

Fortnightly Thoughts

December 17, 2015

Issue 100

A 100 from a 100

It's always a labour of love putting together our annual 100 best charts. This year is a bit different though. We, Fortnightly Thoughts, are hitting two milestones; five years and 100 issues. Our passion for charts is undimmed and we're excited about the swathe we have in here, including heat maps, flow charts and our 'Now and Then' table showing just how much has changed in the last five years: iron ore down 77%, global smartphone penetration up to 75% from 19%, 89% more robots sold pa, cost of sequencing a genome down 97% and total global market capitalisation up 21%.

And that is what this curation is about - change - and the interconnecting threads that help explain it. We go from the end of the beginning of the EM era, the rise of EM competition, reversing globalisation, muted global capex growth, the broad impacts of technology on competition, flows of people around the world, the economics of having children, how young people are changing consumption habits and abundance across more and more things. All of these are connected, and often in multiple ways.

Along with the 100 charts, we also include some thoughtful insights from our interviewees from this past year. On the following page is the fifth edition of our annual crossword. The answers are buried in the charts that follow and will be provided in the first issue next year. Finally, you can also find a list of our previous issues. Just let us know if you would like them sent to you. Until then, we hope this chartbook inspires and entertains you.

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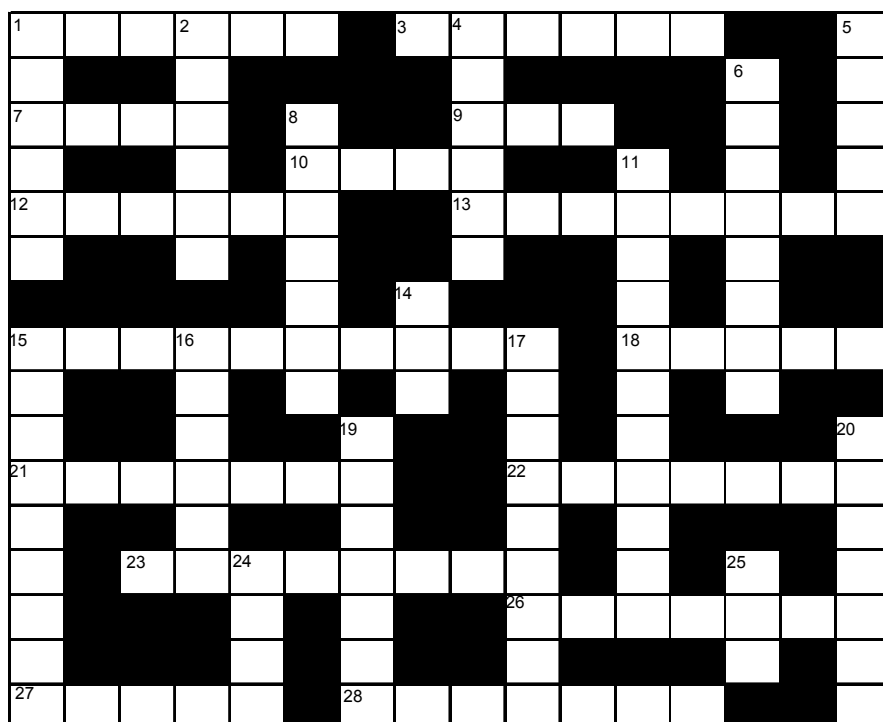
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Our fifth annual crossword



ACROSS

- 1 - This country has more Wi-Fi hotspots per capita than Japan, Germany or the US (6)
- 3 - _____ accounts for c.3% of total global trade, the same as 5 years ago (6)
- 7 - The top three countries in terms of fuel subsidies as a % of GDP are all from this region (4)
- 9 - The fifth biggest capex spender in Europe in 2014 (3)
- 10 - At over a 140 patents per million people, this country scores much higher than most peers in its region (4)
- 12 - Emigrants from this country account for more than 10% of its current domestic population, the highest globally (6)
- 13 - People in the UK consume 9% fewer _____ now than they did in 2002 (8)
- 15 - The largest company in the world at the end of 2010 by market cap (10)
- 18 - Workers in this Chinese province still earn a very low productivity adjusted wage versus Beijing or Guangdong (5)
- 21 - This US state is more expensive than Indiana and less expensive than Arizona, in terms of wage costs per dollar of output (7)
- 22 - Money that emigrants from this country send back home accounts for over 6% of its GDP (7)
- 23 - European firm with the most number of patent applications in 2014 (8)
- 26 - Only one _____ team made it to the final 25 in the US DARPA robotic challenge held this year (7)
- 27 - Our _____ heatmap is our most requested chart of the year (5)
- 28 - The fertility rate in this European nation is expected to remain well below replacement levels despite small improvements forecasted for the coming decade (7)

Remember, as always, the clues lurk in the charts that follow

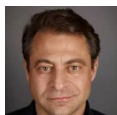
DOWN

- 1 - European and US companies outspend their Chinese counterparts on R&D very significantly in this sector (6)
- 2 - Bots edit more than 40% of the articles in this language on Wikipedia (6)
- 4 - c.20% of the _____ population is tertiary-level educated (advanced degrees)
- 5 - The average commuter in this city spends more than 150 hours a year stuck in traffic (5)
- 6 - The share of out-of-pocket healthcare expenditure for consumers in this country is unusually low for a developing economy in its region (8)
- 8 - This US index is negatively correlated with cost of sequencing a genome (7)
- 11 - This country records an extremely high GINI co-efficient - a measure of income inequality (11)
- 14 - China's consumption of this commodity grew by c.6% CAGR over the last 12 years, versus -1% for the rest of the world (3)
- 15 - Japanese company with a sharp drop in patent applications filed in the last two years (9)
- 16 - This agricultural commodity is 40% cheaper than it was five years ago (6)
- 17 - At over 17% CAGR, China's consumption growth for this material significantly outpaced the rest of the world in the last decade (9)
- 19 - The biggest listed capex spender in Korea in 2014 (7)
- 20 - Remittances account for c.2% of this country's GDP (7)
- 24 - Compared to its European peers, this index is comprised of relatively young companies (4)
- 25 - The _____ services sector is expected to see a 50% decline in capex over the next three years (3)

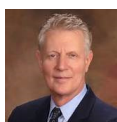
They said it...



Prof. Michael Porter, HBS: "What we're witnessing is a very broad-based transformation of what we mean by a product; how it's composed and clearly what it can do."



Peter Diamandis, X PRIZE: "There is nothing truly scarce anymore – be it time, money, expertise, energy, food or health, everything is becoming relatively more abundant than it used to."



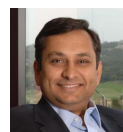
Jesse Berst, Smart Cities Council: "Power grids in the US are up to 30 years past their design lives in some cases, while water systems can be over 100 years old."



Gordon Orr, McKinsey Asia: "Not only are western MNCs facing stiffer competition in China, but Chinese companies are also penetrating other EM markets"



Prof. Pol Antras, Harvard: "There is already evidence that some types of manufacturing have moved away from China to other South East Asian countries."



Manoj Saxena, The Entrepreneur's Fund: "Cognitive systems are going to transform every business process that we know and create myriad opportunities."



Prof. Raj Rajkumar, Carnegie Mellon: "When vehicles become completely autonomous, people will hardly notice as they would have given up control for most of the driving functions before that final step."



Sam Zaid, Getaround: 250 million cars are being used for only an hour a day on average, resulting in 6 bn hours of idle car time each day.



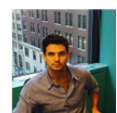
Willy Schlacks, EquipmentShare: "Across the industry, average utilization rates can lie anywhere between 15% and 30%. In contrast, the utilization rates are above 70% for contractors on our platform."



Greg Schvey, TradeBlock: "Blockchain technology has the potential to fundamentally change the infrastructure of nearly any transactional industry."



Stuart Frankel, Narrative Science: "Given how costly it can be to analyze data, enterprises are experiencing inefficiencies that didn't exist before these swathes of data were made available."



Justin Wisz, Vestorly: "Content licensing businesses should be very worried about what we're doing. Our platform basically obviates the need for people to buy expensive content licenses."

Note: Interviewee positions correct when interviewed



Prof. Aswath Damadoran, NYU: "We can no longer assume that competitive advantage will last a century as it used to. Instead, tech companies will climb faster but fall faster too."



Matt Ridley, Author of 'The Rational Optimist': "Now, the notion that we are running out of fossil fuels any time soon is clearly defunct."



Prof. Philip Lane, Trinity College Dublin: "What we saw for the last ten years was not normal. It was very much a transitory phase where China emerged as this big surplus country."



Andrew Ng, Baidu: "Silicon Valley is still ahead of China in many areas, but there are definitely many bright spots where Beijing is driving innovation."



Prof. Sir Partha Dasgupta, Cambridge: "Fertility has come down not because of population policy but because people have responded to their own changing requirements; children are seen less as means and more as ends."



Rodney Brooks, Rethink Robotics: "Overall, the progress being made in artificial intelligence is likely to help people do their jobs better rather than replacing them completely."



Benedict Evans, Andreessen Horowitz: "Many of these start-ups that start off trying to solve a relatively small problem end up fundamentally transforming the way industries operate."



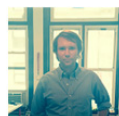
Ross Bailey, AppearHere: "Last year we launched 86 stores in the West End. If you added up all conventional rental agents, they only launched 85 stores in the West End altogether."



Nick Hungerford, Nutmeg: "We should, and we will, live in a world where every individual is accompanied by an avatar, that assists them in making more informed financial choices."



Nick Taranto, Plated: "In the US up to 40% of perishable food is wasted every year. That equates to hundreds of billions of dollars in lost revenue across the supply chain."



Austin Ogilvie, Yhat: "The next wave in analytics now revolves around predictive and prescriptive technologies that use the data already stored and processed by companies."



David Messenger, Mast Mobile: "There is a fundamental change underway in the workspace, from fixed locations to flexible spaces and teams. Legacy communication systems are hindering that transformation and are limiting productivity."

What's changed

The world today versus the world 100 Fortnightly Thoughts ago

	2010	2015 or latest	Change
The cost of commodities			
Brent oil (US\$ per bbl)	95	38	-60%
Iron Ore (US\$ per tonne)	167	39	-77%
Gold (US\$/t oz.)	1,421	1,063	-25%
UN Food Price Index	225	157	-30%
Cocoa (US\$/mT)	3,035	3,369	11%
Lithium prices (US\$/metric ton)	5,180	6,600	27%
The cost of capital			
10-year US Treasury yield	3.29%	2.22%	-107 bps
10-year German bund rate	2.96%	0.61%	-235 bps
30-year US Treasury yield	4.33%	2.95%	-138 bps
VC investments, US (US\$ bn)	24	47	100%
BBB Corporate bond yield	6.6%	5.1%	-144 bps
The cost of technology			
Global smartphone penetration	18.6%	74.6%	56 p.p.
Top 1% of mobile data users as a % of total use	52%	18%	-34 p.p.
Monthly active Facebook users (in bn)	0.6	1.6	161%
Hours of video uploaded to YouTube/min	24	400	16.67x
Cellular phone and network equipment price index	1.9	0.8	-58%
The cost of labour			
Minimum wage in the UK (£/hr)	5.9	6.7	13%
Average wages in China, (000s of CNY)	37.1	57.3	54%
Industrial robots sold (000s)	121	229	89%
Japan female labour participation rate	60%	65%	5 p.p.
An era of abundance			
LED lamp price (US\$/klm)	50	11	-78%
Solar PV c-Si electricity cost (US\$/MWh)	211	133	-37%
Li-ion battery prices (US\$/g)	1.0	0.4	-60%
Cost of sequencing a genome (US\$)	46,774	1,363	-97%
Oil supply (million barrels per day)	87	97	11%
Article count on Wikipedia (millions)	17	37	116%
Seeking growth			
EMs one year forward GDP growth projection	6.5%	4.5%	-2 p.p.
Number of dresses sold per minute on Ebay	6	90	15x
Alibaba's Singles Day revenues (US\$ bn)	0.14	14.3	102.14x
Airbnb guests (000s, over the summer)	47	17,000	361.7x
Corporate colour			
World Market Capitalisation (US\$ tn)	52.0	62.8	21%
Energy as a % of MSCI world index	11%	6%	-5 p.p.
Capex (GS global coverage, US\$ tn)	1.79	2.17	21%
Global M&A deals announced above US\$10bn	21	83	295%
Biggest company by market cap	Petrochina	Apple	
Some things don't change...			
Africa as a % of global trade	3.2%	3.1%	0 p.p.
Life expectancy	70.27	70.91	1%
Speed of a 747 Jumbo jet (km/h)	988	988	0%
Sq. mt of luxury property that \$1mn can buy in London	23	21	-9%
Japan GDP per capita (000s of yen)	3,767	3,835	2%
...while others do			
Top of the English Premier League	Manchester United	Leicester City	
Bitcoin (in US\$)	0.3	453.6	1511.97x
Temperature in Tokyo in December (Celsius)	4.4	12	173%
Top Grossing Movie	Toy Story III	Not out yet	
Beijing Air pollution (PM2.5 concentration in µg/m ³)	104.0	70.4	-32%
Superbowl Champions	Packers	Patriots	
Fuel efficiency of a Ford F150 (MPG)	17	22	29%
China's military expenditure as a % of the US	18%	35%	18 p.p.

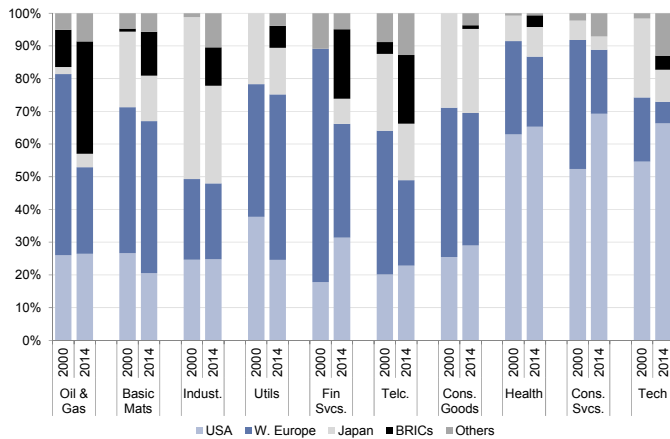
Notes: VC Investments to 2015Q3, phone & network equipment index 1987=100, UK minimum wage for ages 21+, Japan female participation for ages 25-54, annual avg given for Beijing air pollution (levels reached 300+ on red alert day earlier this month) and Chinese military expenditure as % of US for 2010 & 2014.

Sources: Goldman Sachs Global Investment Research, Bloomberg, USGS, PricewaterhouseCoopers, LLP/National Venture Capital Association, MoneyTree, Thomson Reuters, Cisco, Company data, news sources, Federal Reserve, ONS, IFR, OECD, US DOE, National Human Genome Research Institute, IEA, Wikipedia, IMF, Factset, WTO, World Bank, Knight Frank, US State Department, SIPRI.

Change is constant

The world continues to shift...

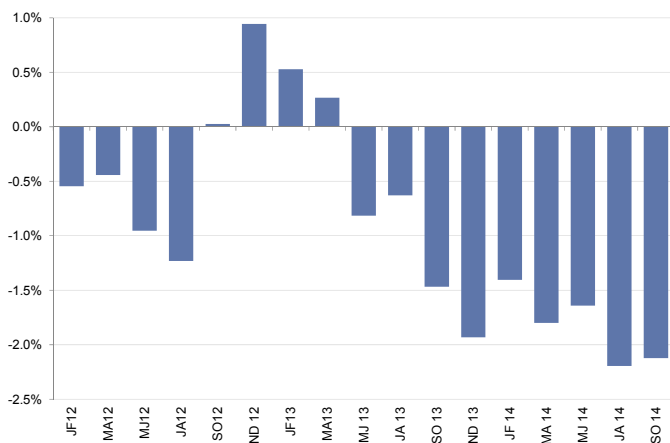
Share of top 50 companies by sales in each sector, EM vs. DM



Source: Datastream, Goldman Sachs Global Investment Research.

Western firms need to seek new ways to grow...

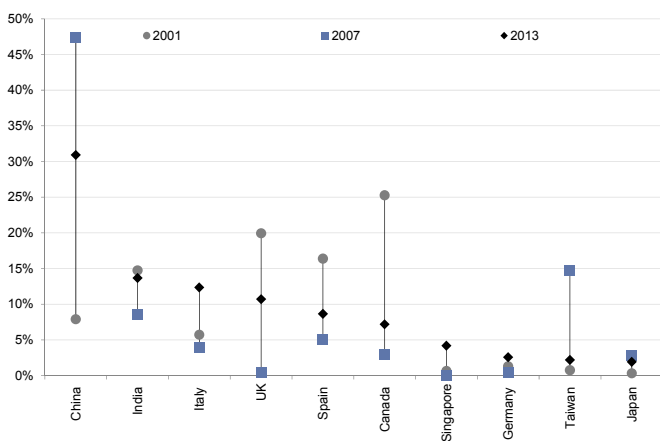
Consumer staples multi-nationals' aggregate market share in EMs, %, two-month basis



Source: Nielsen, Goldman Sachs Global Investment Research.

China remains a dominant manufacturer...

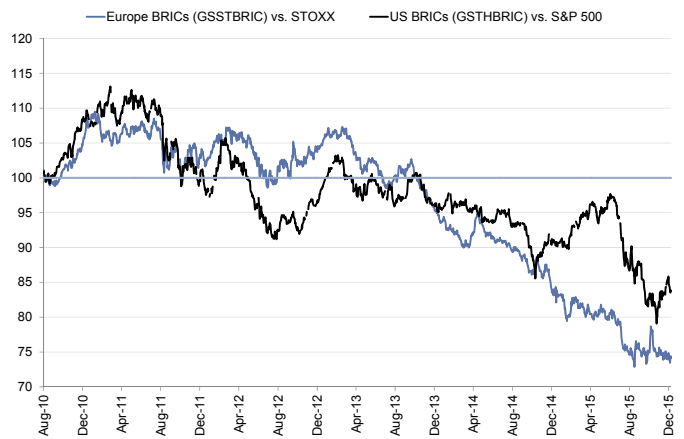
Import share of pumps into the US



Source: US International Trade Commission, Goldman Sachs Global Investment Research.

...as we approach the end of the beginning of the EM era

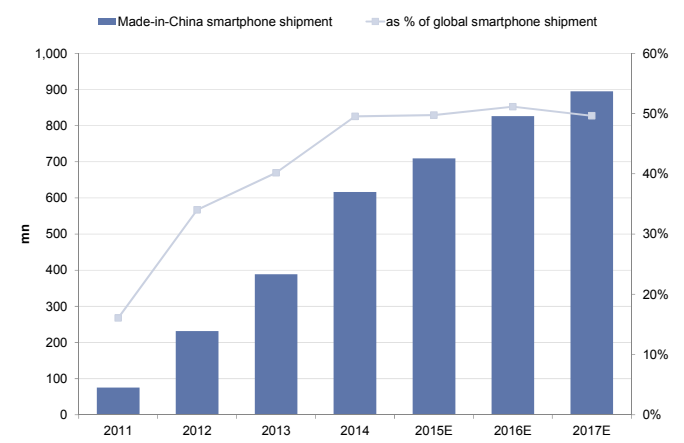
TSR of our Portfolio Strategy baskets, DM stocks with EM exposure



Source: Goldman Sachs Global Investment Research.

...as locals in the East begin to take more share

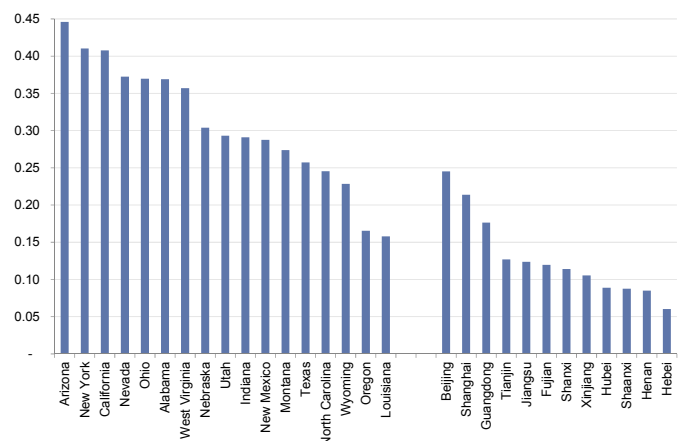
Shipments and global market share of Chinese smartphones



Source: IDC, Company data, Gao Hua Securities Research.

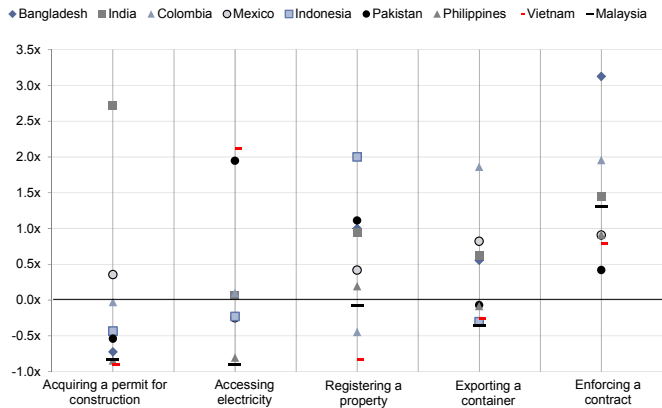
...despite wages rising

Wage per person per dollar of output, USD, 2013



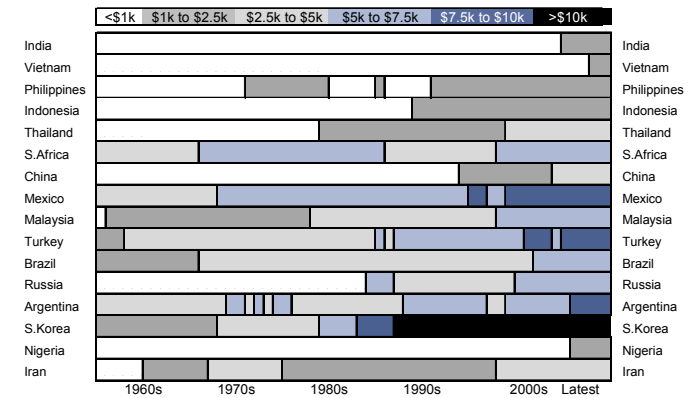
Note: Assumes 8 hr * 5 day work week; for China, productivity is calculated for mining, manufacturing and utilities per number of people employed. Source: BEA, BLS, China National Statistics, Datastream, Goldman Sachs Global Investment Research.

Other EMs may find it hard to compete with China
Costs of doing business, relative to China (0.0x), 2015



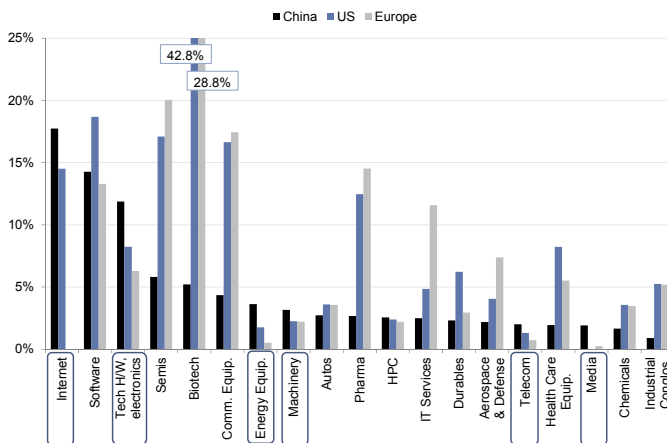
Source: World Bank Doing Business Database.

It's not straightforward to emerge
GDP per capita (in constant 2005 US\$) by cohort, 1960-2014



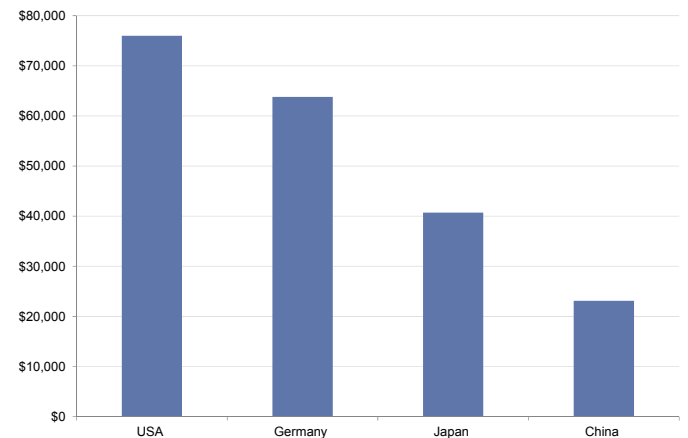
Source: World Bank.

China is spending on innovation...
Average R&D as a % of sales for companies on the Shanghai Composite Index, S&P 500 and Stoxx 60, by sector, 2015



Note: Only for companies with positive R&D data available.
Source: Bloomberg.

...and benefits from cheaper talent
Median software engineer salary (US\$), 2013



Source: China Ministry of Education, Bloomberg.

The rise of local tech giants
Top 15 websites based on browsing, December 2015

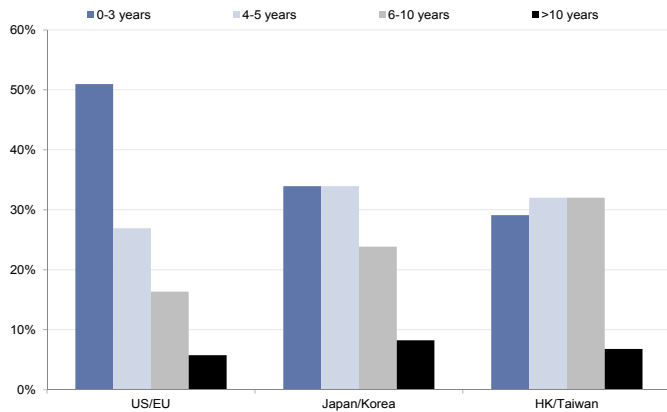
	US	UK	Germany	Spain	Japan	S.Korea	Indonesia	India	Brazil	Russia	China
1	Google	Google.co.uk	Google.de	Google.es	Yahoo.co.jp	Naver.com	Google.com	Google.co.in	Google.com.br	Yandex.ru	Baidu
2	Facebook	Google.com	Amazon.de	Facebook	Google.co.jp	Google.co.kr	Google.co.id	Google.com	Facebook	Vk.com	Qq
3	Amazon	Facebook	Facebook	Google.com	Amazon.co.jp	Google.com	Facebook	Facebook	Google.com	Google.ru	Taobao
4	Youtube	Youtube	Youtube	Youtube	Youtube	Amazon.com	Youtube	Youtube	Youtube	Youtube	Sina
5	Yahoo	Amazon.co.uk	Ebay.de	Amazon.es	Google.com	Daum.net	Yahoo	Amazon	Uol	Mail.ru	Weibo
6	Ebay	Ebay.co.uk	Google.com	Live.com	Fc2.com	Youtube	Detik	Yahoo	Globo	Youtube	Hao123
7	Wikipedia	Bbc.co.uk	Wikipedia	Yahoo.com	Rakuten	Facebook	Liputan6	Flipkart	Yahoo	Google.com	Tmall
8	Twitter	Yahoo.com	Web.de	Twitter	Nicovideo	Tistory.com	Kaskus	Wikipedia	Live	Ok.ru	Sohu
9	Reddit	Live	Ebay-kleinanzei	Wikipedia	Twitter	Ppomppu.co.kr	Lazada	Indiatimes	Mercadolivre	Facebook	360.cn
10	Go.com	Wikipedia	T-Online.de	Marca.com	Facebook	Gmarket.co.kr	Kompas	Linkedin	Wikipedia	Aliexpress	Tianya.cn
11	Live	Twitter	Gmx.net	Elmundo.es	Livedoor	11st.co.kr	Wordpress	Twitter	Twitter	Avito.ru	Xinhuanet
12	Craigslist	TheLadBible	Bing	Milanuncios	Wikipedia	Clien.net	Bukalapak.com	Blogspot	MSN	Rambler.ru	Gmw
13	Pinterest	Bing	Bild.de	Elpais.com	Dmm.co.jp	Donga.com	Tokopedia.com	Snapdeal	Abril.com.br	Sberbank.ru	Soso
14	Netflix	Linkedin	Yahoo	Linkedin	Ameblo	Blog.me	Ask.com	Stackoverflow	Instagram	Livejournal	Cntv
15	Bing	Dailymail	Spiegel.de	Aliexpress	Naver	Auction.co.kr	Twitter	Amazon.com	Americans.com	Twitter	Jd
% global population	4%	1%	1%	1%	2%	1%	3%	18%	3%	2%	19%
% internet penetration	87%	90%	87%	74%	86%	92%	17%	19%	53%	59%	46%
% global online pop'n	10%	2%	2%	1%	4%	2%	1%	8%	4%	3%	22%

Source: Alexa, UN, World Bank.

China changing

Foreign firms are vying for Chinese talent...

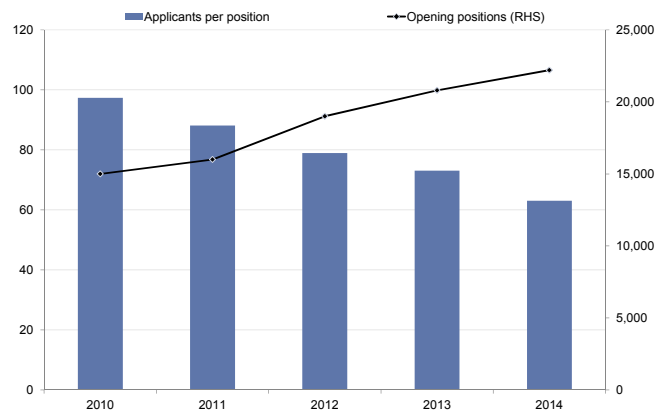
Job tenure of employees working for Chinese firms that have formed a joint venture with a company from another country



Source: Zimmermann, A, Liu, X and., and Buck, T.W., 2009. Employee tenure and the nationality of joint ventures in China. *International Journal of Human Resource Management*, 20 (11), pp. 2271-2291; (316 companies considered).

...along with the government

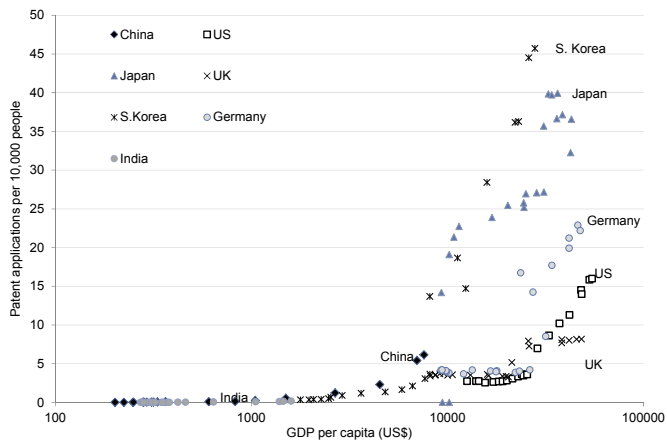
China civil servant applications versus opening positions



Source: State Administration of Civil Service.

China is on track in terms of innovation...

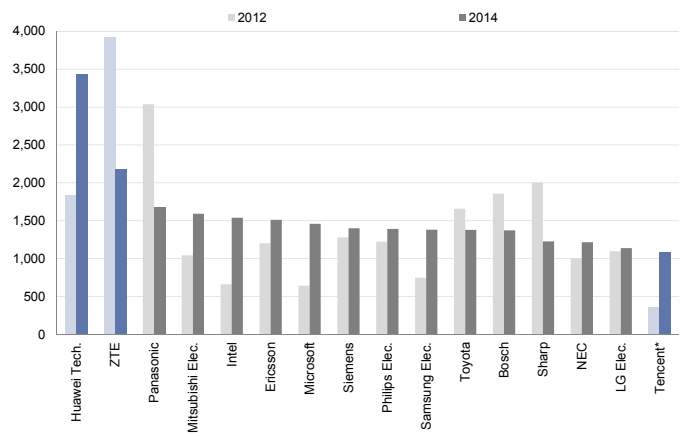
Patent applications per capita versus GDP per capita, 1980 to 2014



Source: WIPO, World Bank.

...with a few giants standing out

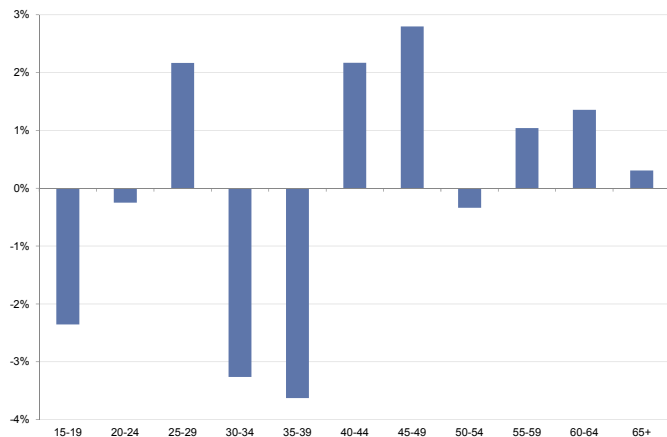
Top patent applications under patent cooperation treaty (international)



Note: (2013 instead of 2012 for Tencent; Chinese firms in blue). Source: WIPO.

However, it faces a shrinking labour pool...

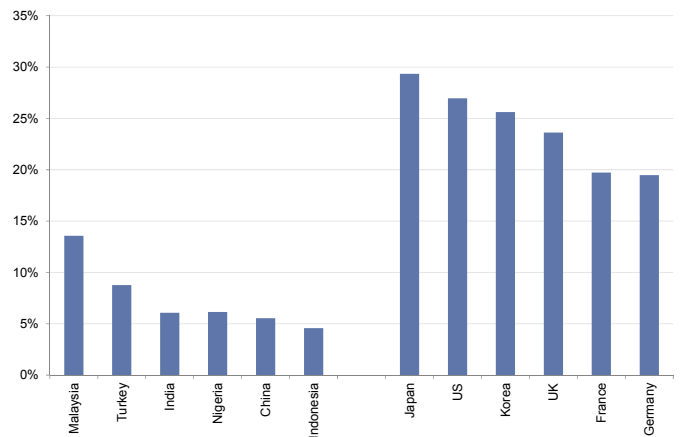
Change in composition of the Chinese labour pool, by age cohorts, 2006-2013



Source: ILO.

...and still needs to up-skill

Percentage of population that is tertiary educated, 2015



Source: WEF.

The differences between the EMs matter

Scorecard 1/2 (EMs versus select DMs), latest available data

	US	UK	Japan	Germany	Korea	France	China	Brazil	India	Russia	Mexico	Indonesia	Turkey	
Sizing up the EMs	GDP (USD bn) 2014	17,419	2,945	4,616	3,860	1,417	2,847	10,380	2,353	2,050	1,857	1,283	889	806
	GDP per capita (USD)	54,597	45,653	36,332	47,590	28,101	44,538	7,589	11,604	1,627	12,926	10,715	3,534	10,482
	Population (mn)	325	64	127	83	50	65	1,402	204	1,282	142	125	256	77
	Land Area ('000s sq km.)	9,147	242	365	349	97	548	9,388	8,358	2,973	16,377	1,944	1,812	770
	Population density (per sq km)	35	267	349	232	518	121	145	24	426	9	64	140	99
	Real GDP growth (2010-14), IMF	2.1%	1.8%	1.5%	2.1%	3.7%	1.0%	8.6%	3.2%	7.2%	2.8%	3.3%	5.8%	5.4%
	Real GDP growth (2015-19E), IMF	2.6%	2.3%	0.7%	1.4%	3.3%	1.6%	6.3%	0.6%	7.5%	-0.1%	3.0%	5.4%	3.3%
	Median age (in years)	37	40	45	44	38	40	35	29	25	38	26	27	28
The pie for capgoods	% pop'n living in urban areas	81%	82%	93%	75%	82%	79%	54%	85%	32%	74%	79%	53%	73%
	Fixed stock per capita (USD)	120,066	86,706	132,998	111,093	75,812	106,766	16,545	18,603	3,506		21,293	7,263	18,994
	Airports per mn people	42	7	1	7	2	7	0	20	0	9	14	3	1
	Road ways per 100 sq km	67	162	320	181	105	160	43	19	143	8	19	26	49
	Power (MWh) generated per capita	13.2	5.2	8.4	7.4	10.4	8.6	4.0	2.9	0.9	7.5	2.3	0.9	3.3
	Avg broadband speed (Mbps)	11.9	11.6	15.2	10.2	23.6	7.5	3.7	3.4	2.3	9.4	4.9	2.2	6.3
	Infrastructure quality score (1-7)	5.76	5.35	6.16	6.03	5.49	6.05	4.36	3.11	3.75	4.13	4.22	4.17	5.10
	Doing business in EMs	Days taken to enforce a contract	420	437	360	394	230	395	453	731	1,420	267	389	471
# heads of gov't since 1985		5	5	19	3	27	4	5	6	10	4	6	6	12
FDI as % of GDP		1.8%	1.5%	0.2%	1.6%	1.0%	0.2%	3.7%	3.4%	1.5%	3.3%	3.5%	2.6%	1.5%
Co2 Emissions per capita (in kg)		2.2	11.6	5.9	5.0	9.3	7.1	0.3	4.5	0.4	3.9	9.1	0.8	1.6
# of univer-sities in global top 500		146	37	18	39	12	22	32	6	1	2	1	0	1
Emigrants as a % of pop'n stock		1%	8%	1%	5%	5%	3%	1%	1%	1%	8%	11%	1%	4%
Patents (per mn pop'n)		910	305	2,134	917	3,186	372	519	25	9	203	10	3	64
Gross savings rate		16%	15%	18%	25%	34%	20%	50%	18%	30%	29%	21%	33%	14%
Current account % of GDP		(2.3%)	(6.2%)	2.3%	8.1%	7.3%	(0.2%)	2.8%	(4.3%)	(1.3%)	5.3%	(1.8%)	(2.5%)	(5.9%)
Market Cap % of GDP		146%	137%	90%	49%	91%	69%	52%	34%	84%	17%	36%	46%	32%
Govt. budget balance (% GDP)		(5.3%)	(5.7%)	(7.7%)	0.6%	0.3%	(4.2%)	(1.1%)	(6.2%)	(7.2%)	(1.2%)	(4.6%)	(2.2%)	(1.5%)
Gross govt debt % of GDP		105%	90%	246%	73%	36%	95%	41%	65%	65%	18%	50%	25%	33%
External debt stock % of GDP	100%	293%	61%	138%	30%	185%	19%	30%	23%	30%	33%	34%	49%	
Consumer	% pop'n earning > \$10/day	95%	96%		99%	98%		22%	49%	3%	81%	38%	6%	52%
	Gini co-efficient	40.8	36.0	37.9	28.3	31.1	30.1	42.1	54.7	33.9	40.1	47.2	38.1	40.0
	Cars per 100 house-holds	89.0	75.4	75.6	77.3	64.3	83.9	7.1	43.3	5.8	56.4	47.0	9.3	36.2
	Fridges per 100 house-holds	100	100	99	100	100	100	88	98	24	99	83	44	99
	Internet users per 100 people	87.4	91.6	90.6	86.2	84.3	83.8	49.3	57.6	18.0	70.5	44.4	17.1	51.0
Trade Profile	Trade as a % of GDP	30%	62%	35%	85%	103%	59%	44%	26%	53%	51%	64%	49%	58%
	Net resource exports % of GDP	(1.3%)	(2.6%)	(7.6%)	(4.3%)	(13.3%)	(2.8%)	(6.1%)	3.5%	(5.8%)	16.8%	1.2%	4.4%	(6.0%)
	Manufacturing exports as % GDP	7%	13%	13%	33%	37%	16%	22%	4%	10%	5%	23%	7%	14%
	Services exports as a % of exports	30%	41%	16%	16%	14%	31%	9%	14%	32%	12%	5%	11%	23%
	Resources exports % of total	33%	43%	20%	23%	21%	28%	15%	70%	57%	86%	29%	62%	39%
	Food exports as a % of total	14%	14%	12%	16%	13%	18%	8%	6%	12%	6%	5%	11%	8%
	Low value mfg exports % of total	6%	7%	4%	8%	5%	12%	26%	5%	16%	2%	7%	14%	25%
	High value mfg exports % of total	47%	36%	64%	52%	61%	42%	51%	19%	15%	6%	59%	13%	28%
	Top export partner	Canada	Switz.	US	France	China	Germany	HK	China	US	Nether.	US	Japan	Germany
	Share of top export partner	19%	13%	19%	9%	26%	16%	17%	19%	12%	13%	79%	15%	9%
Share of top 3 export partners	41%	33%	45%	24%	43%	31%	41%	37%	27%	25%	84%	36%	23%	

Notes: Data is latest available. Fixed capital stock calculated assuming 30-year life for fixed assets incorporating annual gross fixed capital formation data from the World Bank; Infrastructure data for 2013 or latest; Infrastructure quality scores from the WEF based on roads, railroad, ports, air travel, power and telephony; 7 is the maximum score. Population estimates from the UN. GINI co-efficient is the statistical dispersion of incomes of individuals in a country and a measure of income inequality. Resources, food, low and high manufacturing exports as a % of merchandising exports (i.e. ex-services). Cost of accessing power for businesses only. Patents refer to resident patent applications (by origin). China external debt stock as a % of GDP is a GS estimate, others from World Bank. Market cap as of the end of 2014 as a percent of 2014 GDP. Gross savings rate is national income less consumption and net transfers. Debt data for 2014.

Source: IMF, World Economic Forum, World Bank, OECD, UN, Times Higher Education, Wikipedia, Datastream, Bloomberg, Pew Research, CIA Factbook., Akamai State of the Internet Report, WIPO, EIA, UNComtrade, BP Energy Outlook.

The differences between the EMs matter

Scorecard 2/2 (EMs versus select DMs), latest available data

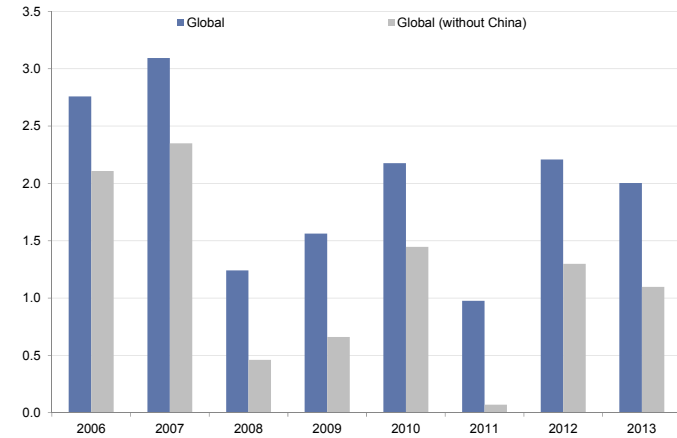
Nigeria	Argentina	Iran	S. Africa	Malaysia	Egypt	Thailand	Philippines	Pakistan	Vietnam	Bangladesh	
574	540	404	350	327	286	374	285	250	186	185	GDP (USD bn) 2014
3,298	12,873	5,183	6,483	10,804	3,304	5,445	2,865	1,343	2,053	1,172	GDP per capita (USD)
184	42	79	53	31	85	67	102	188	93	160	Population (mn)
911	2,737	1,629	1,213	329	995	511	298	771	310	130	Land Area ('000s sq km.)
196	15	48	45	92	84	132	336	240	293	1,218	Population density (per sq km)
6.2%	4.4%	1.2%	2.4%	5.8%	2.7%	3.9%	6.2%	3.5%	5.9%	6.2%	Real GDP growth (2010-14), IMF
4.5%	0.0%	3.5%	2.0%	4.8%	4.5%	3.2%	6.4%	4.7%	6.2%	6.9%	Real GDP growth (2015-19E), IMF
18	30	27	25	26	24	35	22	22	29	24	Median age (in years)
47%	92%	73%	64%	74%	43%	49%	44%	38%	33%	34%	% pop'n living in urban areas
1,927	21,766	4,578	12,975	20,696	4,414	13,468	4,122	1,558		1,933	Fixed stock per capita (USD)
0	26	4	12	4	1	1	2	1	0	0	Airports per mn people
21	8	12	61	44	14	35	71	33	62	15	Road ways per 100 sq km
	3.3	3.4	4.7	4.8	1.8	2.5	0.8	0.5	1.6		Power (MWh) generated per capita
	4.6		3.4	4.3		7.4	2.8		3.2		Average broad-band speed (Mbps)
2.67	3.00	3.93	4.49	5.63	2.94	4.07	3.66	3.32	3.33	2.82	Infrastructure quality score (1-7)
510	590	505	600	425	1,010	440	842	993	400	1,442	Days taken to enforce a contract
9	7	5	6	3	12	16	6	11	6	8	# heads of gov't since 1985
1.1%	1.8%	0.6%	2.2%	3.7%	1.5%	3.7%	1.4%	0.6%	5.2%	1.0%	FDI as % of GDP
0.4	4.0	1.4	2.3	1.8	0.3	0.8	6.7	7.0	3.5	11.8	Co2 Emissions per capita (in kg)
0	1	2	4	2	1	0	0	0	0	0	# of univer-sities in global top 500
1%	2%	1%	1%	6%	4%	1%	6%	3%	3%	5%	Emigrants as a % of population stock
	16	146	12	40	8	23	2	1	5		Patents (per mn pop'n)
20%	18%		18%	35%	7%	33%	16%	8%	29%	21%	Gross savings rate
1.1%	(1.1%)	3.8%	(3.1%)	2.7%	(0.8%)	5.1%	5.0%	(1.4%)	5.4%	(0.2%)	Current account % of GDP
12%	9%		138%	145%	28%	107%	94%	32%	32%		Market Cap % of GDP
(2.3%)	(2.7%)	(1.4%)	(4.1%)	(3.7%)	(13.6%)	(1.8%)	0.5%	(4.7%)	(5.4%)	(3.0%)	Govt. budget balance as a % of GDP
11%	49%	12%	46%	57%	90%	47%	37%	64%	59%	34%	Gross govt debt % of GDP
3%	28%	2%	41%	63%	14%	37%	26%	24%	38%	19%	External debt stock % of GDP
2%		36%	27%	68%	25%	42%	14%	2%	6%	2%	% pop'n earning > \$10/day
48.8	44.5	38.3	63.1	46.2	30.8	39.4	43.0	30.0	35.6	32.1	Gini co-efficient
8.9	34.6	36.0	33.2	79.9	10.4	17.2	11.7	6.3	2.0		Cars per 100 house-holds
19	97	88	72	97	95	86	45	46	55		Fridges per 100 house-holds
42.7	64.7	39.4	49.0	67.5	31.7	34.9	39.7	13.8	48.3	9.6	Internet users per 100 people
31%	29%		64%	154%	43%	144%	60%	33%	165%	46%	Trade as a % of GDP
18.3%	5.1%	9.7%	4.2%	7.2%	(4.5%)	(5.2%)	(3.9%)	(7.0%)	4.9%	(8.0%)	Net resource exports % of GDP
0%	4%	3%	11%	44%		43%	15%	8%	54%	18%	Manufacturing exports as % GDP
5%	15%		15%	15%	45%	21%	34%	16%	7%	9%	Services exports as a % of exports
94%	70%	90%	68%	41%	60%	30%	24%	32%	28%	6%	Resources exports % of total
3%	7%	7%	7%	11%	16%	17%	4%	3%	6%	1%	Food exports as a % of total
2%	5%	2%	5%	6%	18%	9%	13%	62%	32%	92%	Low value mfg exports % of total
1%	18%	1%	20%	42%	6%	44%	58%	3%	34%	1%	High value mfg exports % of total
India	Brazil		China	Singapore	Italy	China	Japan	US	US	US	Top export partner
13%	21%	0%	13%	14%	9%	12%	21%	15%	18%	21%	Share of top export partner
33%	34%	0%	26%	38%	24%	32%	48%	33%	38%	46%	Share of top 3 export partners

Notes: Data is latest available. Fixed capital stock calculated assuming 30-year life for fixed assets incorporating annual gross fixed capital formation data from the World Bank; Infrastructure data for 2013 or latest; Infrastructure quality scores from the WEF based on roads, railroad, ports, air travel, power and telephony; 7 is the maximum score. Population estimates from the UN. GINI co-efficient is the statistical dispersion of incomes of individuals in a country and a measure of income inequality. Resources, food, low and high manufacturing exports as a % of merchandising exports (i.e. ex-services). Cost of accessing power for businesses only. Patents refer to resident patent applications (by origin). China external debt stock as a % of GDP is a GS estimate, others from World Bank. Market cap as of the end of 2014 as a percent of 2014 GDP. Gross savings rate is national income less consumption and net transfers. Debt data for 2014.

Source: IMF, World Economic Forum, World Bank, OECD, UN, Times Higher Education, Wikipedia, Datastream, Bloomberg, Pew Research, CIA Factbook., Akamai State of the Internet Report, WIPO, EIA, UNComtrade, BP Energy Outlook.

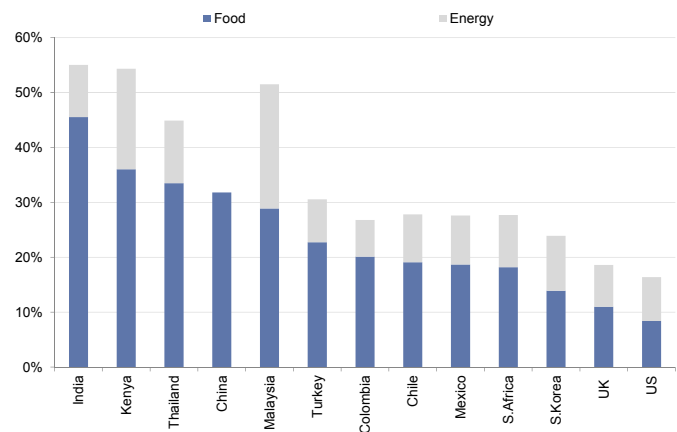
There are still constraints to be solved in EMs

China needs to solve for rising wages...
Yoy growth in wages



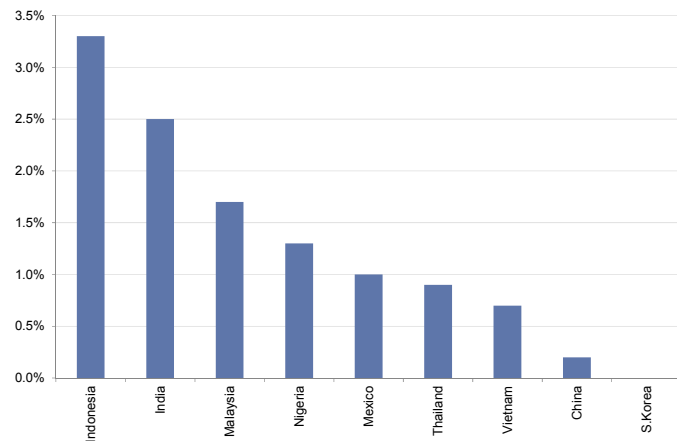
Source: ILO.

Food inflation may limit spending power...
Food and energy as a percentage of the CPI basket, latest



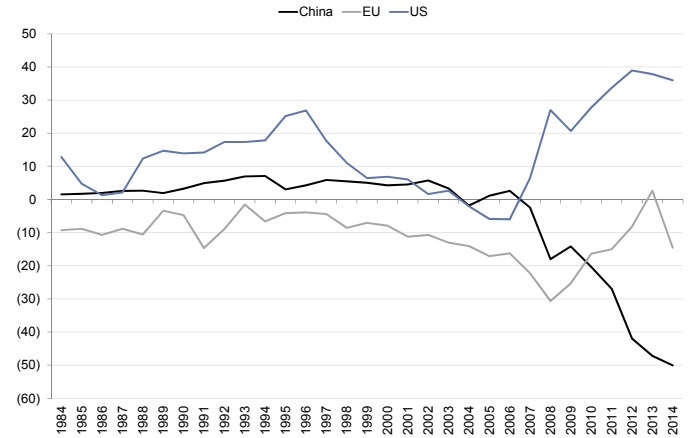
Source: Various national statistics offices, OECD (definitions may vary slightly).

EMs need to reduce reliance on fossil fuels...
Total fuel subsidy as a percentage of GDP in 2013



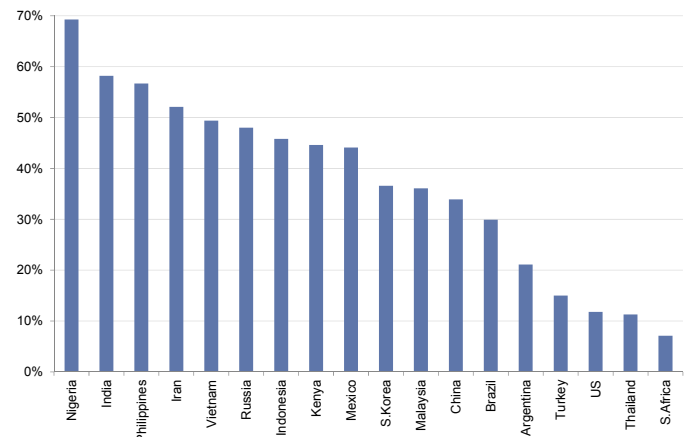
Source: IEA.

...and imbalanced food demand-supply
Net trade surplus/(deficit) for food, US\$ bn



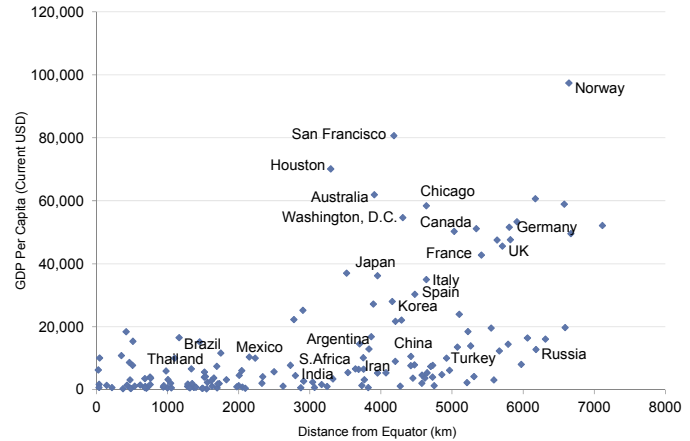
Source: World Bank.

...along with higher healthcare costs
Share of out-of-pocket expenditure in total expenditure on health, 2013



Source: WHO.

...and more economical solar power may be the key
Distance between the equator and city/country vs. GDP per capita, 2014



Note: Where the country is given, the distance taken is from the capital city.
Source: Wikipedia/World Bank.

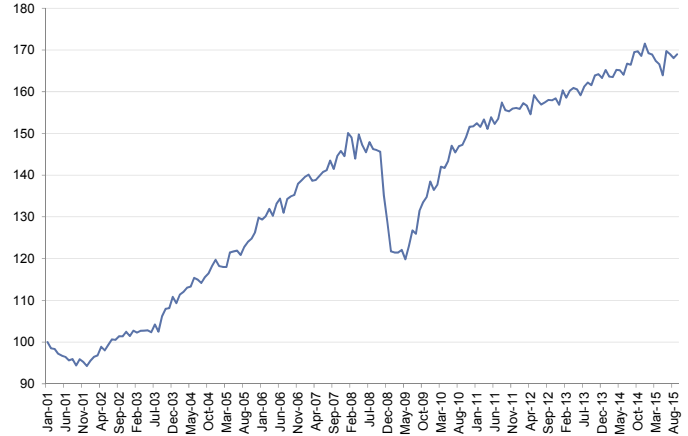
Changing nature of globalisation

China's increasing self-reliance is reflected in lower imports...
China imports and exports (August 2011=100)



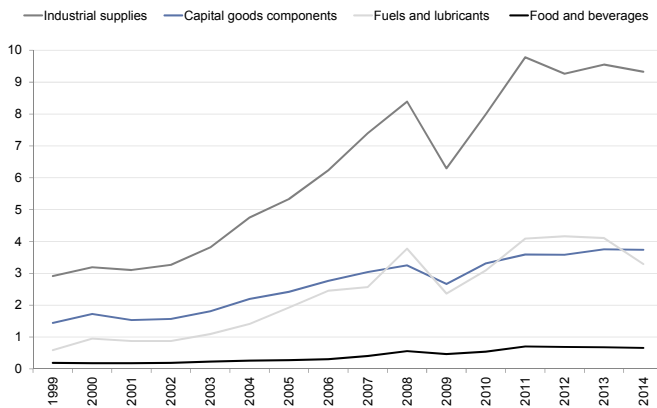
Source: Bloomberg.

...and weaker global trade
Global trade volumes, indexed to 2001



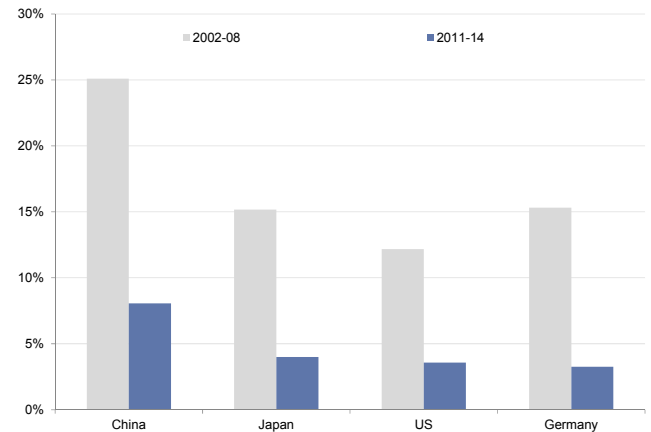
Source: CPB World Trade Monitor.

Intermediate goods trade flow has been weaker...
Global trade in intermediate goods, US\$ bn



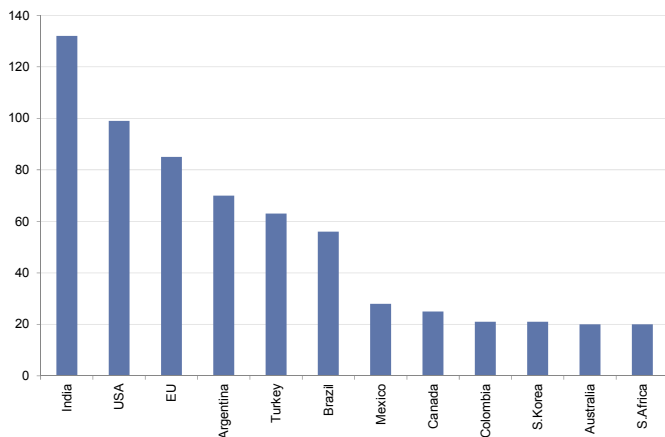
Source: UNComtrade, Bloomberg, OECD.

...driven mostly by China
CAGR in intermediate imports



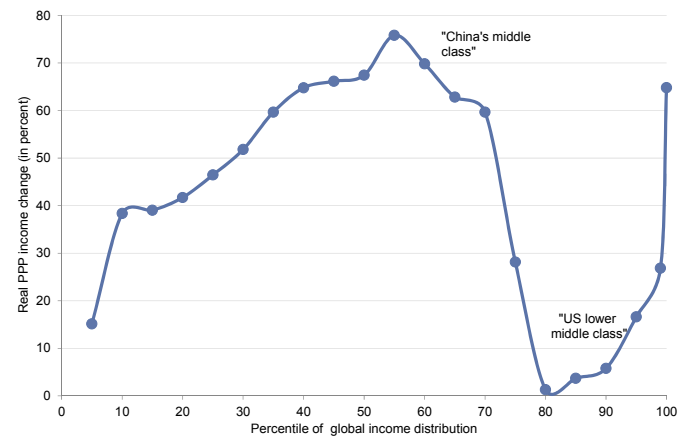
Source: UNComtrade, Bloomberg, OECD.

Is protectionism on the rise?
Number of anti-dumping measures imposed on China by country (1995-2014)



Source: World Bank.

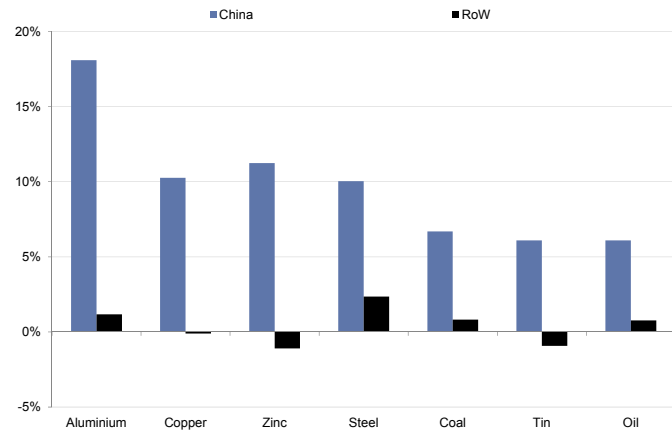
What will the next phase of globalisation look like?
Change in real income between 1988 and 2008 at various percentiles of global income distribution



Note: Calculated in 2005 international dollars
Source: Branko Milanovic.

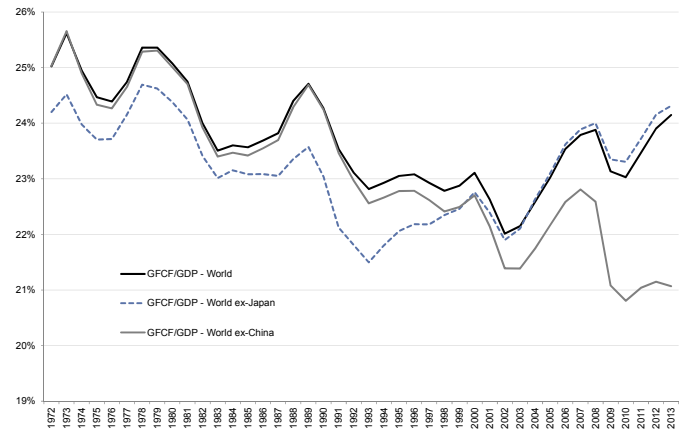
What does China's rebalancing mean for capex?

An outsized driver of resource demand...
Consumption CAGR, 2003 - 2015 (or latest)



Source: Bloomberg.

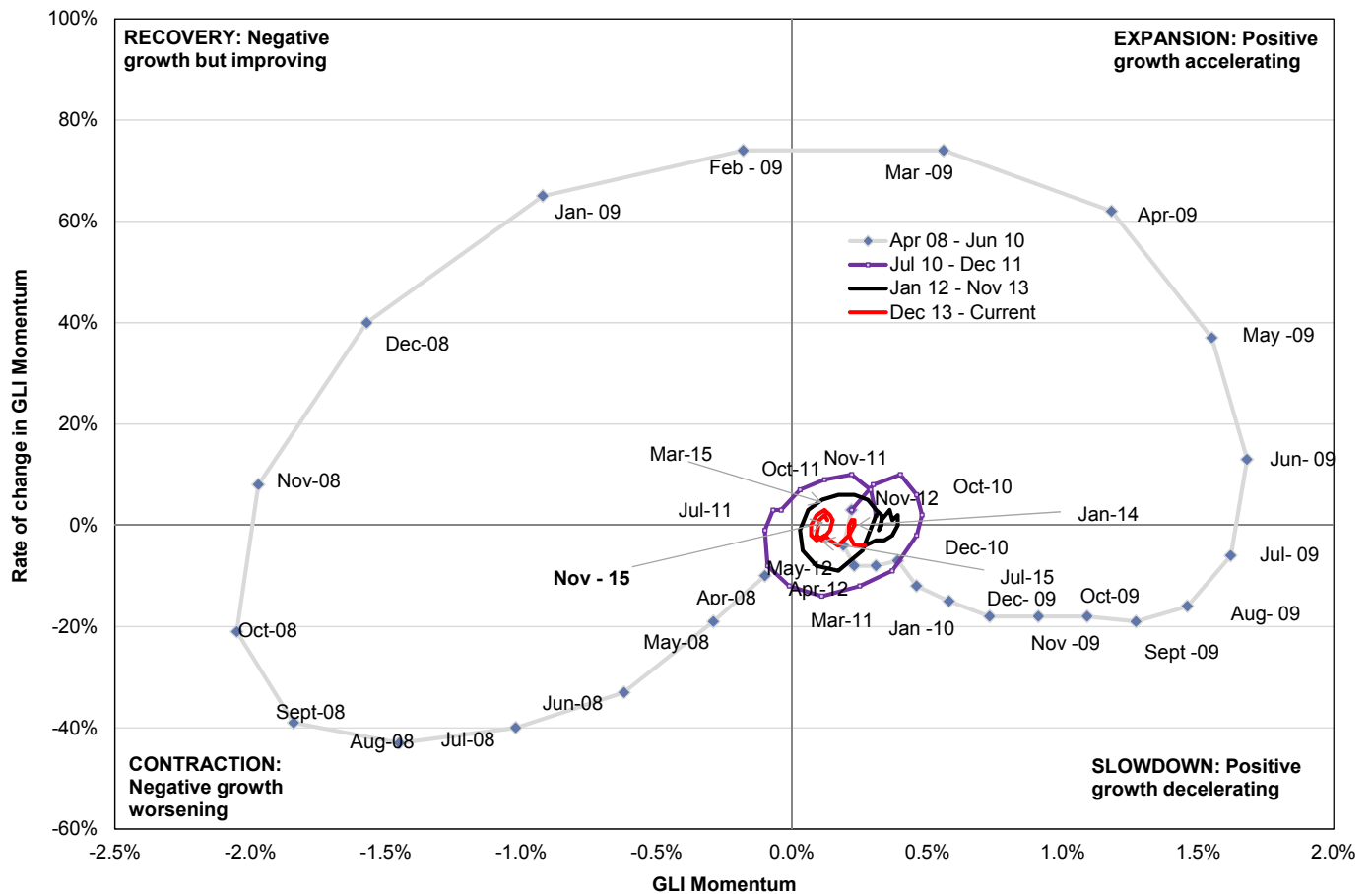
...and capex
Gross fixed capital formation as a % of GDP, 1972-2013



Source: World Bank.

But changing China adds to uncertainty...

Rate of change in Global Leading Indicator's momentum

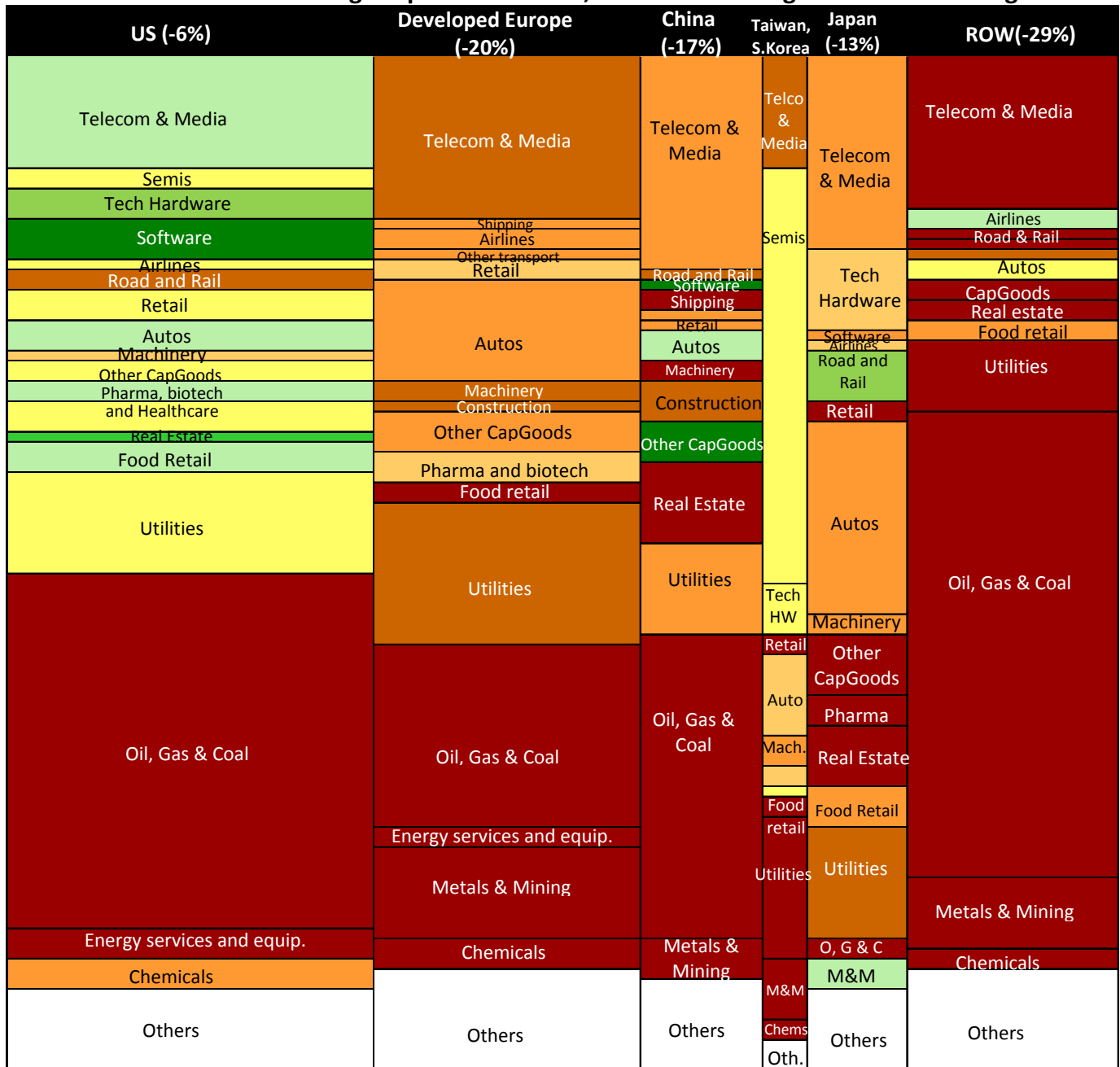


Note: The Global Leading Indicator is a Goldman Sachs proprietary indicator that is meant to provide an early signal of the global industrial cycle on a monthly basis.
Source: Goldman Sachs Global Investment Research.

Our capex heatmap – global capex by region and sector

Total capex for over 2,500 stocks covered by GS globally by region (width) and sector (height), coloured according to 2014-17E change (GS forecasts); dark green (high growth) to dark red (sharp decline)

2014 GS Global coverage capex breakdown, shaded according to 2014-17E change



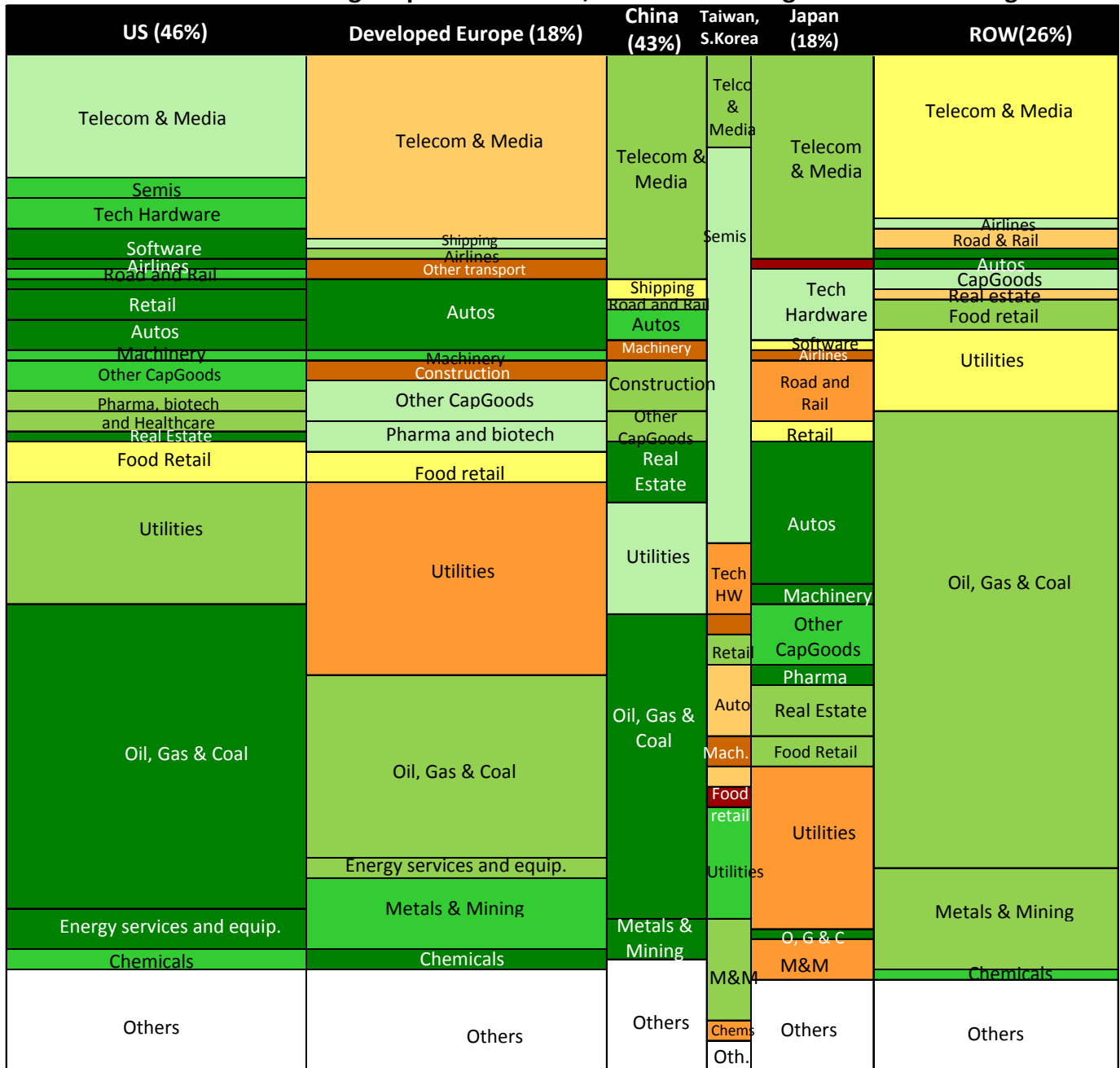
Note (1) For GS coverage where we have data for both 2014 and 2017 only; (2) Companies classified as Telecom & Media within GICS level 2 are amalgamated; (3) GICS level 2 classification is also used for Semis, Tech hardware, Software & Services, Retail, Autos, Food & Bevs., Pharma, Healthcare, Real Estate, Food Retail and Utilities; (4) GICS level 3 classification is used for Marine, Airline, Road & Rail, Machinery, Construction & Engineering, Oil, Gas & Coal, Energy Equipment & Services, Metals & Mining and Chemicals; (5) Transport categories include Marine, Airlines, Air Freight, Logistics, Transport Infrastructure and Road & Rail while Capgoods is the superset of Industrial Conglomerates, Building Products, Machinery, Electrical Equipment, Construction & Eng., Aerospace & Defense and Distributors; (6) As GICS level 2 & 3 classification is used for all companies, sector constituents may differ versus GS classification (for example: Amazon is considered within Retail for this analysis, although it falls under our Internet coverage).

Source: Goldman Sachs Global Investment Research.

Our capex heatmap – global capex by region and sector

Total capex for over 2,500 stocks covered by GS globally by region (width) and sector (height), coloured according to 2010-13 change (GS estimates); dark green (high growth) to dark red (sharp decline)

2010 GS Global coverage capex breakdown, shaded according to 2010-13E change



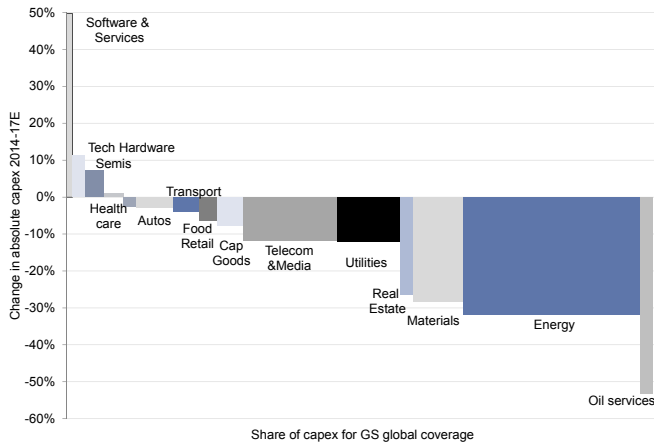
Note (1) For GS coverage where we have data for both 2010 and 2013 only; (2) Companies classified as Telecom & Media within GICS level 2 are amalgamated; (3) GICS level 2 classification is also used for Semis, Tech hardware, Software & Services, Retail, Autos, Food & Bevs., Pharma, Healthcare, Real Estate, Food Retail and Utilities; (4) GICS level 3 classification is used for Marine, Airline, Road & Rail, Machinery, Construction & Engineering, Oil, Gas & Coal, Energy Equipment & Services, Metals & Mining and Chemicals; (5) Transport categories include Marine, Airlines, Air Freight, Logistics, Transport Infrastructure and Road & Rail while Capgoods is the superset of Industrial Conglomerates, Building Products, Machinery, Electrical Equipment, Construction & Eng., Aerospace & Defense and Distributors; (6) As GICS level 2 & 3 classification is used for all companies, sector constituents may differ versus GS classification (for example: Amazon is considered within Retail for this analysis, although it falls under our Internet coverage).

Source: Goldman Sachs Global Investment Research.

Capex: Lower for longer

Capex should remain stagnant...

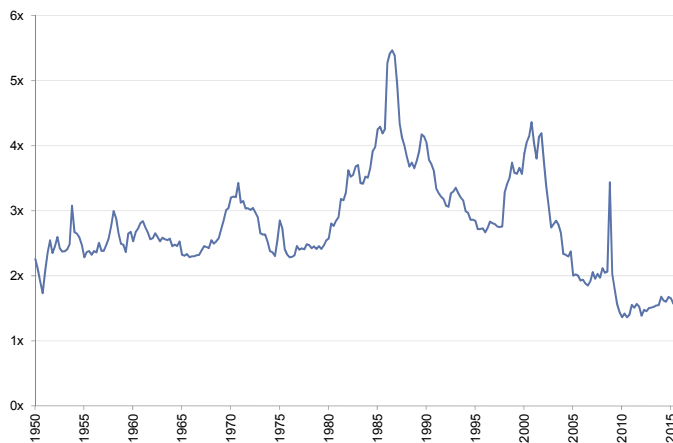
Share of capex in 2014 vs. change 2014-2017E, GS global coverage



Source: Goldman Sachs Global Investment Research.

Corporate hesitation to invest in growth...

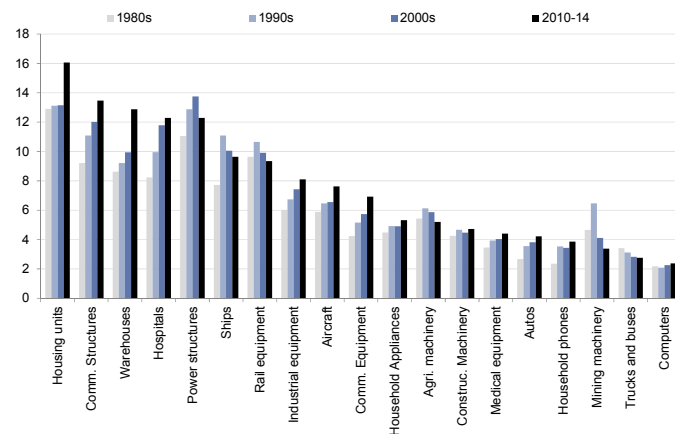
Ratio of fixed private investment to corporate profits after tax, US



Source: Federal Reserve.

Older assets may need renewal...

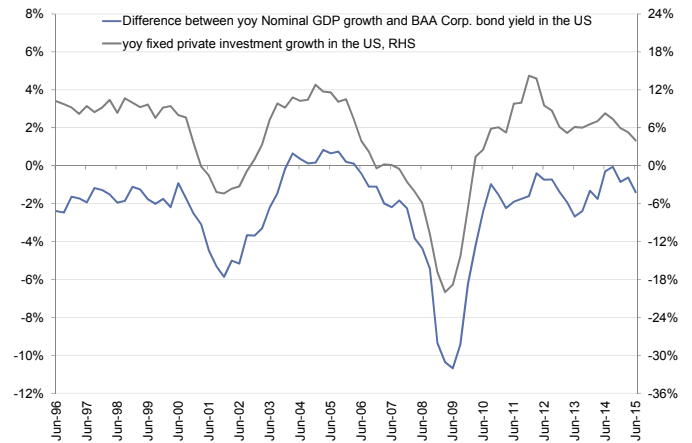
Average age of infrastructure in years, historical cost method, US



Source: BEA.

...as weak demand overshadows excess capital supply

Spread between GDP growth and corp. bond yield vs. private investment growth in the US

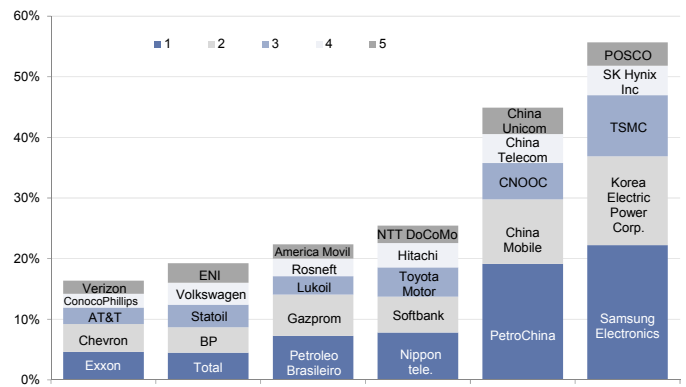


Note: Investment growth lagged by a quarter.

Source: Bloomberg, BEA.

...should continue given lower commodity prices

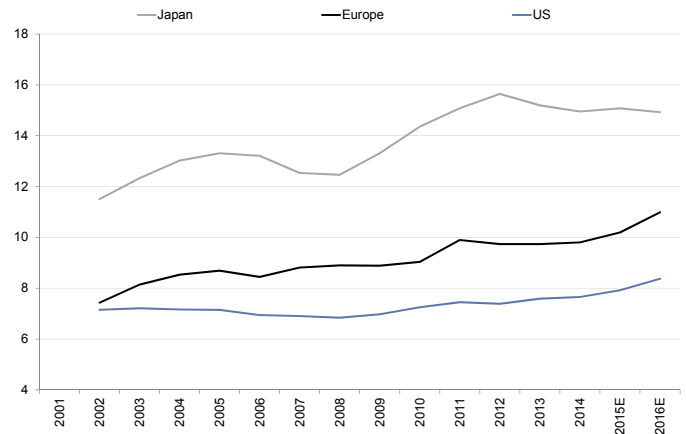
Share of top 5 companies in total regional capex, 2014, GS coverage



Source: Goldman Sachs Global Investment Research.

...but Japan shows that asset ages can rise much higher

Average age of assets in years for coverage, calculated as accumulated depreciation/annual depreciation, ex-financials

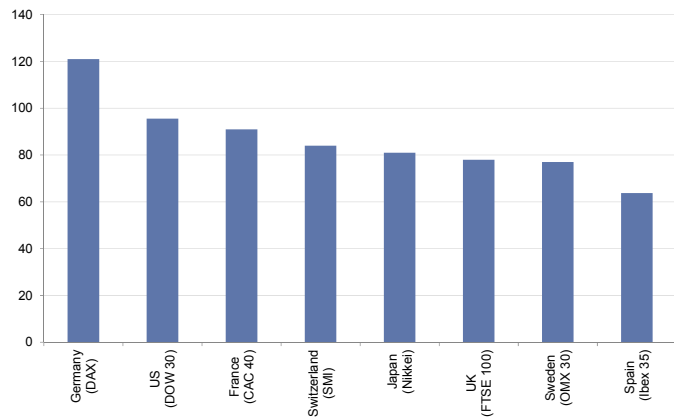


Source: Goldman Sachs Global Investment Research.

Tech reduces the need for capex

Well established incumbents...

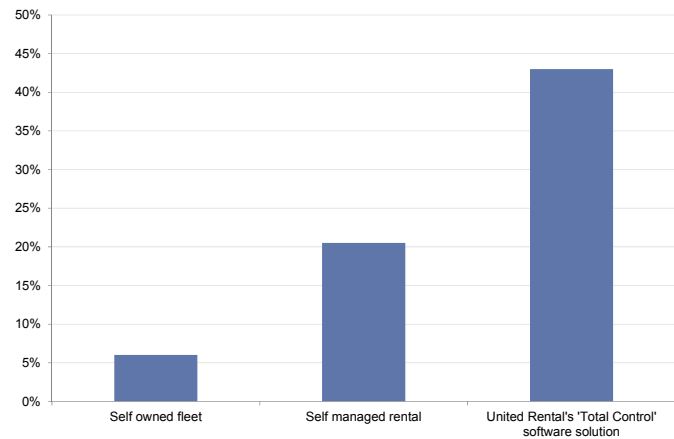
Median age of companies in stock indices, in years



Source: Datastream.

Tech increases utilisation of some assets...

Construction equipment utilisation rates

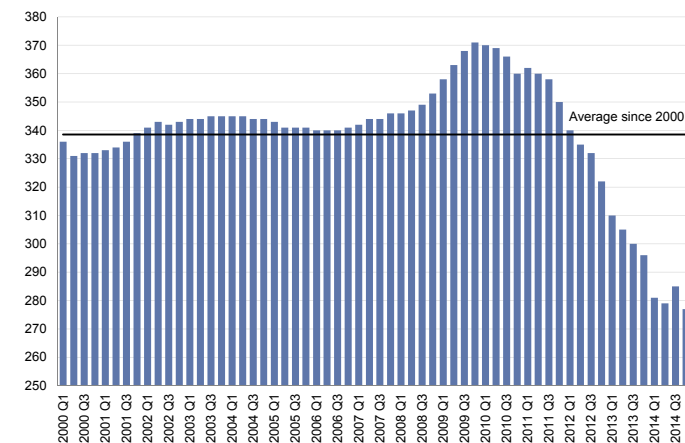


Note: Self-owned = no rental, self-managed = conventional rental, 'Total-Control' = using software for optimized fleet management and rental.

Source: Company data.

Demand for assets (like office space) may also reduce...

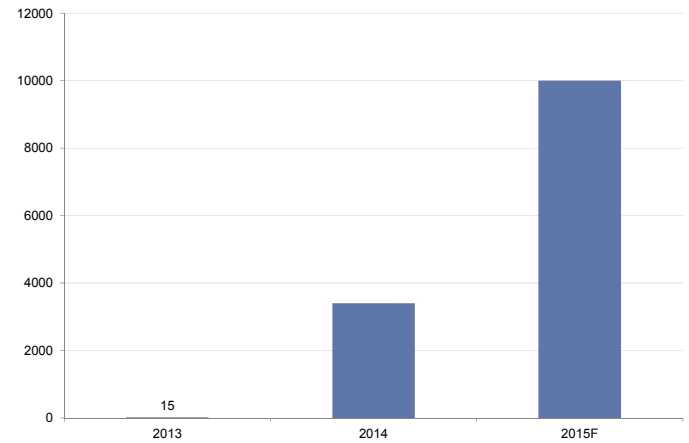
Space per worker in the US, sq. ft.



Note: Property Portfolio of largest 54 markets; considers Class A & B >5 tenants. Source: Analysis by Norm G. Miller, University of San Diego; CoStar data

...will need to adopt tech

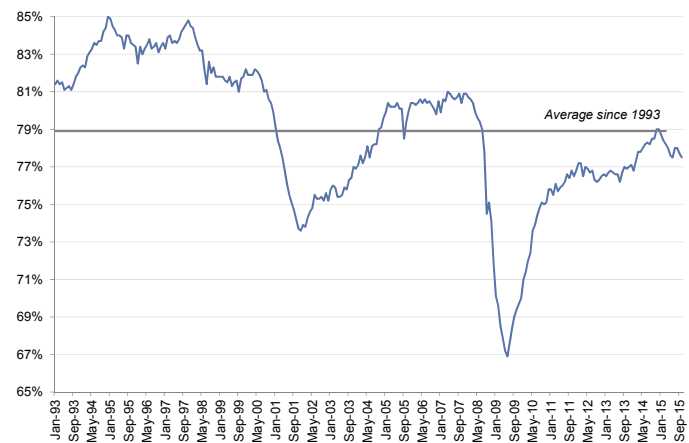
Flights tracked by GE for full flight analytics (GE Predictivity), '000s



Source: Company data.

...keeping overall capacity underutilised

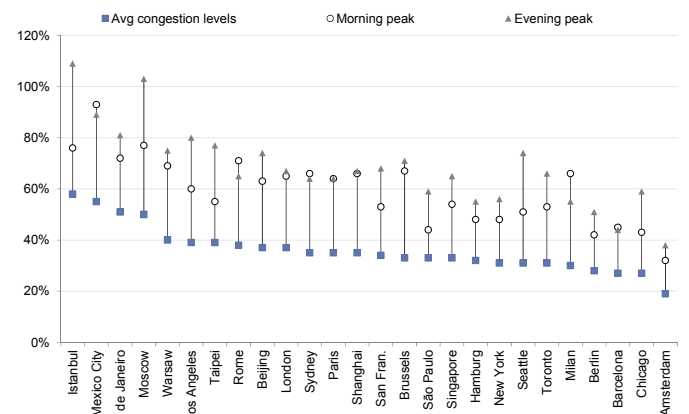
Industry capacity utilization in the US, Jan 1993 to Oct 2015



Source: Federal Reserve.

...if tech allows for more efficient solutions (working at home)

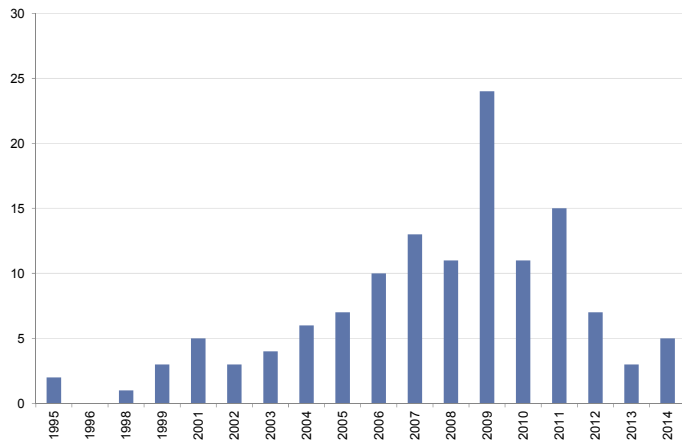
Increase in travel times v time taken during non-congested periods



Note: Based on GPS data for the year 2014. Source: TomTom traffic index, Goldman Sachs Global Investment Research.

The era of disruption

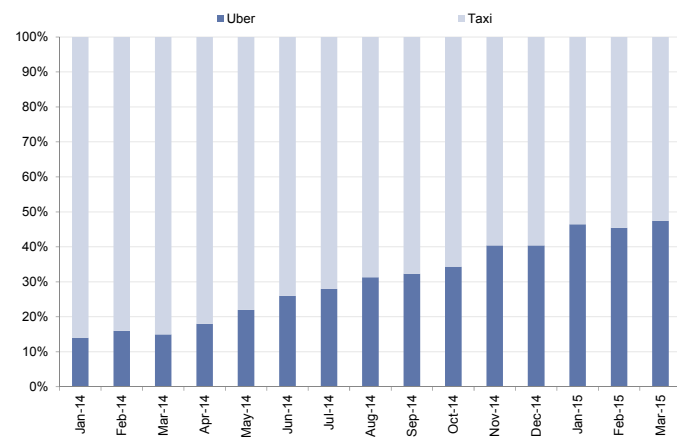
Abundance of capital = abundance of new competitors...
Current unicorns by year founded



Note: Unicorns are privately held companies with US\$1bn or more in valuation, data as of December 8, 2015.
Source: Wall Street Journal.

Disruptive threats from privates...

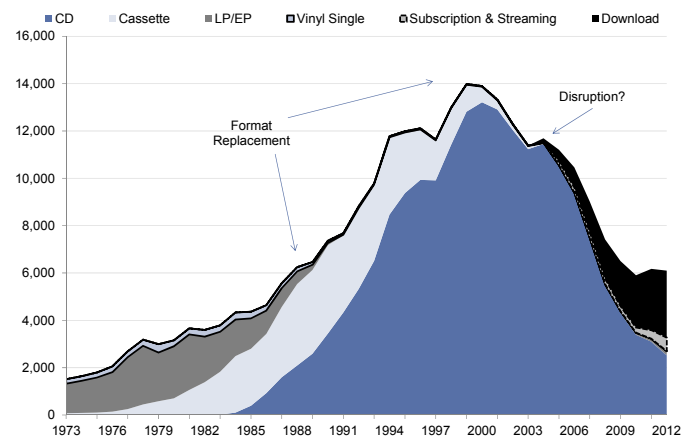
Share of total paid car rides for business users, US



Source: Certify SpendSmart Report 1Q15.

Entertainment sets the template...

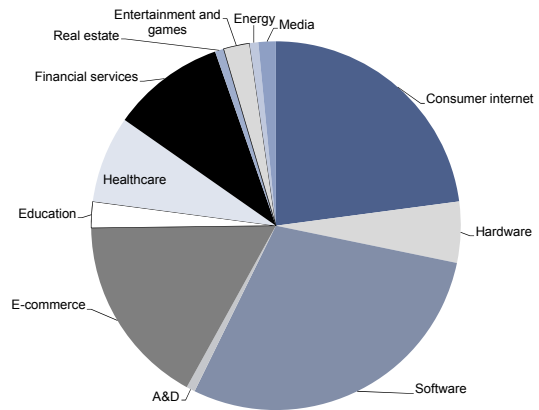
Sales of CDs, cassettes, LP/Eps, subscription & streaming and legal downloads



Source: RIAA, Goldman Sachs Global Investment Research

...across many sectors

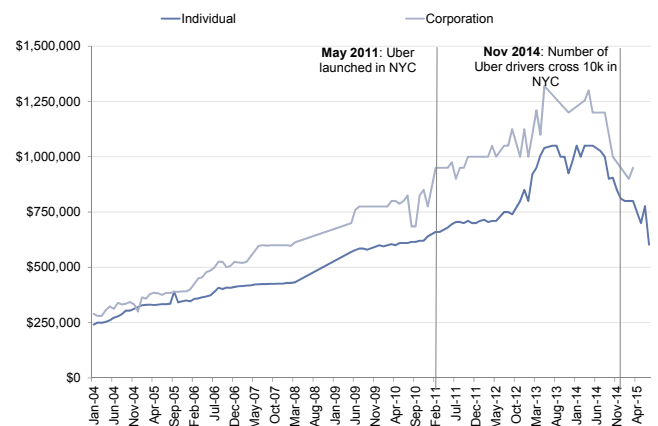
Number of unicorns by sector



Note: Unicorns are privately held companies with US\$1 bn or more in valuation, data as of December 8, 2015.
Source: Wall Street Journal.

...are materialising

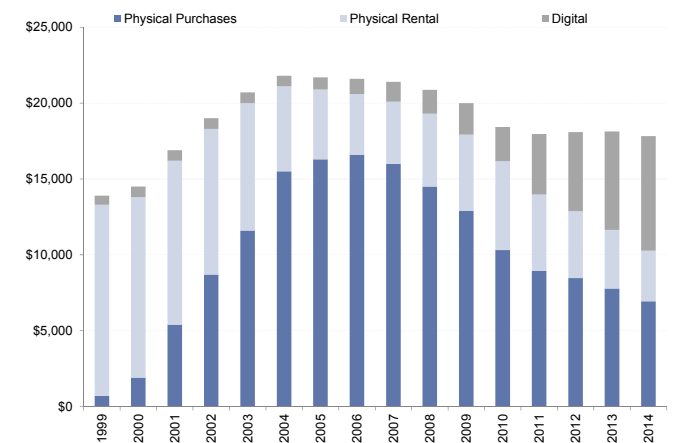
Individual and corporation Medallion prices in NYC



Source: NYC taxi and limousine commission.

...for tech reshaping revenue pools

US home entertainment spend, US\$ bn

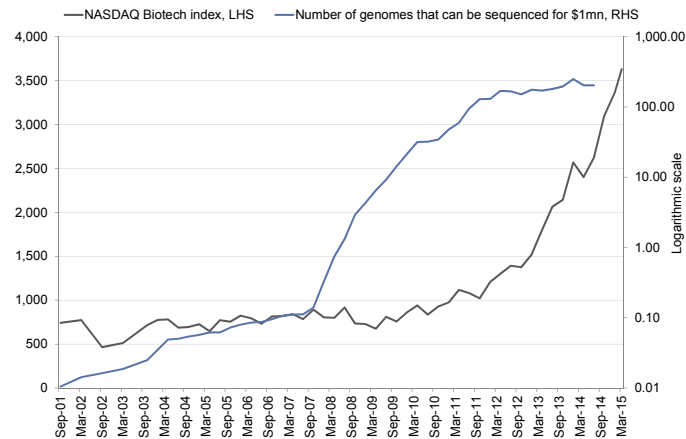


Source: Digital Entertainment Group, SNL Kagan.

Few industries are immune

Healthcare to change via supercomputing power...

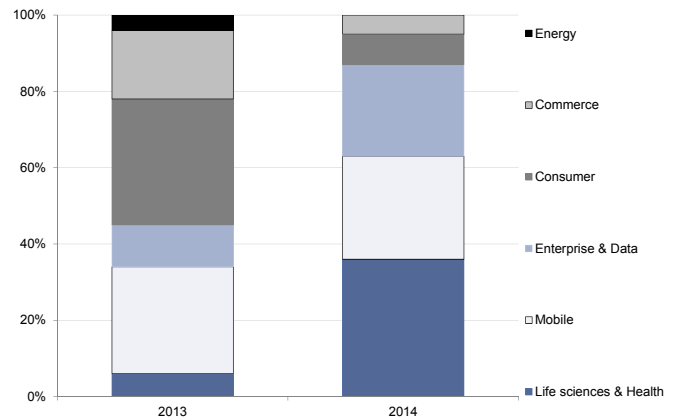
Number of genomes sequenced for US\$1 mn over time versus NASDAQ Biotech Index



Source: Bloomberg, National Human Genome Research Institute.

...and new capital coming in

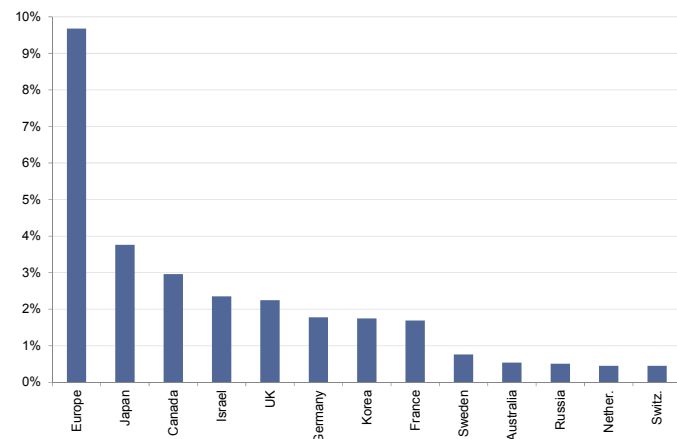
Google Ventures investments (new investments only)



Source: Google Ventures.

The US is still dominant...

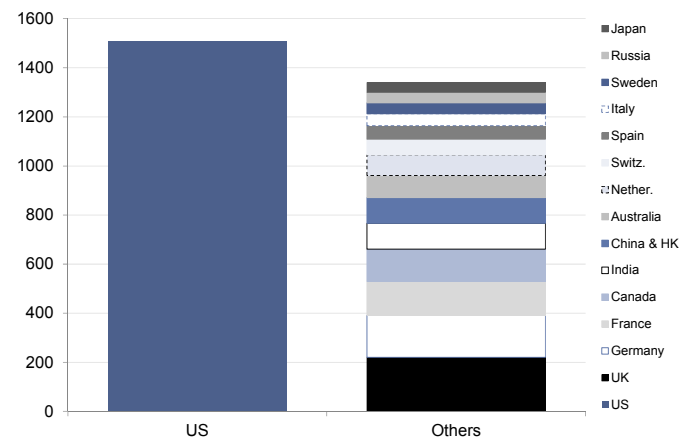
Venture capital investments per country as a % of US (2014, or latest available)



Source: OECD.

...when it comes to tech

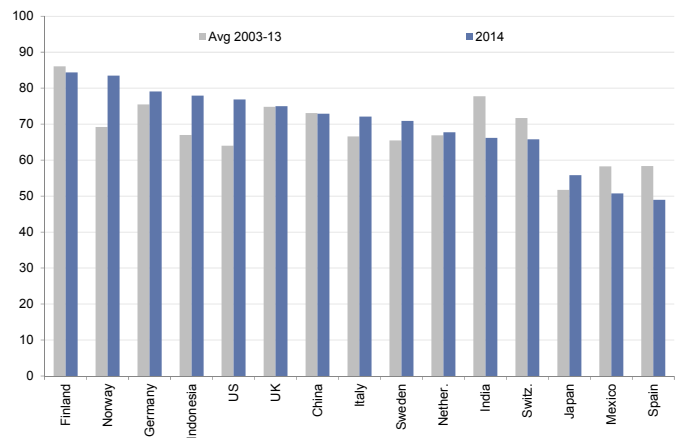
Number of colocation data centers in the US vs. others (2015)



Source: Data Center map.

A more positive attitude towards entrepreneurship in the US...

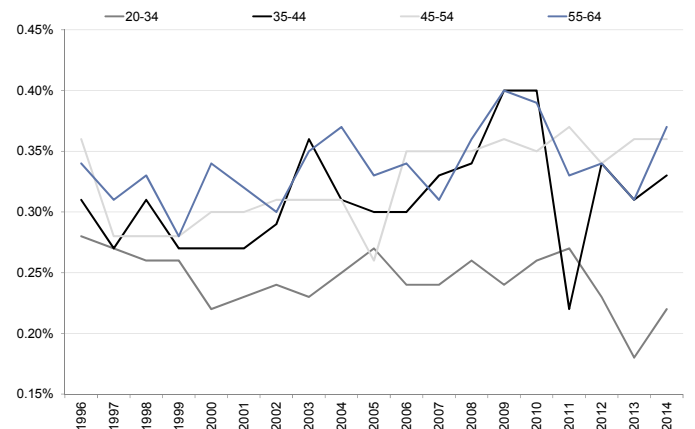
Percentage of 18-64 population who agree that in their country, successful entrepreneurs receive high status



Source: GEM consortium.

...across all age groups

Rate of new entrepreneurs by age, US

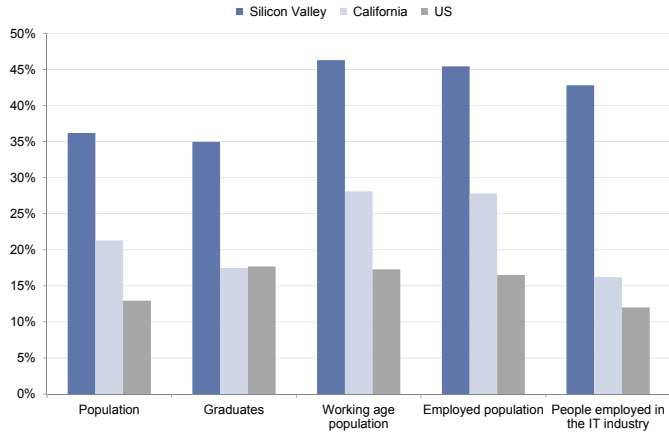


Note: % of individuals who do not own a business in the first survey month, but start a business in the following month with 15 or more hours worked.
Source: Kaufmann Foundation.

Importing talent...

A honeypot of ideas

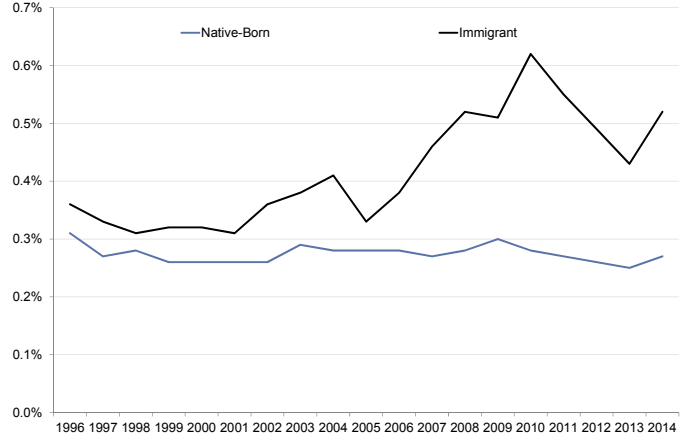
Share of foreign born people in...



Note: Data obtained for 2009-2013
Source: US Census Bureau.

A big advantage for the US

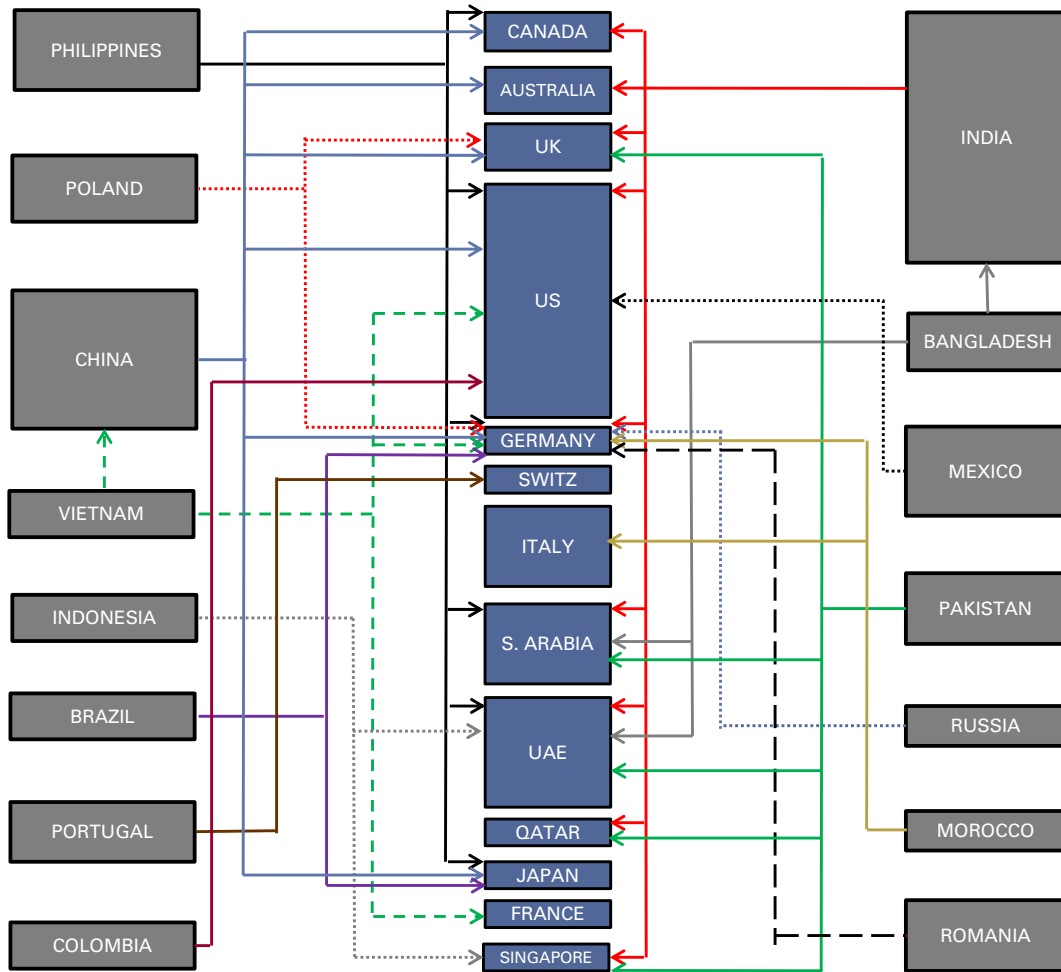
Percent of adult population becoming entrepreneurs, monthly average, US



Source: Kaufmann Foundation.

Tracking people flows

2000-13, net people outflow and inflow countries (in grey and blue respectively)

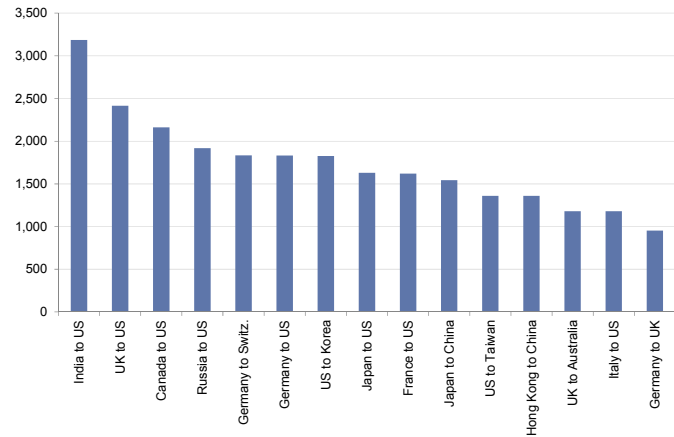


Note: Major people flows highlighted. Size of the box depicts size of net inflows/outflows; note that line colours are only meant to make flows easier to follow.
Source: Goldman Sachs Global Investment Research, UN.

...innovators, leaders and young people

Welcoming ideas...

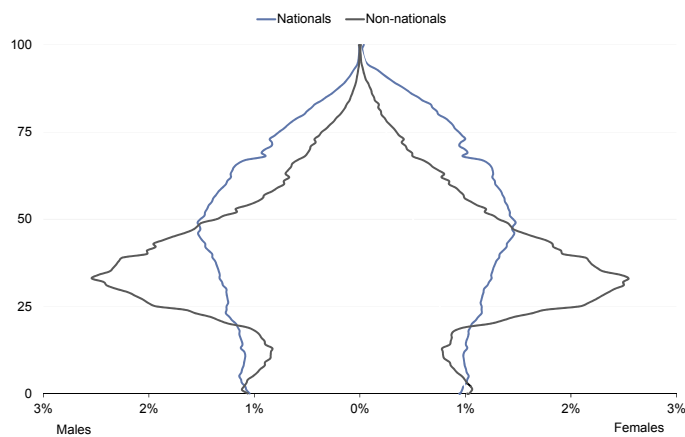
Largest bilateral flows of patent holders, 2000-10



Source: OECD.

Immigrants change population structures...

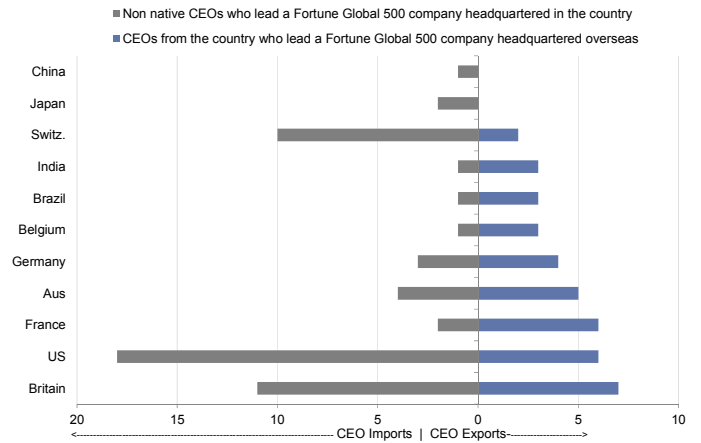
Age structure of national and non-national populations, EU, 2014



Source: Eurostat.

...and leaders

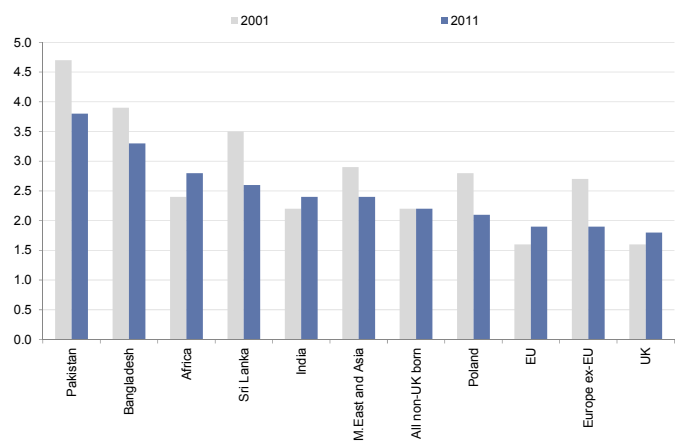
CEO imports and exports, as of 2013



Source: HBR.

...and this is helped by higher fertility

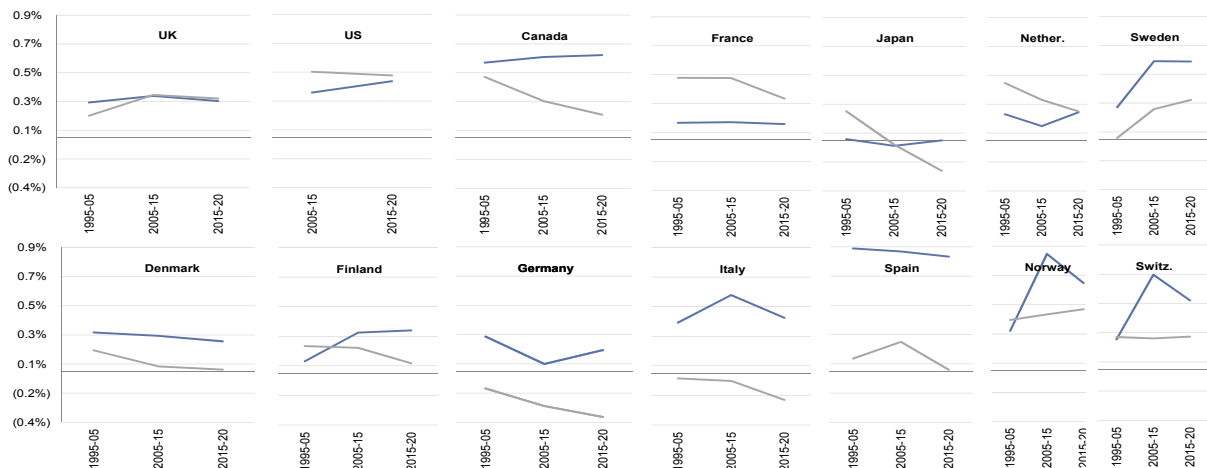
Total fertility rates in the UK, by country of birth of mother (native and immigrants), 2001 and 2011



Source: ONS.

Who is driving population growth?

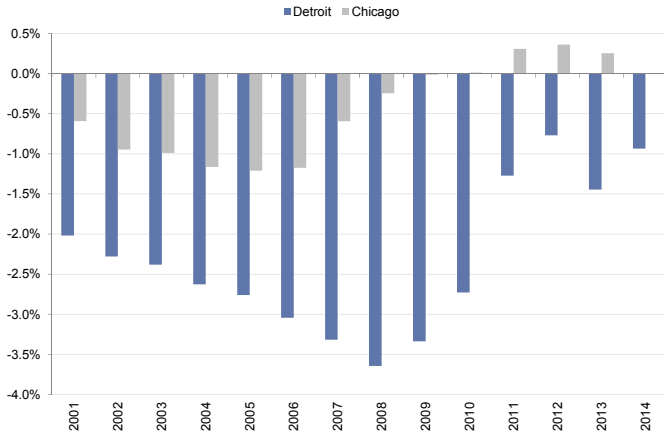
Change in native population (in grey) and immigrant population (blue) as a % of total population of previous year, average across time periods



Source: Goldman Sachs Global Investment Research, UN.

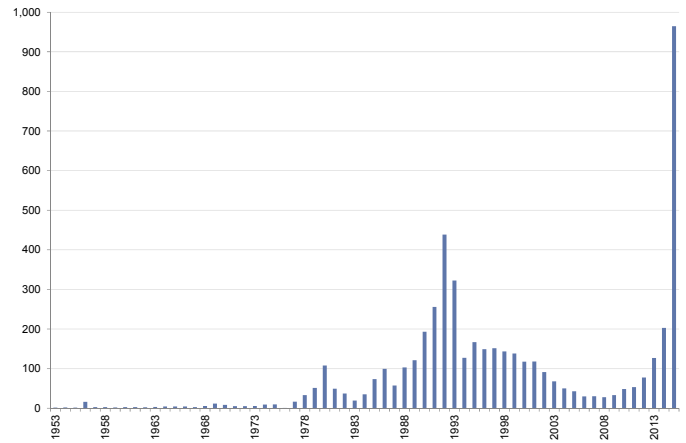
Matching demand and supply

Some places are looking for people...
Yoy population change



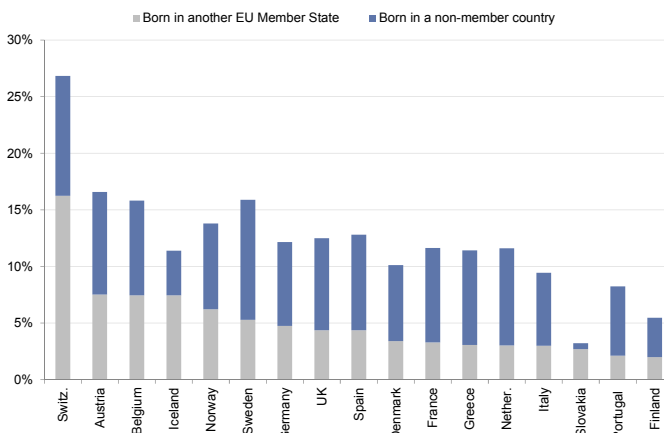
Source: US Census Bureau.

...while lots of people are looking for places to go to
Applications for political asylum in Germany ('000s)



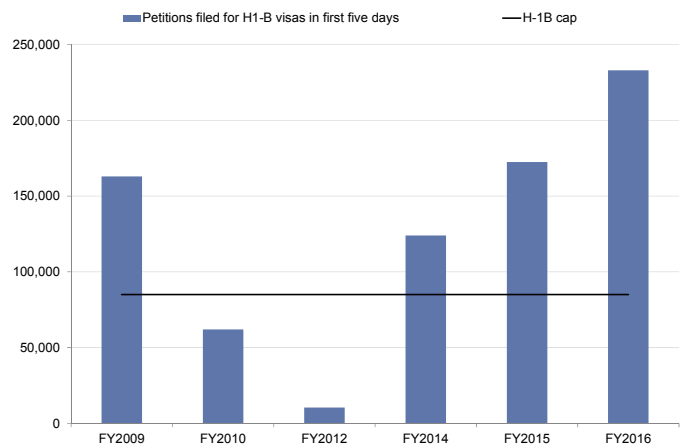
Note: Data for 2015 is up until the end of November 2015.
Source: German Federal Immigration Agency.

Rethinking people supply...
Foreign born as a proportion of population, 2014



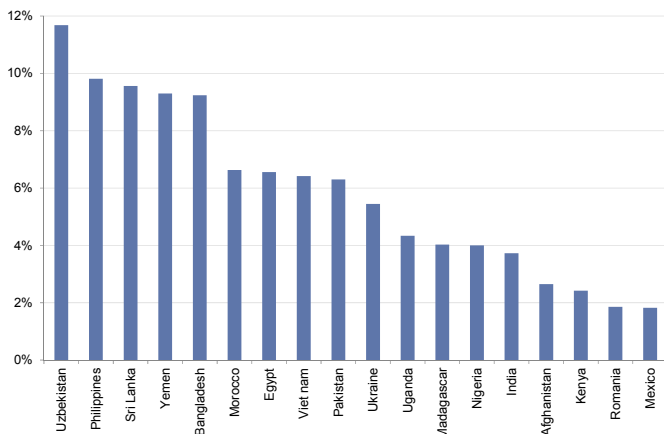
Source: Eurostat.

...and people demand
Petitions filed for H1-B visas in the first five days of cycle, US



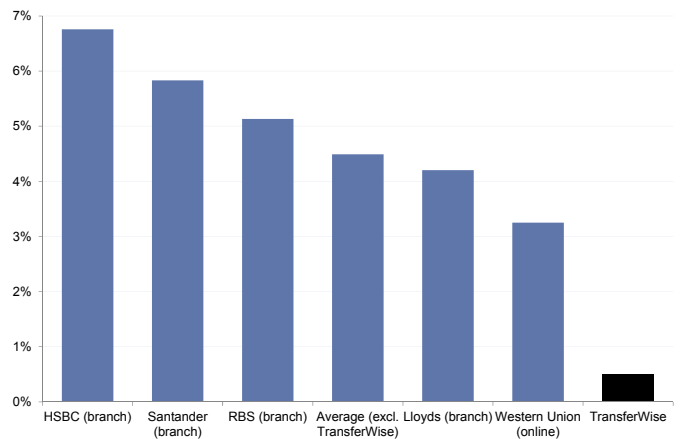
Source: USCIS.

When people flow, so does money
Remittance inflows as a % of GDP, 2014



Source: UN.

An industry ripe for change
Total cost of sending £1000 from UK to Germany

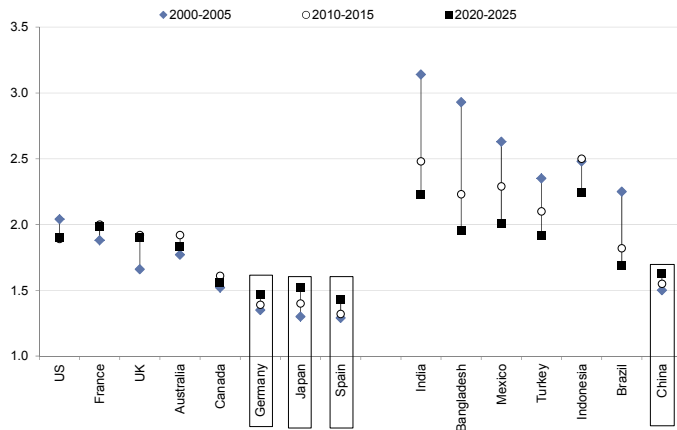


Source: TransferWise (Survey conducted by Charterhouse Research).

The economics of having children

A bump in bumps

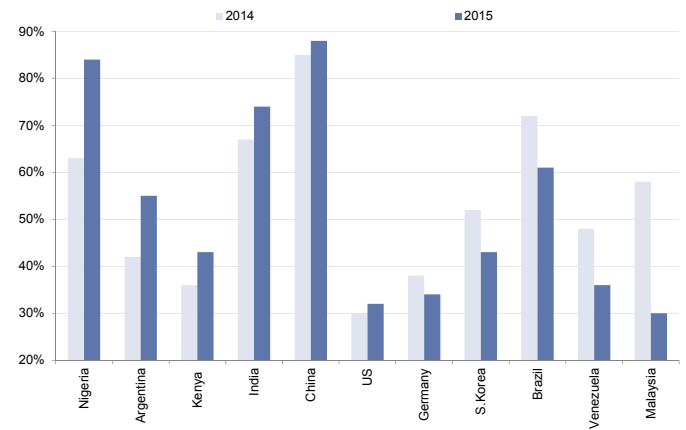
Fertility rates across countries



Source: UN.

An uncertain future

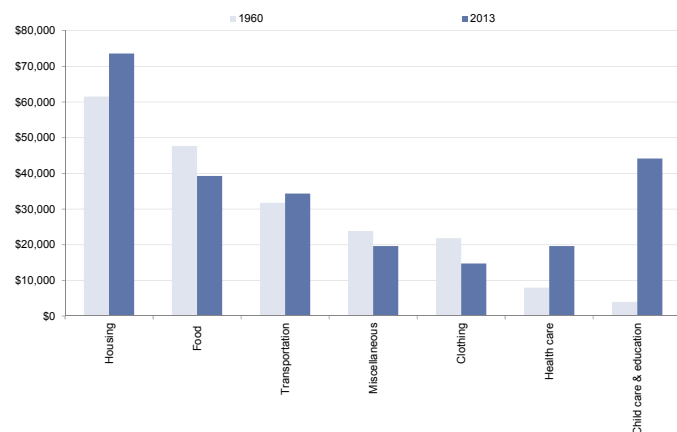
Percentage of respondents that say children, when they grow up, will be financially better off than their parents



Source: Pew World Research.

More expensive to raise children...

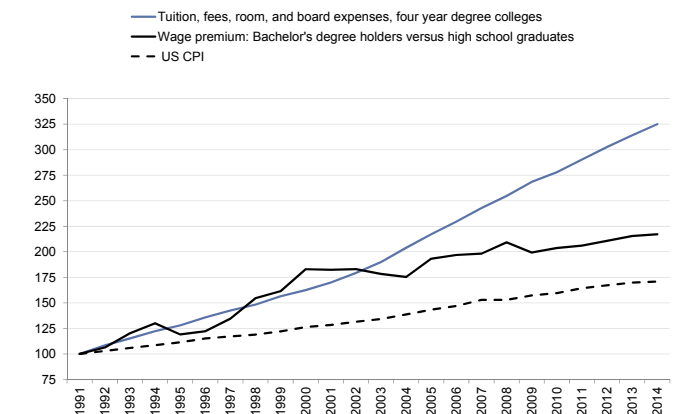
Child rearing expenditures from birth through to age 17, US



Note: 2013 prices; for a two-child, middle-income married couple family.
Source: US Department for Agriculture.

...and send them to college

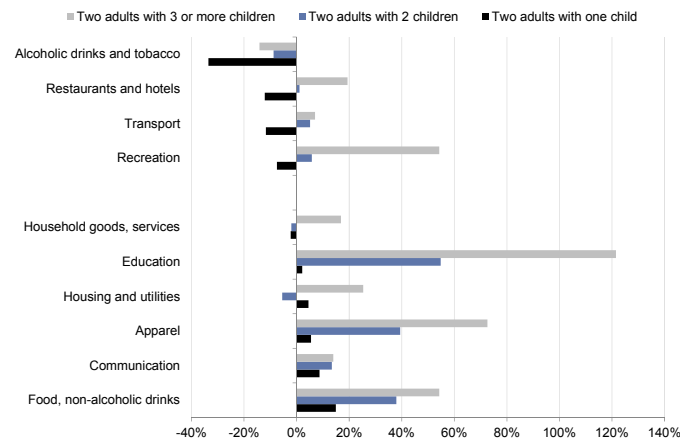
Average fee of 4 year degree colleges, US CPI and difference in mean earnings of high school graduates and degree holders, US



Source: US Census Bureau, NCES, BLS.

Not suitable for kids

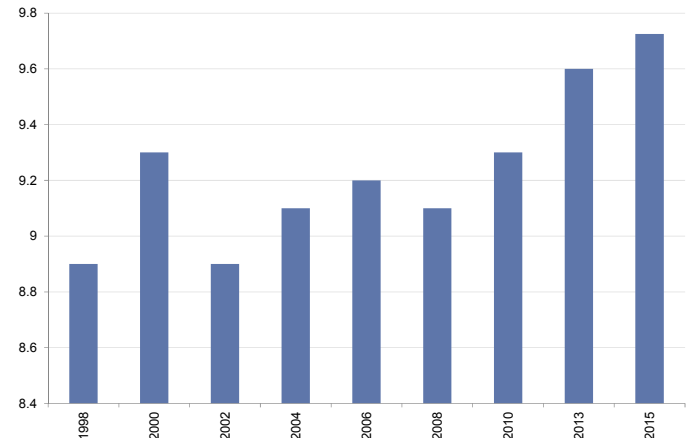
Difference in weekly spending versus two-adult households without children, UK, 2014



Source: ONS.

Keep an eye on population forecasts

Population projections over time for 2050, bn

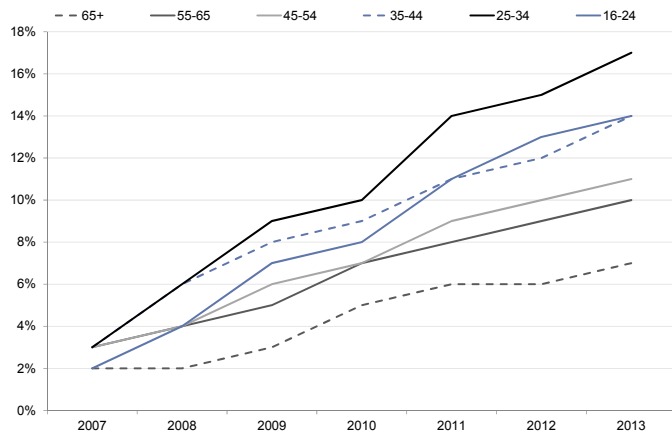


Source: UN.

Younger households are driving shifts in consumption habits

Convenience...

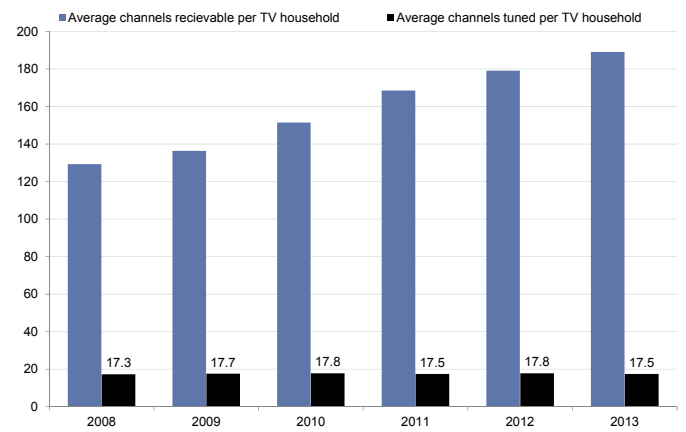
Proportion of time shifted viewing (through TV catch-up services like BBC iPlayer etc. or by storing on DVRs or other recording devices) of television by age, UK



Source: OFCOM, BARB, network, based on average daily minutes.

...over choice

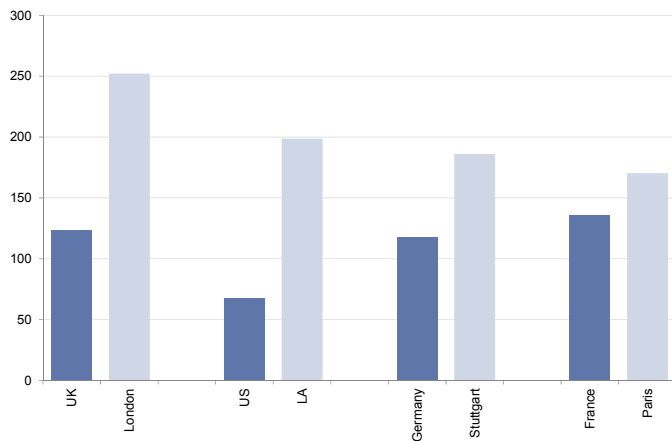
Number of channels receivable and tuned per household in the US



Source: Nielsen.

Lower incentives to drive...

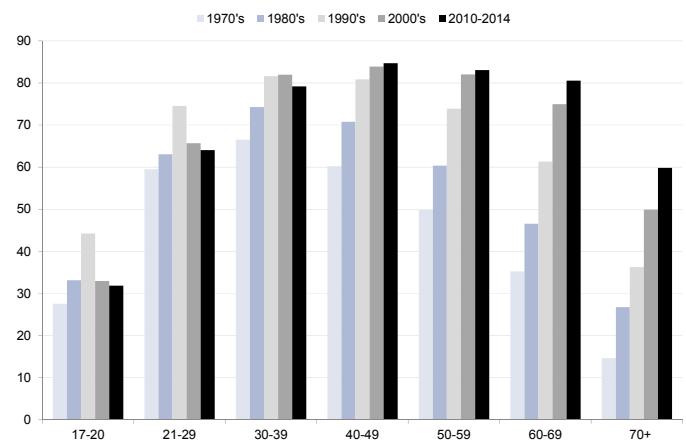
Estimates of avg annual hours wasted in congested traffic, 2013



Source: CEBR report, INRIX.

...mean fewer licenses issued

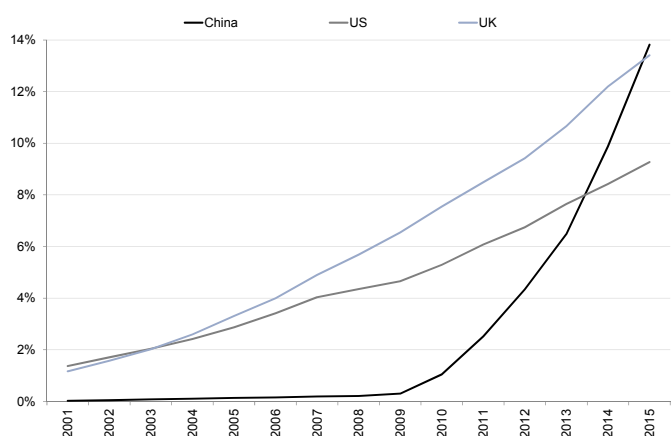
Car driving licence holders by age, Great Britain



Source: Department for Transport statistics, UK.

A shift towards online convenience

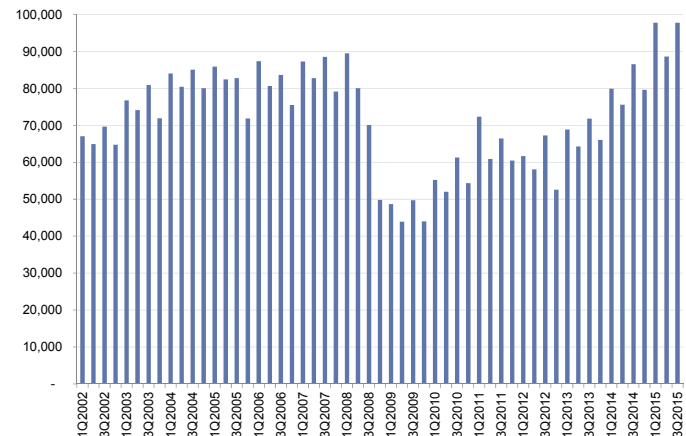
Percentage of retail sales conducted online



Source: Euromonitor.

...isn't bad news for everyone

Number of commercial vans registered in the UK

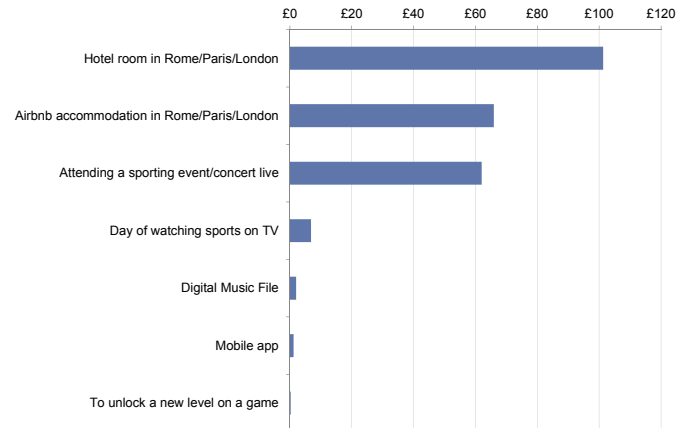


Source: Society of Motor Manufacturers and Traders.

Our annual intern survey sheds more light on how young consumers spend

Experience pays

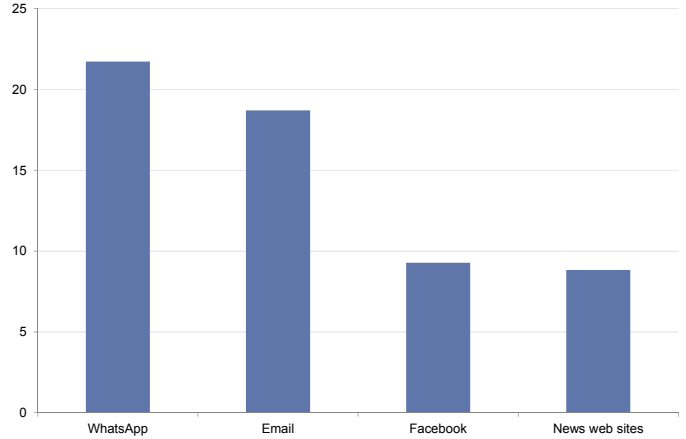
How much would you pay for on average...?



Source: Goldman Sachs Fortnightly Thoughts intern survey, 2015.

Sense checking

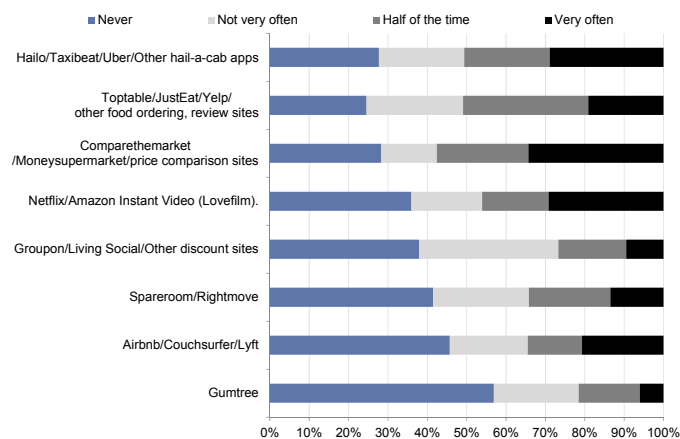
How many times on average do you check the following per day?



Source: Goldman Sachs Fortnightly Thoughts intern survey, 2015.

Price transparency, very visible

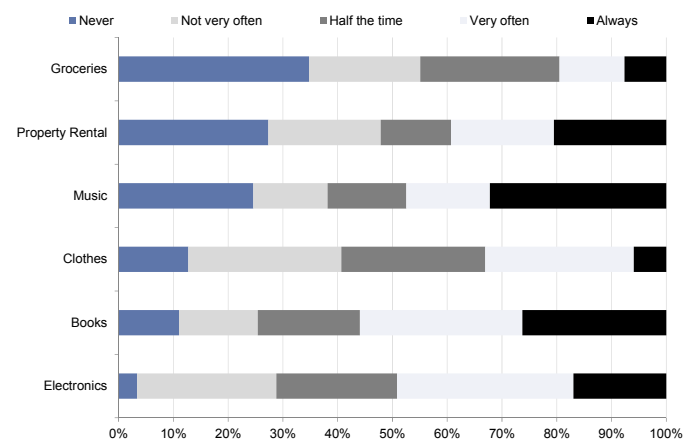
How often have you used the following?



Source: Goldman Sachs Fortnightly Thoughts intern survey, 2015.

Internet trolleys

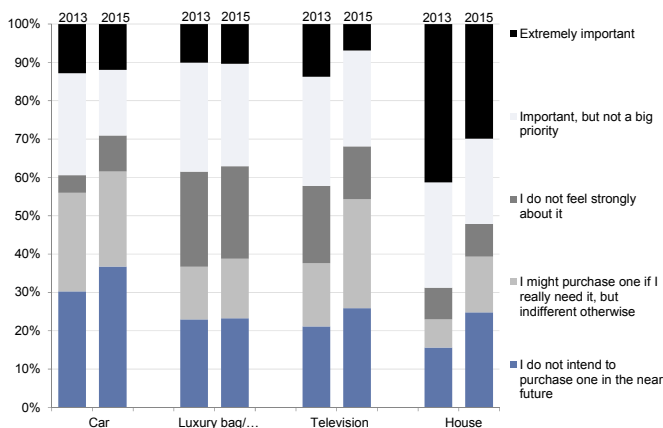
How often would you purchase the following online?



Source: Goldman Sachs Fortnightly Thoughts intern survey, 2015.

Exercising choices

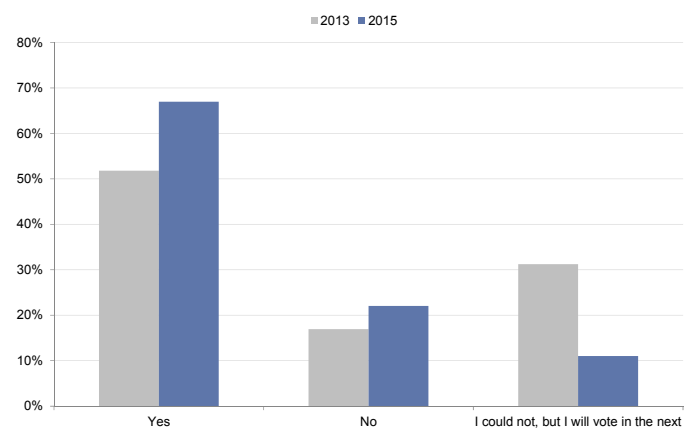
How important is it for you to own the following?



Source: Goldman Sachs Fortnightly Thoughts intern survey, 2015.

Cars less desirable

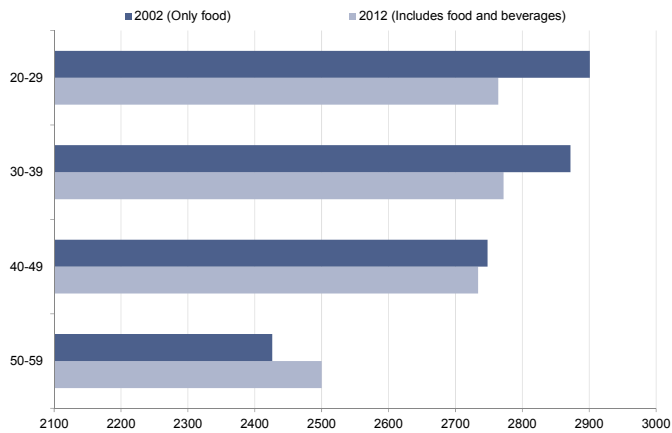
Did you vote in the previous election?



Source: Goldman Sachs Fortnightly Thoughts intern survey, 2015.

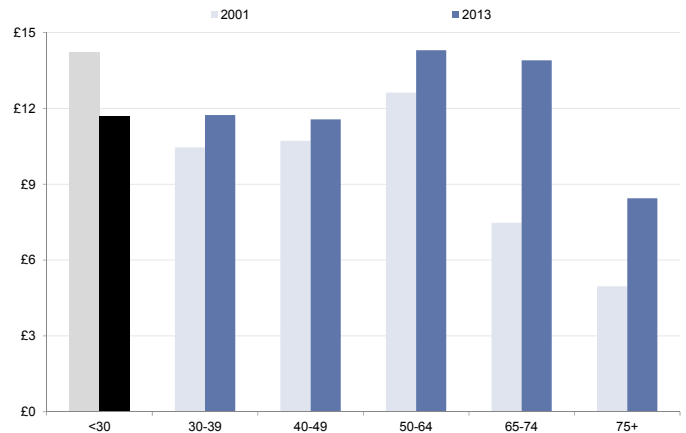
Changing habits reflected in diets

The young are consuming fewer calories...
 Calorie consumption per day by age, men, US



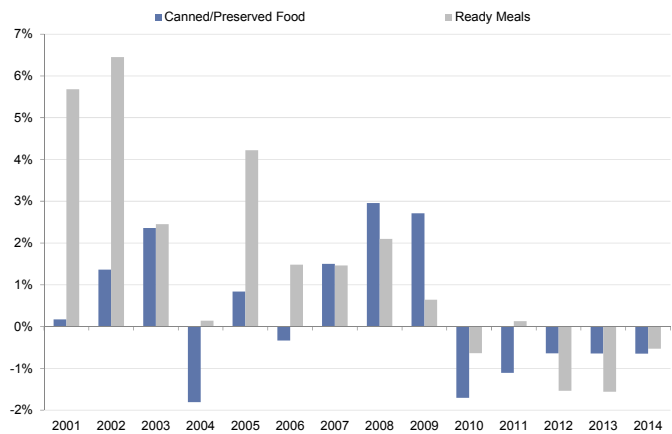
Source: USDA "What we eat in America" survey.

...thanks in part to more meals at home
 Expenditure on food and drink eaten outside the household by age of household reference person in the UK (£ per week)



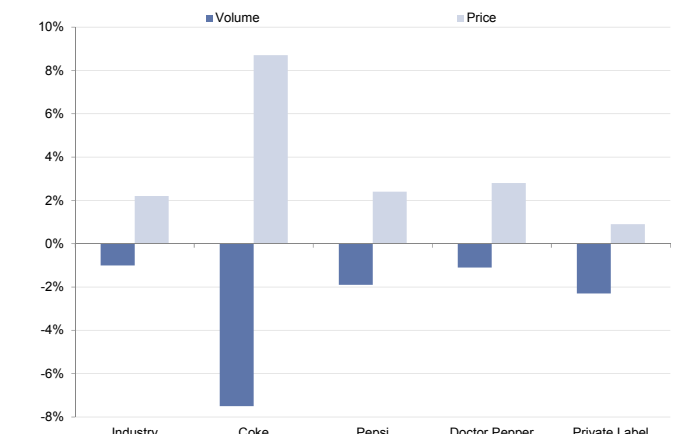
Source: UK Government.

More effort into dinner...
 Yoy change in per capita sales of canned food and ready meals, US



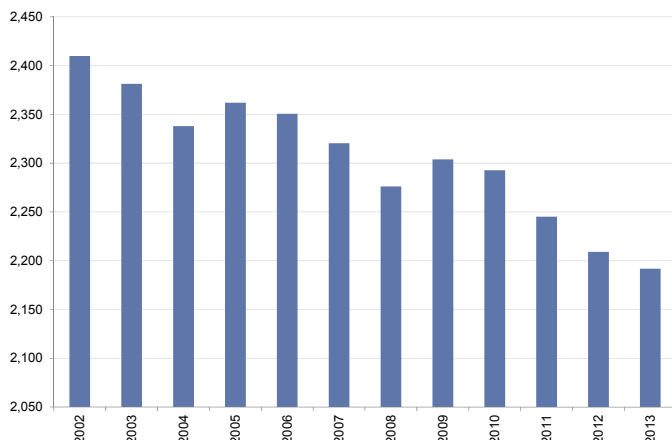
Source: Euromonitor.

...and less sugar in drinks
 Sales yoy %, carbonated soft drinks, as of March 21, 2015, US



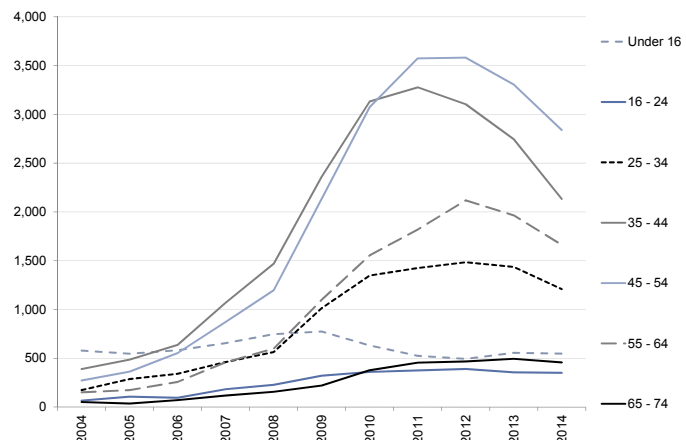
Source: Nielsen, Goldman Sachs Global Investment Research.

Does fewer calories being consumed...
 UK average daily calories consumption in kcal per capita



Source: UK Government Survey.

...mean we've passed the peak on obesity?
 Inpatient admissions with a primary diagnosis of obesity, UK

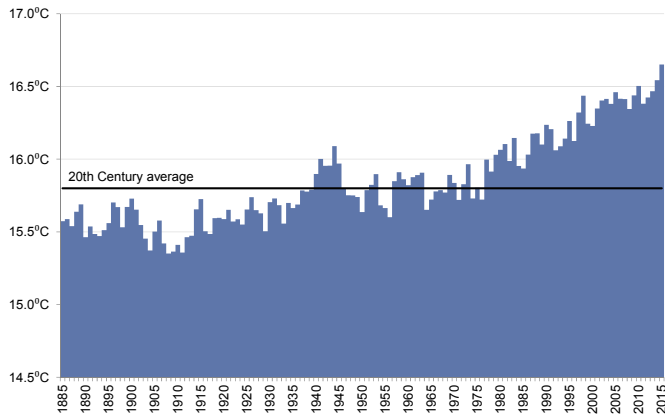


Source: Health and Social Care Information Centre.

The climate for change

It's getting warmer...

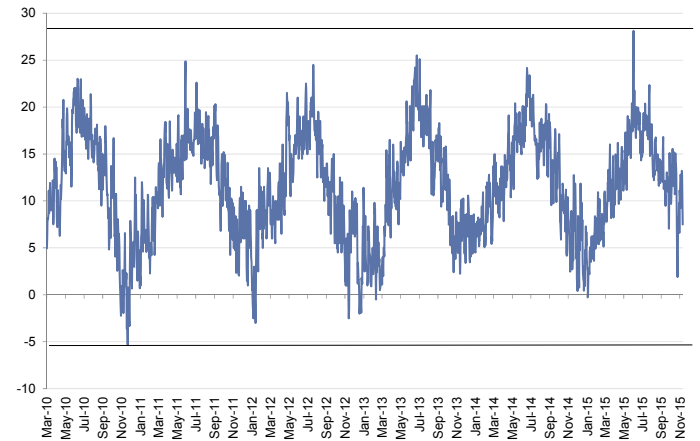
Average monthly temperature versus 20th century average (2015 to November)



Source: National Oceanic and Atmospheric Administration.

...in most places

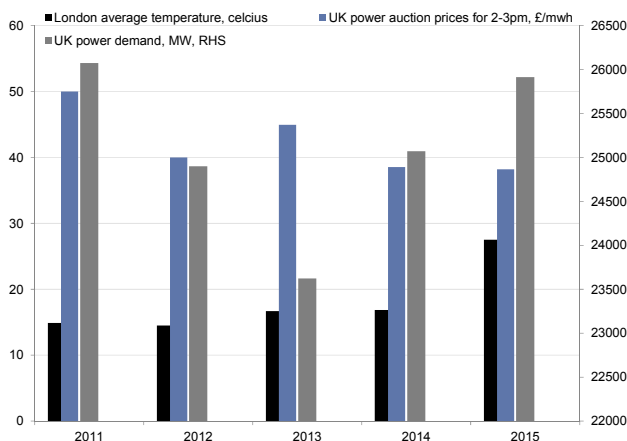
London average temperature, celsius



Source: Bloomberg.

Peak demand or peak supply?

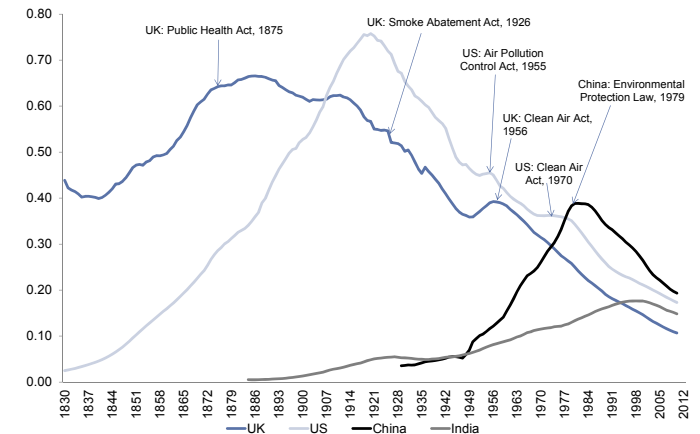
Power prices and demand for July 1 of each year



Source: Bloomberg.

History rhymes

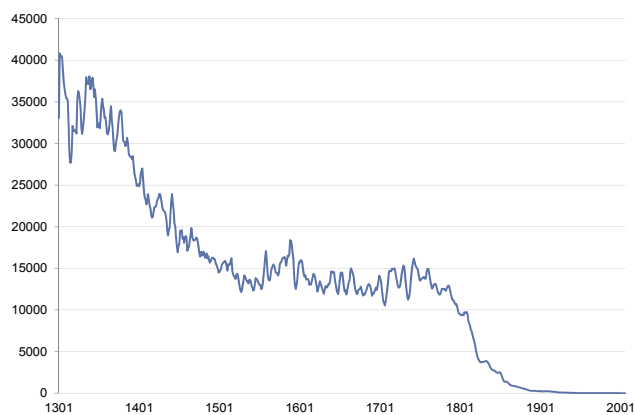
1,000 metric tons of carbon emissions per million dollars of GDP, 10-year moving average



Note: GDP is PPP and commodity price adjusted, constant 1990 dollars.
Source: World Bank, CDIAC (Tom Boden, Bob Andres, Gregg Marland), Angus Maddison, Wikipedia.

Let there be light...

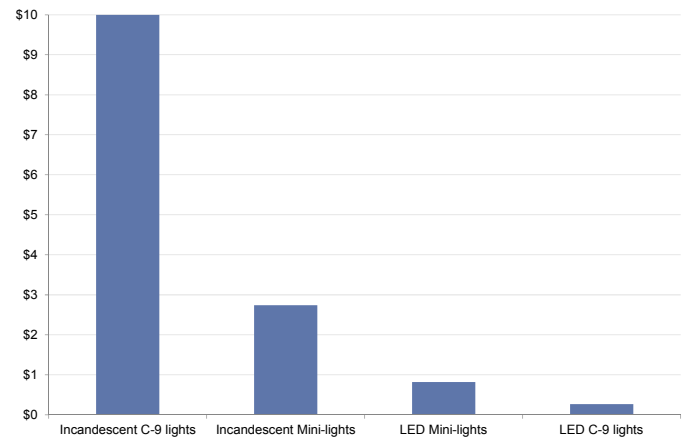
Price for lighting (per million lumen-hours) in the UK (GBP at 2000 prices)



Source: Fouquet and Pearson (2012) - The long run demand for lighting.

...much, cheaper light

Estimated cost of electricity to light a six foot tree for 12 hours a day for 40 days



Source: US Department of Energy.

Tech-tonic shifts

Top 20 biggest companies in the world by market cap

2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
General Electric	General Electric	Exxon Mobil	Petrochina	Exxon Mobil	Petrochina	Apple Inc	Apple Inc	Apple Inc	Apple Inc	Apple Inc
Exxon Mobil	Exxon Mobil	General Electric	Exxon Mobil	Petrochina	Exxon Mobil	Exxon Mobil	Exxon Mobil	Exxon Mobil	Exxon Mobil	Alphabet Inc
Microsoft	Citigroup Inc	Microsoft	General Electric	Microsoft	Apple Inc	Petrochina	Petrochina	Microsoft	Alphabet Inc	Microsoft
Citigroup Inc	Microsoft	Citigroup Inc	China Mobile	China Mobile	ICBC	BHP Billiton	Microsoft	Petrochina	Microsoft	Berkshire Hathaway
Wal-Mart	BP Plc	Gazprom Pao	ICBC	Wal-Mart	Wal-Mart	ICBC	ICBC	ICBC	Berkshire Hathaway	Exxon Mobil
BP Plc	Wal-Mart	Petrochina	Gazprom Pao	ICBC	CCB	Petrobras	IBM	China Mobile	General Electric	Amazon.com
Pfizer Inc	Bank Of America	ICBC	Microsoft	General Electric	Microsoft	CCB	Chevron	Alphabet Inc	Johnson & Johnson	Facebook
Bank Of America	HSBC	Bank Of America	AT&T	AT&T	HSBC	Microsoft	Alphabet Inc	Wal-Mart	Wal-Mart	General Electric
Johnson & Johnson	Johnson & Johnson	AT&T	Petrobras	Apple Inc	Petrobras	BHP Billiton	Wal-Mart	Berkshire Hathaway	Chevron	Johnson & Johnson
HSBC	Toyota Motor	BP Plc	BP Plc	Johnson & Johnson	Alphabet Inc	China Mobile	China Mobile	General Electric	Wells Fargo	Wells Fargo
Vodafone Group	AIG	HSBC	BHP Billiton	BP Plc	China Mobile	Berkshire Hathaway	General Electric	IBM	Roche	ICBC
AIG	P&G	Toyota Motor	Berkshire Hathaway	Berkshire Hathaway	BP Plc	Wal-Mart	Berkshire Hathaway	P&G	Nestle	Nestle
IBM	Pfizer Inc	Wal-Mart	EDF	P&G	Johnson & Johnson	General Electric	Nestle	Chevron	Petrochina	Roche
Intel	Altria Group Inc	P&G	Alphabet Inc	Chevron	BHP Billiton	Nestle	Johnson & Johnson	Nestle	JPMorgan Chase	JPMorgan Chase
JPMorgan Chase	Total SA	Johnson & Johnson	China Life	BHP Billiton	IBM	Alphabet Inc	CCB	CCB	P&G	China Mobile
Total SA	Mitsubishi	AIG	Wal-Mart	Nestle	P&G	Chevron	BHP Billiton	HSBC	China Mobile	Novartis Ag-Reg
GSK	Intel	Pfizer Inc	Total SA	Roche	Nestle	IBM	AT&T	Johnson & Johnson	ICBC	Petrochina
Berkshire Hathaway	GSK	Altria Group Inc	CCB	CCB	AT&T	HSBC	P&G	AT&T	HSBC	P&G
P&G	Petrochina	Cisco	HSBC	Cisco	JPMorgan Chase	P&G	Pfizer Inc	Samsung Electron	IBM	Toyota Motor
Altria Group Inc	JP Morgan	TOTAL	Chevron	Wells Fargo	General Electric	Vale	Coca-Cola	Pfizer	Pfizer	AT&T

Source: Bloomberg.

The haves and the have mores

Country as % of the commodity's global exports versus commodity as a % of the country's merchandise exports

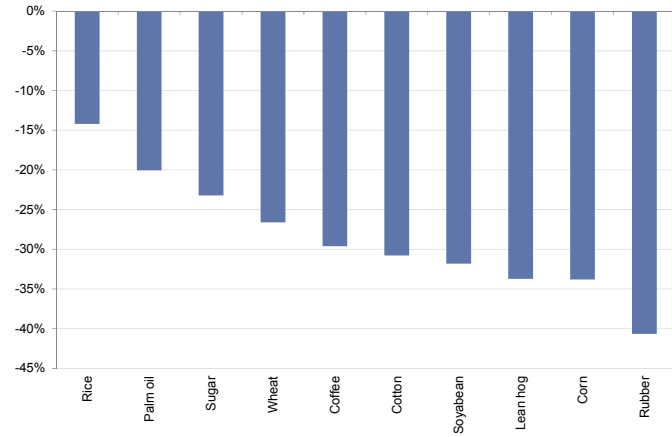
How important is a commodity to a country?		How important is a country to a commodity?											
Commodity as a % of country's merchandise exports		Country's contribution to total value of commodity traded globally											
		<1%	1% - 3%	3% - 5%	5% - 10%	10% - 15%	15% - 20%	20% - 25%	25% - 30%	30% - 35%	35% - 40%	>40%	
>60%			Norway - O&G			S. Arabia - O&G Russia - O&G							
40% - 60%													
30% - 40%							Chile - Copper						
25% - 30%			AUS - O&G										
20% - 25%			CAN - O&G								AUS - Iron Ore		
15% - 20%				SA - Precious									
10% - 15%		MEX - O&G UK - O&G	SA - O&G SA - I&S MEX - Precious					BRA - Iron Ore					
8% - 10%		BRA - O&G ARG - O&G											
6% - 8%		Chile - Fruits	AUS - Precious	BRA - Meat SA - Iron ore	ARG - Cereals	ARG - Soybean ARG - Corn				BRA - Sugar			
4% - 6%		UK - Precious	CAN - Precious	Russia - I&S	Japan - I&S						BRA - Soybean		
2% - 4%		AUS - Meat	SA - Alum. Norway - Alum.	India - IronOre CAN - Alum. Russia - Alum.	THAI - Cereal		India - Cotton						
<2%			Russia - Copper	Japan - Copper	CAN - Zinc THAI - Sugar CAN - Cereals	CAN - Wheat AUS- Wheat France - Cereals	US - Wheat					US - Soybean US - Corn	

Note: MEX - Mexico, SA - South Africa, CAN - Canada, THAI - Thailand, BRA - Brazil, ARG - Argentina, AUS - Australia, Precious - Precious metals.
Source: UN comtrade, CIA Factbook, BP Statistical Review, Goldman Sachs Global Investment Research.

An era of abundance

Abundant food?

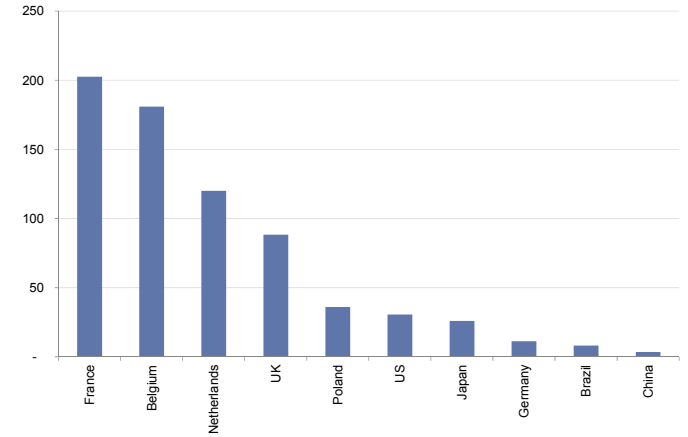
Current price versus last 5-year average



Source: Bloomberg.

Abundant data?

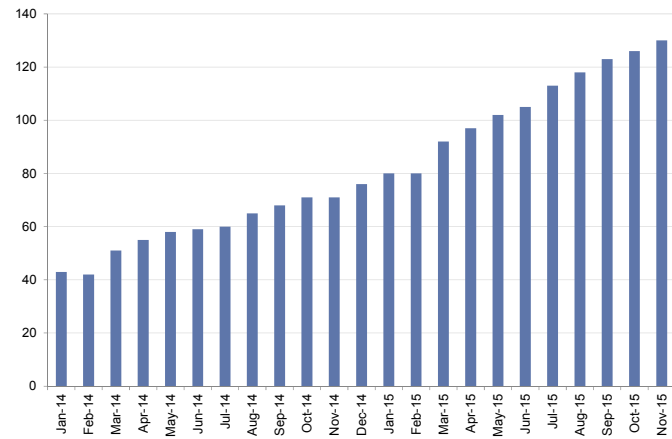
Wi-Fi hotspots per 1,000 people



Source: iPass.

Abundant capital?

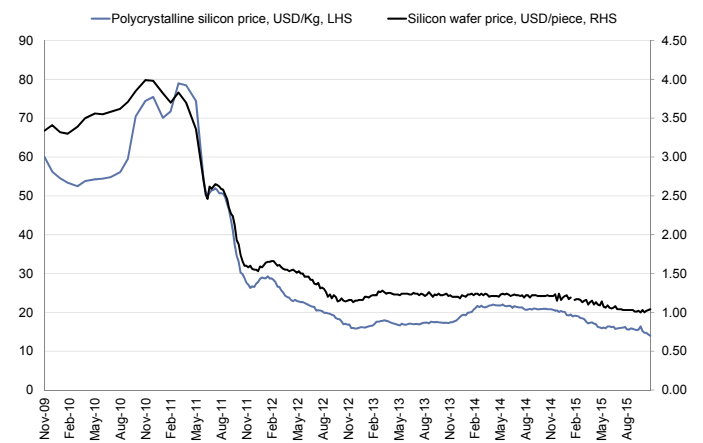
Number of unicorns over time



Source: Wall Street Journal.

Abundant energy?

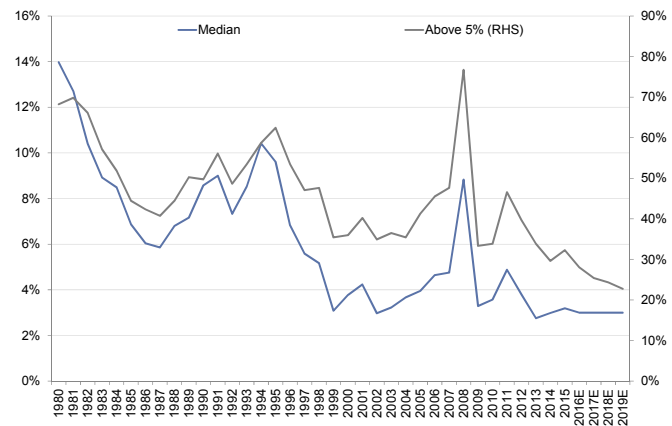
Silicon wafer price



Source: Bloomberg.

Inflation becoming increasingly scarce

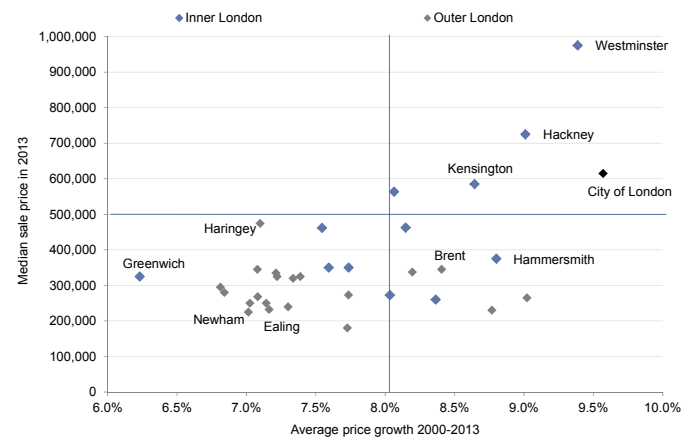
Proportion of countries with >5% CPI inflation and median (over 140 countries)



Source: IMF.

Despite pockets of scarcity

Median sale price (£) of all dwelling types in London, inner versus outer boroughs

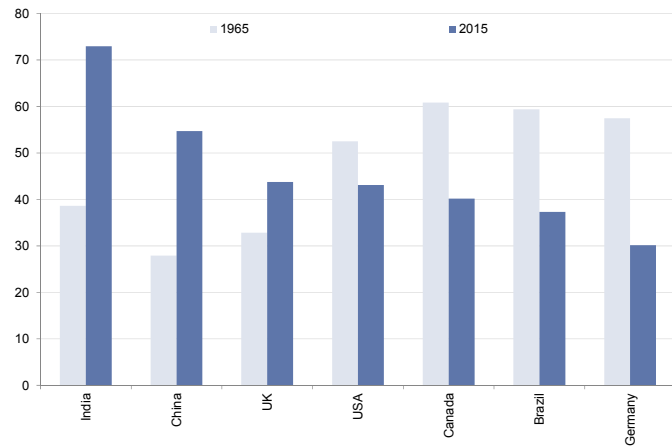


Source: ONS.

Finding the right balance

Rebalancing...

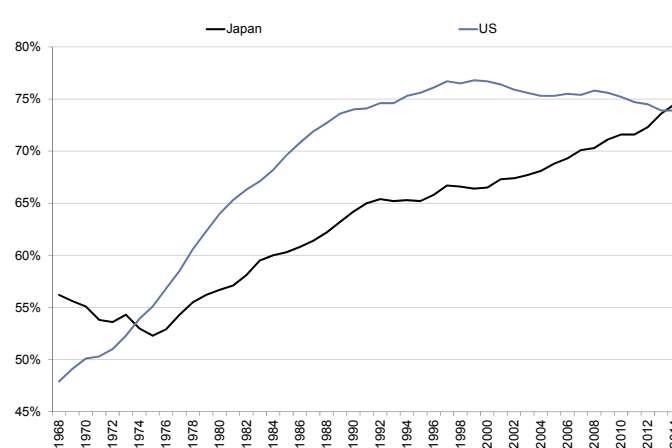
Number of males per 100 females for ages 90+



Source: UN.

The big shift

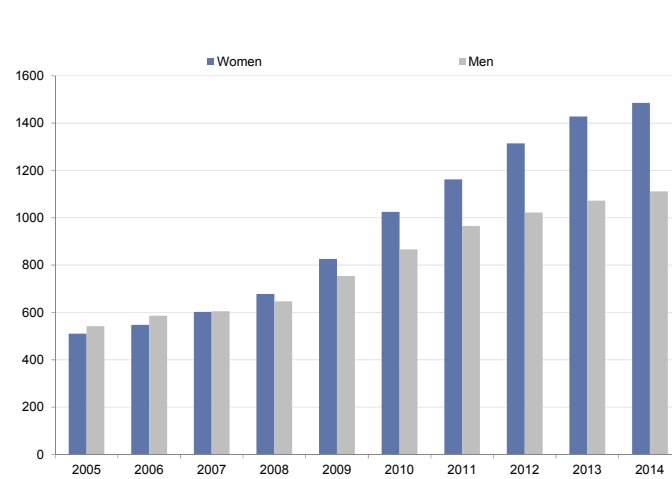
Female labour force participation rate, 25-54 year olds



Source: OECD.

The race is heating up

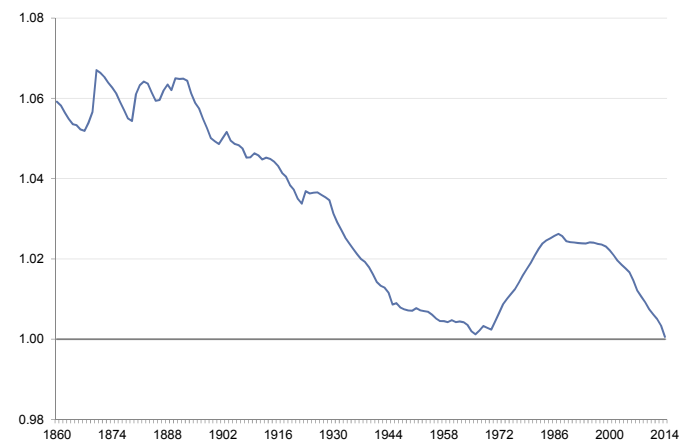
Number of marathon and half marathon finishers in the US, '000s



Source: runningusa.org.

...of a different sort

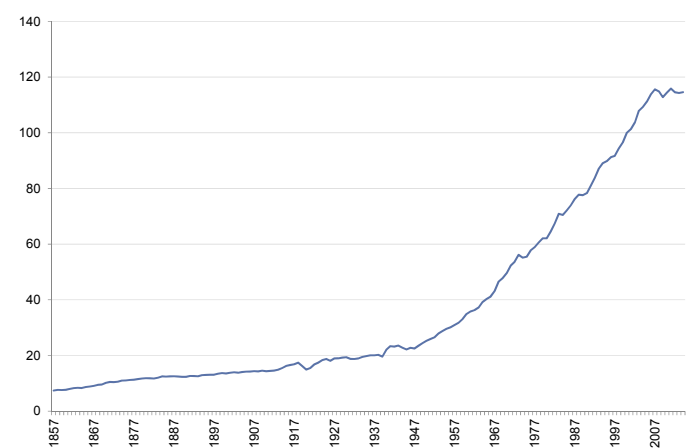
Female to male population ratio in Sweden



Source: Sweden National Statistics.

The productivity conundrum

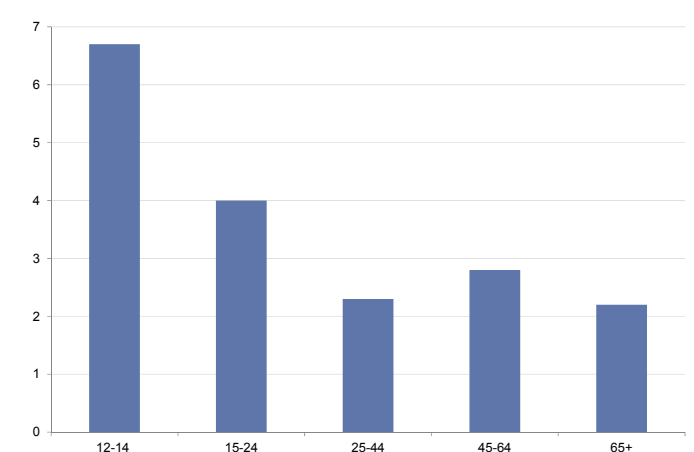
UK Labour productivity per hour over time (2000=100)



Source: Bank of England.

Cyclical growth

Average distance cycled per person per day by age group in 2014 in the Netherlands (km)

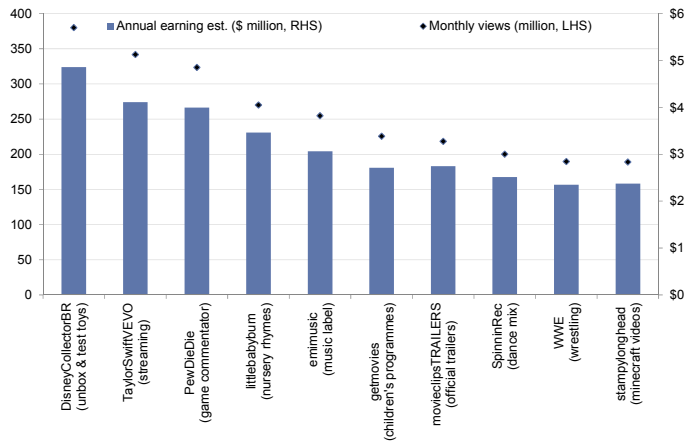


Source: Statistics Netherlands.

On a parting note, some charts that surprised us

What are you watching?

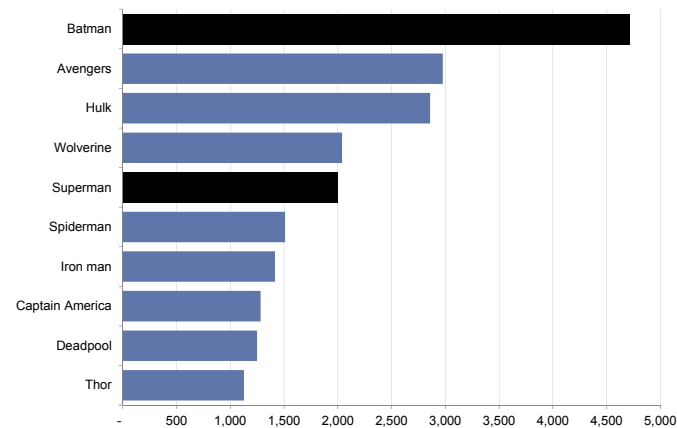
Top earning youtube channels of 2014



Source: VentureBeat.

Batman begins (the chart)

Comic book sales on Ebay (000' USD)

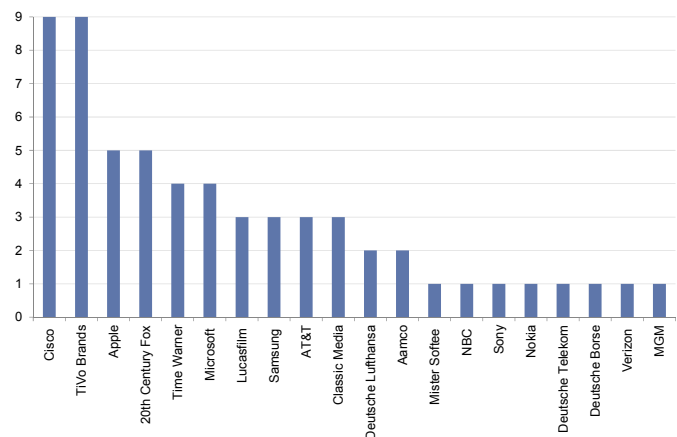


Note: DC's superheroes in black, Marvel's in blue. Data gathered over 180-day period ending 29/03/2015.

Source: Terapeak.

The sound of innovation

Number of (live) trademarked sounds owned by companies

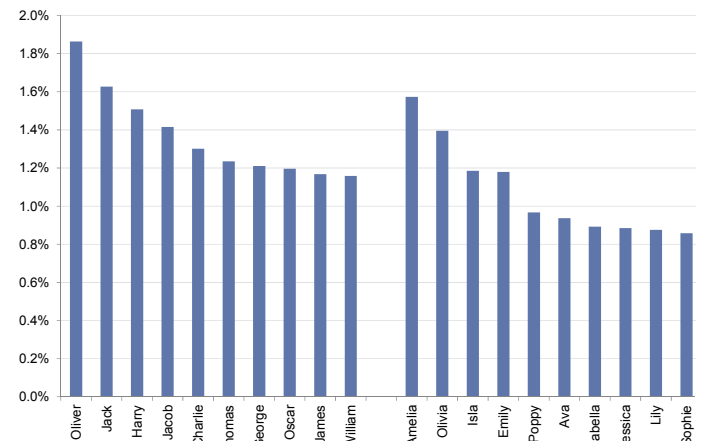


Note: In total there are 255 live trademarked sounds, and 341 dead trademarked sounds.

Source: US Patent and Trademark Office.

And the winner is...

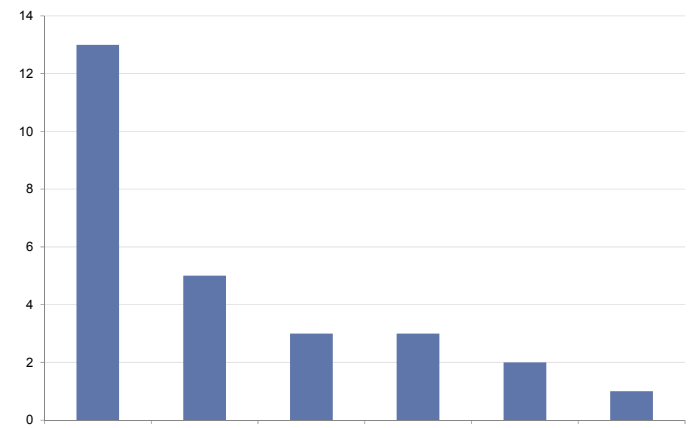
Babies born in 2014 by popularity of name, as a % of all births



Source: ONS.

Transformers

25 finalist teams of the US DARPA (Defense Advanced Research Projects Agency) robotic challenge by country, 2015

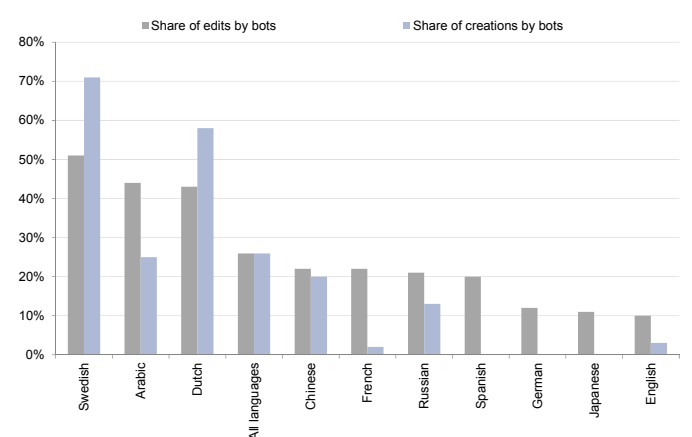


Note: Joint teams counted twice: 1 from US & HK and 1 from US & Germany.

Source: DARPA.

Editors-in-waiting

Share of article edits and creations by bots on Wikipedia



Note: Only registered bots have been included. Only article namespace(s) have been counted.

Source: Wikipedia.

Our past issues

Issue	Date	Topic	Fortnightly Thoughts	Interviewees
99	Dec 17, 2015	Thematic Investing	What we think about when we think about themes	Prof. Michael Porter of HBS and Prof. Aswath Damodaran of NYU
98	Dec 11, 2015	Fertility	Who shrunk the fertility rates?	Prof. Sir Partha Dasgupta of Cambridge University
97	Nov 23, 2015	Capex hotspots	Where are the capex hotspots?	
96	Oct 23, 2015	Cost to build a city	SimpliCity: What does it take to build a city	Jesse Berst, Chairman of the Smart Cities Council
95	Sep 17, 2015	End of easy EM growth	Is the era of EM growth over for DM exporters?	
94	Sep 24, 2015	Startups	Code makers and code breakers	Founders of Appear Here, Equipment Share, Getaround, Mast Mobile, Plated, Narrative Science, Nutmeg, TradeBlock, Vestorly and Yhat.
93	Sep 2, 2015	People flows	FAQ: Where is everybody going?	
92	Jul 7, 2015	Everything as a Service	Everything as a Service	
91	July 7, 2015	Buzzwords	No more buzzword FOMO*	
90	June 16 2015	Info asymmetry	FAQ: Why does shrinking information asymmetry matter?	
89	May 21, 2015	Convenience	At your convenience	Benedict Evans, Partner at Andreessen Horowitz
88	May 6, 2015	Capex	FAQ: Why isn't corporate capex higher?	
87	April 6, 2015	China innovation	How innovative is China?	Gordon Orr of McKinsey Asia and Prof. Andrew Ng of Baidu
86	Mar 24, 2015	Scarcity	Scarcity in a sea of abundance	Peter Diamandis of XPRIZE and Matt Ridley, author of 'The Rational Optimist'
85	Feb 18, 2015	Artificial intelligence	The real consequences of artificial intelligence	Prof. Raj Rajkumar of Carnegie Mellon, Rodney Brooks of Rethink Robotics and Manoj Saxena of The Entrepreneurs' Fund
84	Jan 28, 2015	EM competition	The globalisation of competition	Prof. Philip Lane of Trinity College Dublin and Prof. Pol Antras of Harvard
83	Dec 17 2014	100 best charts	The best of Fortnightly Thoughts 2014	
82	Nov 28, 2014	Skills	People make the world go round	Bernard Liautaud of Balderton Capital and David Epstein, author of 'The Sports Gene'
81	Oct 23, 2014	Young consumers	How the young are shaping future consumption	Jeremy Rifkin, author of 'Zero Marginal Cost Society' and Rory Sutherland of Ogilvy Group
80	Oct 3, 2014	EM reforms	The many forms of EM reform	Ruchir Sharma, author of 'Breakout Nations'
79	Sep 10, 2014	Capex	The capex conundrum	Ola Rollén, CEO of Hexagon
78	Aug 14, 2014	Old consumers	Grey anatomy: How older cohorts spend and save	
77	Jul 16, 2014	Disruption	Let's talk disruption	Prof. Bruce Greenwald of Columbia University
76	Jul 1, 2014	Industry repair	The value in repair	Nick Kirrage of Schroders
75	Jun 10, 2014	Buzzwords	Buzz! 22 things you need to know	
74	May 27, 2014	Pollution	The evolution of pollution solutions	Prof. Sam Fankhauser of Grantham Research Institute and Debra Tan of China Water Risk
73	May 1, 2014	GDP	GDP: Forecasters' friend or foe	Diane Coyle, author of 'GDP: A Brief but Affectionate History' and Prof. Erik Brynjolfsson of MIT
72	Apr 14, 2014	Future materials	Material changes in the material world	Prof. Chris Grovenor and Prof. Peter Edwards of Oxford University, Ray Gibbs, CEO of Haydale
71	Mar 27, 2014	Income Inequality	Unequal income, unequal consequences	Prof. Branko Milanovic of City University of New York Graduate Center and Prof. Greg Mankiw of Harvard
70	Mar 6, 2014	Healthcare	Healthcare Innovation on the mend?	Sir John Chisholm of Genomics England, Dr. Peter Bach of Sloane-Kettering Cancer Center and Sir Michael Rawlins of UK's Royal Society of Science, ex-NICE
69	Feb 21, 2014	Key Questions	15 questions that need to be answered	
68	Feb 7, 2014	Private Companies	The rising importance of private companies	Prof. Clayton M. Christensen of Harvard, Tim Bunting of Balderton Capital and Prof. Hermann Simon of Simon Kucher and Partners
67	Jan 23, 2014	Customer Loyalty	To have and to hold: Customer stickiness and tech	Bernard Charlès, CEO of Dassault Systemes
66	Dec 11, 2013	100 best charts	The best of Fortnightly Thoughts 2013	Charles Himmelberg, GS US Credit Strategist
65	Nov 21, 2013	Cities	Brighter lights, bigger cities	Prof. Edward Glaeser of Harvard
64	Oct 31, 2013	Tech	Tech is everywhere	Paul Brody of IBM and Brian Mukherjee, CEO of Blinkx
63	Oct 14, 2013	Europe	The changing parts of Europe	Prof. Otmar Issing of Center for Financial Studies, Dr. Dieter Wemmer of Allianz and Jose Abad of Instituto de Crédito Oficial Madrid
62	Sep 26, 2013	Dominance	Concentrating on dominance	Prof. Peter Nolan of Cambridge University and Joe Studwell, author of 'How Asia Works'
61	Sep 12, 2013	Habits	The compounding habits	David Halpern of the UK Government Behavioural Insight Team
60	Sep 2, 2013	Governments	The changing State of affairs	Prof. Mariana Mazzucato of University of Sussex, Prof. Michael Sandel and Prof. Cass Sunstein of Harvard and Prof. Larry Kotlikoff of Boston University
59	Aug 1, 2013	Renewables	Time to renew interest in renewables?	Ditlev Engel of Vestas and John Searle of Saft
58	Jul 18, 2013	Commodities	Peddalling through commodity cycles	Jeff Currie, GS Global head of Commodities Research
57	Jul 4, 2013	Logistics	Movers and shapers: Why logistics matters	Bruce Edwards and Ken Allen of DHL, Dr. William Fung of Li & Fung and Jeff Schwartz of GLP
56	Jun 13, 2013	China	The consequences of China's price discovery	Stan Druckenmiller of Duquesne Family Office, Gordon Orr of McKinsey and Prof. Victor Nee of Cornell University
55	May 24, 2013	Stocks	The global stock take	
54	May 10, 2013	Jobs	What is everybody going to do?	Andrew McAfee of MIT and Jeffrey Joerres of ManpowerGroup
53	Apr 25, 2013	Women	Why women working works	Gro Brundtland, former Prime Minister of Norway, Melanne Vermeer, ex-US Ambassador for Global Women's Issues and Jacqueline Novogratz of Acumen Fund
52	Apr 11, 2013	Capital Intensity	How to capitalise on rising capital intensity	Huw Pill, GS Chief European Economist
51	Mar 14, 2013	Security	Tinker, tailor, hacker, spy	Richard Vary of Nokia, Mark Parsons of Freshfields and Nigel Inkster of IISS

Our past issues

Issue	Date	Topic	Fortnightly Thoughts	Interviewees
50	Feb 28, 2013	Energy Efficiency	More energetic efforts needed in energy efficiency	Dr. Alex Claus Heitmann of Lanxess and James Tyler of Telecty Group
49	Feb 14, 2013	Behaviour	The unforced errors of behavioural biases	Prof. Daniel Kahneman of Princeton and Howard Marks of Oaktree Capital
48	Jan 31, 2013	Shale	Where will the shale gale blow next?	Paul Wogan of GasLog and David Demers of Westport
47	Jan 17, 2013	Manufacturing	Making things faster, stronger, leaner, better	Peter Marsh of the Financial Times, Prof. Neil Hopkinson of Sheffield University, Avi Reichental of 3D Systems and Jonathan Flint of Oxford Instruments
46	Dec 13, 2012	100 best charts	The best of Fortnightly Thoughts 2012	
45	Nov 30, 2012	Restructuring	Changing shape and shaping change	Michael Garstka and Alan Bird of Bain & Company
44	Nov 15, 2012	Food	Meaty problems, simmering solutions	Dr. Werner J. Bauer of Nestle and Karim Bitar of Genus
43	Nov 1, 2012	Growth	When growth is not enough	Jim O'Neill, Chairman of GS Asset Management
42	Oct 18, 2012	Mobile payments	Money, money, money in a mobile world	Peter Ayliffe of Visa Europe, Alastair Lukies of Monitise and Sarah Friar of Square
41	Oct 4, 2012	Banks	Banking on change	Guillermo de la Dehesa, former Spanish Finance Minister
40	Sep 20, 2012	Countries	Where countries succeed companies follow	Prof. James Robinson of Harvard
39	Sep 7, 2012	Asset Management	The business of managing the world's savings	Marc Spilker of Apollo Global Management, Gavin Rochussen of J. O. Hambro and Ralph Mupita of Old Mutual
38	Aug 16, 2012	Housing	All quiet on the home front?	Doug Yearly, Jr of Toll Brothers and Rob Perrin of The Berkeley Group
37	Jul 26, 2012	Sports	Sport: The world's favourite growth industry	Herbert Hainer of Adidas, Ralph Topping of William Hill and Jon Sigurdsson of Ossur
36	Jul 12, 2012	Small-Mid Cap	The big small cap issue	Nick Robertson of ASOS, John O'Higgins of Spectris, Julian Diaz of Dufry and Gerald Grohmann of Schoeller-Bleckmann
35	Jul 12, 2012	Automation	The automation revolution	Dieter Manz of Manz and Anil Menon of Cisco
34	Jun 28, 2012	Quality/Value	Some value in quality, some quality in value	Dominic Barton of McKinsey
33	Jun 14, 2012	Russia	How much is Russia changing?	Oleg Tinkoff of Tinkoff Credit Systems, Alexander Novak, Energy Minister of Russia, Mark Gyetvay of Novatek and Igor Levit of LSR Group
32	Jun 5, 2012	EM infrastructure	Digging the EM infrastructure story	Marcelo Haddad of the Investment Promotion Agency of Rio de Janeiro
31	May 17, 2012	Data	The Big deal about data	Mark Read of WPP, Michael Tobin of Telecty and David Rowan of the Wired UK
30	May 3, 2012	DM Infrastructure	Can the West's infrastructure keep up?	Ian Tyler of Balfour Beatty
29	Apr 19, 2012	Dividends	The dividends of cash deployment	Peter Oppenheimer, GS Chief Global Equity Strategist
28	Mar 29, 2012	Shale	On the shale trail	Aubrey K. McClendon of Chesapeake Energy and Daniel Yergin of IHS CERA
27	Mar 16, 2012	Africa	Africa's turn	Thushen Govender of Tiger Brands, Runa Alam of DPI, Peter Schmid of Actis and Simpiwe Tshabalala of Standard Bank
26	Mar 2, 2012	Value	The value of looking up	
25	Feb 16, 2012	Innovation	Innovation, the crown jewel	Dr. Andreas Kreimeyer of BASF
24	Feb 2, 2012	Europe	European stocks and Europe are not the same	Peter Sutherland, Chairman of GS International and Pierre Kosciusko-Morizet of PriceMinister
	Jan 20, 2012	100 best charts	The best of Fortnightly Thoughts 2011	
23	Dec 15, 2011	Bifurcation	Another year of bifurcation beckons	Prof. Ian Morris of Stanford
22	Dec 2, 2011	Middle East	MENA: In the middle of economic realignment	Wassim Younan, CEO of GS MENA
21	Nov 18, 2011	Education	Growing education and educated growth	John Fallon of Pearson and Prof. Anthony Grayling of New College of the Humanities
20	Nov 3, 2011	BRICs	Not everyone can be a BRICs winner	Paul Walsh of Diageo
19	Oct 20, 2011	Global trade	Is global trade set to fade?	Dr. Ian Goldin of Oxford and Reinhard Lange of Kuehne + Nagel
18	Oct 6, 2011	Japan	Some hope for Japan, some echoes for Europe	Masa Mochida, President of GS Japan
17	Sep 22, 2011	Mining	Time to dig deep for the miners	Evy Hambro of BlackRock
16	Sep 8, 2011	Banks	Around the world in nearly 80 banks	Alexander Scurluck of Fidelity
15	Aug 26, 2011	Food	Rain and grain, hard to sustain	Robert Berendes of Syngenta
14	Aug 11, 2011	Quality stocks	Time to discriminate in quality's favour	
13	Jul 28, 2011	Germany	Germany's time, Germany's challenge	Joe Kaeser of Siemens AG
12	Jul 14, 2011	Credible growth	The incredible story of credible growth	Jim O'Neill, Chairman of GS Asset Management
11	Jun 30, 2011	Power	Power plays amid power surges	Rupert Soames of Aggreko and Rudolf Hadorn of Gurit
10	Jun 17, 2011	Demographics	Aging angst or demographic decoys?	Martin Wolf of the Financial Times and Lars Sørensen of Novo Nordisk
9	Jun 2, 2011	BRICs	Why the differences in the BRICs matter	Martin Wolf of the Financial Times and Ivan Tong of Sparkle Roll
8	May 20, 2011	Smart devices	Technological disruption equals economic eruption	Warren East of ARM
7	May 5, 2011	Winners	Why you need to buy and hold industry leaders now	Anthony Ling, GS Global CIO
6	Apr 14, 2011	China	The rise and rise of the Chinese consumer	Anthony Bolton of Fidelity
5	Mar 31, 2011	Nordics	Northern Soul - unlocking Nordic secrets	Arne Karlsson of Ratos
4	Mar 18, 2011	Luxury	Brands deluxe redux	Sir Martin Sorrell of WPP
3	Mar 3, 2011	Capex	The consequences of consensus-busting capex	Bill McDermott of SAP
2	Feb 17, 2011	M&A	M&A and the new world order	
1	Feb 7, 2011	UK	The UK; from first to worst?	Dr. Ben Broadbent of the Bank of England

Note: Interviewee positions correct as of date interviewed

Disclosure Appendix

Equity basket disclosure

The ability to trade the basket(s) discussed in this research will depend upon market conditions, including liquidity and borrow constraints at the time of trade.

Reg AC

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