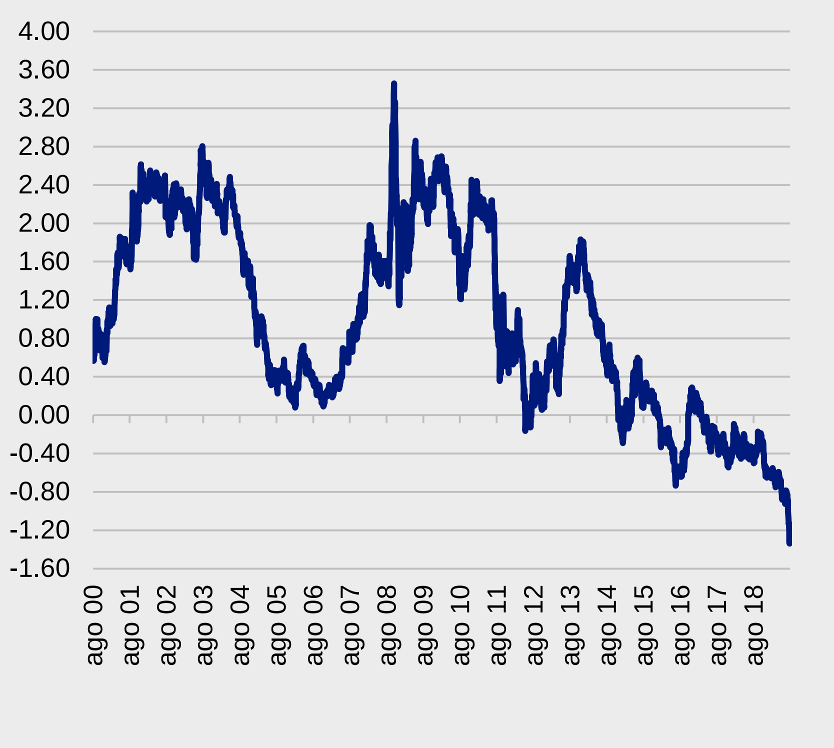
Bloomberg Barclays Global Aggregate Ex-USD Index (Yield to Worst %)



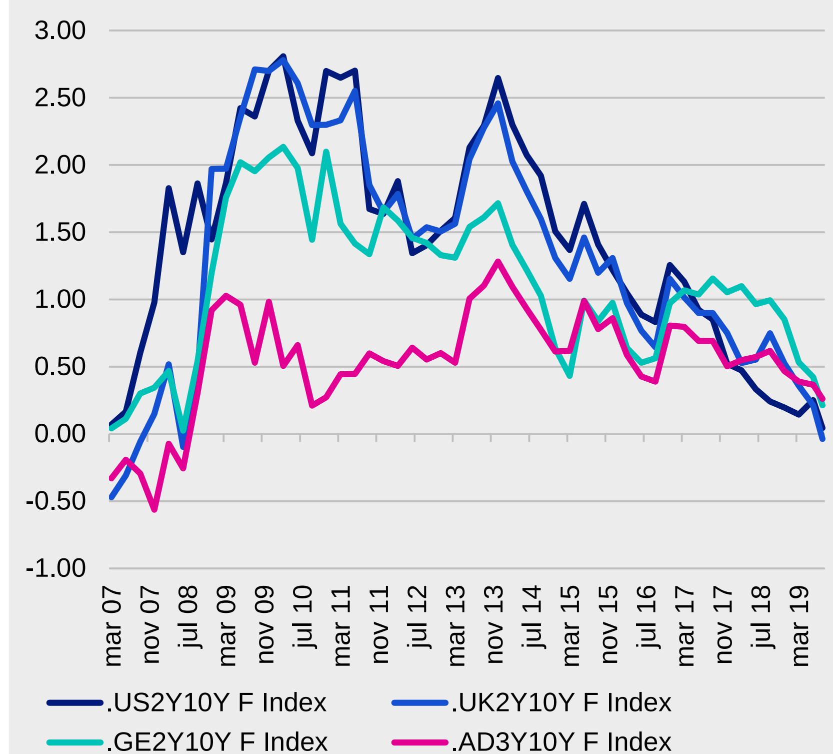
Source: LHC: Bloomberg as at 1 August 2019. RHC: Bloomberg as at 1 August 2019.

Challenges – unless yields keep falling, returns will be negative

Adrian Crump & Moench 10 Year Treasury Term Premium



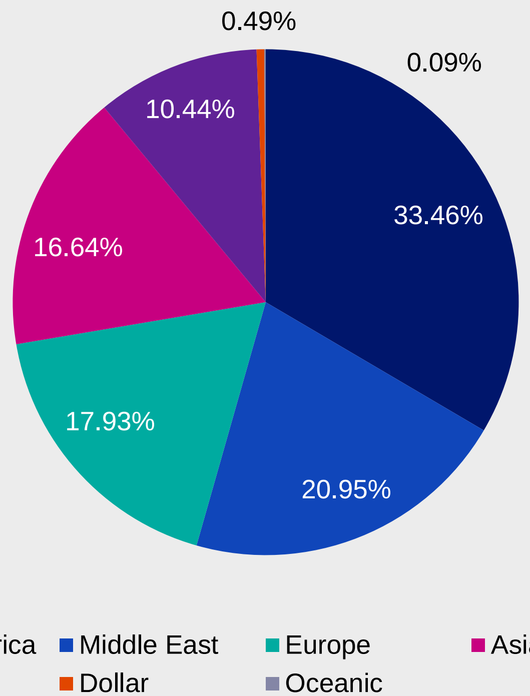
Global yield curves continue to converge towards zero



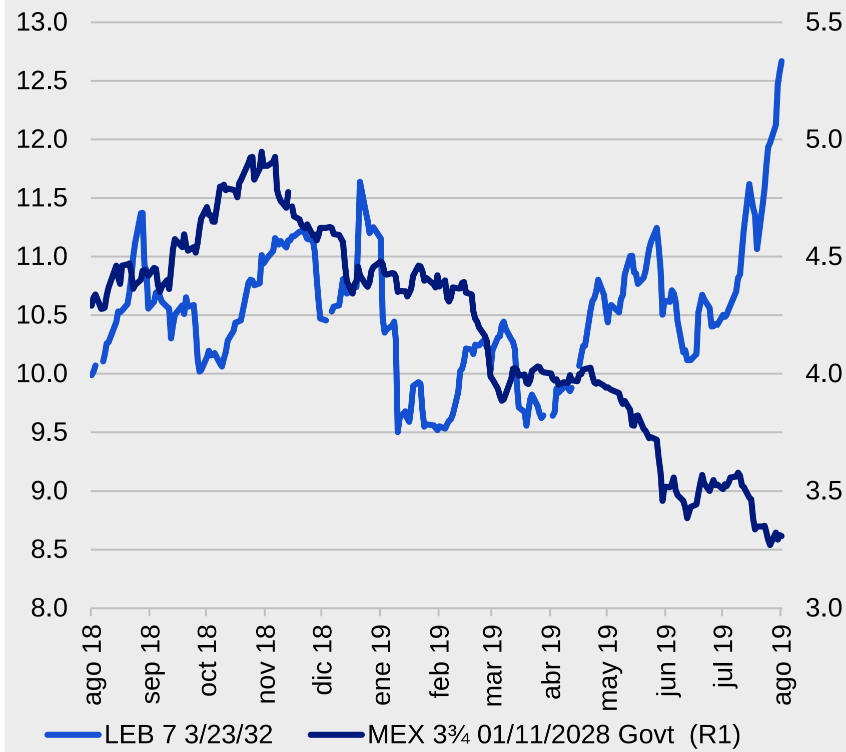
Source: Bloomberg, as at 20 August 2019.

Broad indices provide broad – and often unintended exposures

JP Morgan EMBI Global Diversified Index - Regional



Lebanon vs. Mexico 10yr USD Yield to Maturity (%)



Lebanon International Bond

- Coupon: 7%
- Expiry: 3/23/32
- Yield to Worst: 11.3%

Mexico International Bond

- Coupon: 4.5%
- Expiry: 4/24/29
- Yield to Worst: 3.4%

Source: Bloomberg as at 22 August 2019.

Executive Summary

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Growth: Lower than expectations

- US growth data has slowed, particularly out of industrial sector. Expect manufacturing PMIs to bounce unless trade tensions persist. Consumer remains well positioned.
- EU growth still softening and should continue while Brexit, auto-tariffs and Italy loom.
- Chinese growth is slowing but consumer showing signs of stability in retail sales and credit growth. Tariffs could negatively impact growth by 1-1.2% if implemented.
- Trade developments will threaten wobbly growth picture, watch closely.

Inflation: *At Expectations*

- US inflation will firm somewhat (from slowing). Tariffs will add noise in 2019. Expect housing component to stabilize from slowing trend. Wages are building but not expected to hit in 2019.
- Continue to see little evidence of global inflationary pressures but Chinese policy will likely encourage higher inflation. Need to see further demand in EU for core inflation to change structurally.
- What's next? Tariffs will cause prices to be more volatile over the next year. The trend will be harder to determine but the long-term range is not expected to breakout in a major way.

Policy: *Easier than Expectations*

- Fed has shown commitment to extending the cycle, expect 1 more cut in 2019. Data does not support a full cutting cycle but we could see 2 more if trade tensions persist.
- China is easing actively and expected to focus more on fiscal policy into the end of the year.
- ECB to launch QE in 2019 and cut in Q3 2019. Extensive fiscal policy is a long way off given domestic sector solid.

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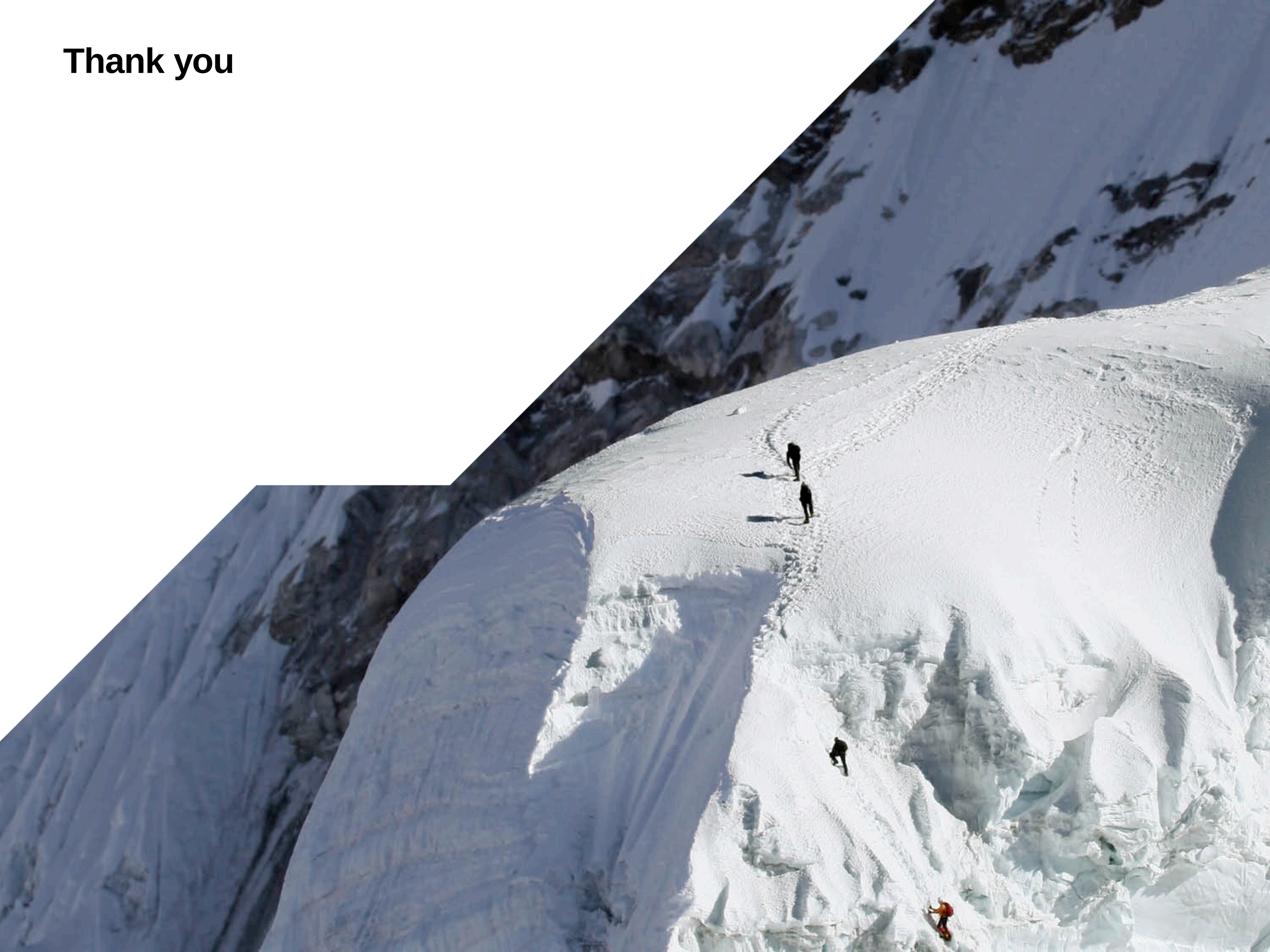
Investment Themes – Q3 2019

High Conviction Views	Rationale	Implementation
H1 Goldilocks - compatible but not sustainable	Renewed central bank easing supporting new highs in risk assets and ever lower bond yields. But current pricing is unsustainable and volatility is likely to rise.	Low credit beta Relative value within credit - Corporate hybrids, legacy sub debt vs broad beta Overweight financials v non -fins Long Credit payers Long US inflation breakevens Long FX volatility Long AUD vs NZD/CAD Long JPY
Global hunt for yield	The reality of negative yielding debt is here to stay. As markets further adjust to this norm, supply/demand dynamics will create valuation distortions.	Long 30yr EUR vs 5yr EUR SSA vs 10yr bunds Long EUR Credit vs USD Credit Long Spain and Italy vs Germany
Brexit - the uncertainty has caught up with the economy.	No deal risks are clearly rising. The uncertainty is increasingly weighing on the economy and a sharp slowdown could unfold. The MPC have abandoned their tightening bias and are now more likely to ease policy.	Long Gilts vs bunds Short UK Inflation UK steepener Retain select UK financial/industrial credits
EM - it's all idiosyncratic	Global easing will support EM, and money has poured into EM assets. However, valuations have become far less compelling and structural vulnerabilities remain - our favoured idiosyncratic stories continue to offer value.	Best pick hard currency EM sovereign/corporates (Ukraine, Brazil, Russia) Favoured local rates (INDOGB, OFZ) Long CE4 carry (-EURPLN)

Source: Invesco, July 2019. For illustrative purposes only.

Thank you



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