Market and survey based measures of inflation expectations remain weak even as expectations for easing by major central banks continue to build

- In many countries, expected rate hikes for 2019 have given way to expected (realized in the case of Australia) rate cuts
- The market is now expecting up to 3 x 25 basis points of rate cuts from the FOMC by the end of this year
- Central banks with near zero or negative interest rates are expected to restart QE
- The stock of negative yielding bonds has now risen to above $12 trillion

- Central banks have communicated that their inflation targets are symmetric. In many major countries, inflation has typically failed to rise above their targets
- Market based measures of longer term inflation expectations have not turned up in the U.S. and have continued to fall in the Eurozone. Survey measures of inflation expectations have been more stable but have also weakened

![Central banks globally are expected to ease](image)

Expected changes in rates by end-2019, %

- **Powell: “rates below neutral”**
- **FOMC rate hike**

- **US**
- **UK**
- **Japan**
- **Canada**
- **Australia**

Jan'18 Mar'18 May'18 Jul'18 Sep'18 Nov'18 Jan'19 Mar'19 May'19 Jul'19

Source: Bloomberg, JPMAM *Australia pricing includes 50bps of cuts delivered by RBA

![Market and survey based inflation measures in the U.S. still point towards lower inflation expectations](image)

Inflation expectations* %

- **Average market based measures**
- **Average survey based measures**
- **CPI 5y average**

Source: Bloomberg, "Survey based measures include UoM and Philly Fed inflation forecasts. Market based measures include 5y5y inflation swap, 10y breakeven, St. Louis Fed 5y5y inflation expectations"
Inflation expectations in the U.S. are correlated with recent inflation as well as with oil prices

- The recent rate of inflation is a key factor in the determination of expected inflation (measured by inflation swaps) and both have been trending down.

- U.S. inflation expectations, measured by the 5y5y inflation swap, remains close to the Fed's target but has shifted down during the past few years.

- With increasing downside risks to growth, the possibility of a U.S. recession in the medium term may be a consideration that is being priced in inflation forwards.

- Structural changes in oil, especially technology's impact on shale production costs, have pushed down both inflation and inflation expectations in the U.S. There has historically been a strong relationship between oil prices and inflation expectations.

U.S. inflation expectations have fallen a lot but are still broadly around the Fed's target

Source: Bloomberg, JPMAM

Inflation expectations in the U.S. are clearly correlated with oil prices

Source: Bloomberg, JPMAM
Inflation expectations in the Eurozone are at risk of becoming de-anchored

- Eurozone inflation has been low since the peripherals crisis. Countries such as Greece or Italy are forced to have low inflation to increase competitiveness. With Germany reluctant to accept inflation above 2%, the average inflation rate for the Eurozone has been well below 2%

- With unemployment still above pre-crisis levels, some slack remains within the Eurozone keeping inflation low

- Inflation expectations in the Eurozone have shifted down to alarmingly low levels and the 5y5y inflation swap recently touched a low of around 1.1%

- ECB projections for Eurozone inflation in the medium term have not been at or above 2% since the crisis. The market therefore questions whether the ECB believes it can achieve its inflation target

- The ECB is perceived by the markets as running out of effective monetary options to raise inflation

- After confirmation and appointment, Christine Lagarde’s ECB is likely to foster greater co-ordination between fiscal and monetary stimulus

Persistently low inflation has led to very low inflation expectations in the Eurozone which may be de-anchoring

ECB medium term inflation projections remain well below target and market participants question whether the ECB believes it can attain its 2% target

**Eurozone HICP inflation, per cent**

<table>
<thead>
<tr>
<th>Year</th>
<th>04</th>
<th>06</th>
<th>08</th>
<th>10</th>
<th>12</th>
<th>14</th>
<th>16</th>
<th>18</th>
<th>18</th>
</tr>
</thead>
<tbody>
<tr>
<td>5y5y inflation swap, LHS</td>
<td>3.0</td>
<td>2.5</td>
<td>2.0</td>
<td>1.5</td>
<td>1.0</td>
<td>0.5</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>5yr average HICP, RHS</td>
<td>2.5</td>
<td>2.0</td>
<td>1.5</td>
<td>1.0</td>
<td>0.5</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
</tbody>
</table>

Source: Bloomberg, JPMAM. HICP = Harmonized Index of Consumer Prices

**ECB Eurozone medium term inflation projections, %**

<table>
<thead>
<tr>
<th>Year</th>
<th>00Q4</th>
<th>02Q4</th>
<th>04Q4</th>
<th>06Q4</th>
<th>08Q4</th>
<th>10Q4</th>
<th>12Q4</th>
<th>14Q4</th>
<th>16Q4</th>
<th>18Q4</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.0</td>
<td>2.5</td>
<td>3.0</td>
<td>3.0</td>
<td>3.0</td>
<td>3.0</td>
<td>3.0</td>
<td>3.0</td>
<td>3.0</td>
<td>3.0</td>
<td>3.0</td>
</tr>
</tbody>
</table>

Source: ECB
Structural forces may keep inflation low: Globalization

- Labor markets are strong and wages are rising. The relationship between lower unemployment and stronger wages has weakened and competition also means that higher wages can get absorbed into leaner margins.

- Since the crisis, U.S. inflation has been higher than in other G10 due to earlier and more forceful policy but the deviation has been limited due to global competition. Currency may be another channel holding U.S. inflation down. President Trump recently voiced frustration that some currencies appear undervalued.

- Global trade tensions have raised uncertainty and weighed on economic activity. In the medium term ‘America First’ and tariffs may undercut gains from globalisation and raise prices.

Higher wages squeeze profit margins

Although wages are clearly rising, the pass through from growth in wages to higher inflation has been weaker

Source: Bloomberg, JPMAM. DM includes 5 major DM countries and Eurozone, GDP weighted

U.S. inflation has not deviated by far from global inflation

Source: Bloomberg, JPMAM
Structural forces may keep inflation low: Demographics

- Demographics may act as a structural drag on inflation. Baby boomers become savers and not spenders; the pool of excess savings seeking a home rises and consumers' spending propensity falls.

- Longer life expectancy allows some older workers to choose to remain in the labor force. Low growth and low interest rates may also force some older employees to keep working due to a combination of weaker wages growth, lower pension contributions and the difficulty of generating non-employment income.

- In some countries (such as Japan) with more significant or earlier demographic shifts, there may be a preference amongst older cohorts for lower inflation to protect the real value of savings.

- The combination of higher participation rates from older workers or prime age female workers may mean that labor markets can remain strong with continued muted transmission into higher wages.

- The unemployment rate may drop to very low levels in some countries without raising inflation as NAIRU may now be lower than pre-crisis.

**LFPR for older age group is rising structurally**

<table>
<thead>
<tr>
<th>OECD &gt;65 participation rate %</th>
<th>US</th>
<th>EU</th>
<th>Canada</th>
<th>Japan</th>
<th>Sweden</th>
<th>UK</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25</td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>20</td>
<td></td>
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<td></td>
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<tr>
<td>15</td>
<td></td>
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<tr>
<td>10</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: OECD

**Female prime age participation rate has been rising in many countries but only gradually in the U.S.**

<table>
<thead>
<tr>
<th>OECD prime age participation rate female, 25-54, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>US</td>
</tr>
<tr>
<td>-----------------</td>
</tr>
<tr>
<td>90</td>
</tr>
</tbody>
</table>

Source: OECD
Structural forces may keep inflation low: Technology

- The *Sharing Economy* has capped firms' capability to raise prices. Increasing online purchases have also made the price discovery process easier and more transparent.

- The speed of development in shale production is another example of how technology changes the landscape of traditional industries such as energy. The structural rise in U.S. oil production has put a ceiling on oil prices and downward pressure on inflation expectations.

- The impact of technological progress on measured inflation depends on both the speed of this progress, and on statisticians' ability to capture the impact on (quality-adjusted) prices.

### Internet usage and technology continue to disrupt business models

#### US: industrial robots per thousand workers

- **Acemoglu (MIT)**
- **Institute for Employment Research**
- **Bruegel Inst. (Belgium)**

Source: MIT, IAB, Bruegel Inst. 2018, JPMAM (Eye on the Market)

---

### Technology heavy sectors have spent most of the time in deflationary territory

**Information & Information Processing**

- 2.0% CPI (2yr annualized)

Source: BLS

---

### Prices of goods that can be traded online tend to rise more slowly than those typically traded offline

**Core goods**, % YoY

Source: JPMAM, U.S. Census Bureau. *CPI baskets are categorized by intensity of online and offline sales.*
The global bond environment is starving for yield
Lack of supply and an uncertain macro environment have driven global yields lower

<table>
<thead>
<tr>
<th>Maturity</th>
<th>2yr</th>
<th>5yr</th>
<th>10yr</th>
<th>30yr</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switzerland</td>
<td>Negative yield</td>
<td>Negative yield</td>
<td>Negative yield</td>
<td>Positive yield</td>
</tr>
<tr>
<td>Germany</td>
<td>Negative yield</td>
<td>Negative yield</td>
<td>Negative yield</td>
<td>Positive yield</td>
</tr>
<tr>
<td>Japan</td>
<td>Negative yield</td>
<td>Negative yield</td>
<td>Positive yield</td>
<td>Positive yield</td>
</tr>
<tr>
<td>France</td>
<td>Negative yield</td>
<td>Negative yield</td>
<td>Positive yield</td>
<td>Positive yield</td>
</tr>
<tr>
<td>Spain</td>
<td>Negative yield</td>
<td>Negative yield</td>
<td>Positive yield</td>
<td>Positive yield</td>
</tr>
<tr>
<td>Italy</td>
<td>Negative yield</td>
<td>Negative yield</td>
<td>Positive yield</td>
<td>Positive yield</td>
</tr>
<tr>
<td>UK</td>
<td>Negative yield</td>
<td>Negative yield</td>
<td>Positive yield</td>
<td>Positive yield</td>
</tr>
</tbody>
</table>

Negative interest rates seem to be back with a vengeance.

- Since interest rates peaked in October of 2018, the amount of negative yielding debt has doubled (11% vs. 24% today) in the Barclays Global Bond Index.
- Over $12T in sovereign debt has a negative yield, spanning across the yield curve.
- The combination of lower central bank policy rates, low growth and inflation expectations, and scarcity of bond supply are all pressuring yields lower.

Nearly 25% of all IG debt has a negative yield

% of Bloomberg Barclays Global Agg index with negative yield

Source: Bloomberg, Barclays, June 2019.


For illustrative purposes only. This information does not reflect the performance of any specific investment scenario.

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J.P.Morgan Asset Management

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China Outlook

Ray Dalio
Chairman & Chief Investment Officer

July 2019
China's Development Since 1978

<table>
<thead>
<tr>
<th>Metric</th>
<th>1978</th>
<th>1998</th>
<th>Now</th>
<th>Δ Since 1978</th>
</tr>
</thead>
<tbody>
<tr>
<td>RGDP Per Capita*</td>
<td>613</td>
<td>2,636</td>
<td>16,184</td>
<td>26x</td>
</tr>
<tr>
<td>Share of World GDP</td>
<td>2%</td>
<td>6%</td>
<td>22%</td>
<td>11x</td>
</tr>
<tr>
<td>Population Below the Poverty Line ($1.90/day)</td>
<td>88%</td>
<td>41%</td>
<td>1%</td>
<td>-88%</td>
</tr>
<tr>
<td>Life Expectancy</td>
<td>66</td>
<td>71</td>
<td>76</td>
<td>+10 Yrs</td>
</tr>
<tr>
<td>Infant Mortality Rate (per 1000 births)</td>
<td>53</td>
<td>33</td>
<td>8</td>
<td>-85%</td>
</tr>
<tr>
<td>Urbanization</td>
<td>18%</td>
<td>34%</td>
<td>57%</td>
<td>+39%</td>
</tr>
<tr>
<td>Literacy</td>
<td>70%</td>
<td>93%</td>
<td>96%</td>
<td>+26%</td>
</tr>
<tr>
<td>Avg Yrs of Education</td>
<td>4.4</td>
<td>6.6</td>
<td>7.7</td>
<td>+74%</td>
</tr>
</tbody>
</table>

*Thous, USD 2011, PPP-adjusted

The Growth of China's Domestic Capital Markets

<table>
<thead>
<tr>
<th>Market</th>
<th>2009</th>
<th>2014</th>
<th>Now</th>
<th>Δ Since 1978</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equities (A-Shares) Mkt Cap (USD, Bln)</td>
<td>1,767</td>
<td>3,922</td>
<td>7,556</td>
<td>4x</td>
</tr>
<tr>
<td>As a % of GDP</td>
<td>37%</td>
<td>39%</td>
<td>54%</td>
<td>+17%</td>
</tr>
<tr>
<td>As a % of World Mkt Cap</td>
<td>4%</td>
<td>6%</td>
<td>9%</td>
<td>+5%</td>
</tr>
<tr>
<td>Mkt Cap (USD, Bln)</td>
<td>1,388</td>
<td>3,025</td>
<td>7,218</td>
<td>5x</td>
</tr>
<tr>
<td>As a % of GDP</td>
<td>29%</td>
<td>30%</td>
<td>52%</td>
<td>+23%</td>
</tr>
<tr>
<td>As a % of World Mkt Cap</td>
<td>4%</td>
<td>5%</td>
<td>10%</td>
<td>+6%</td>
</tr>
<tr>
<td>Mkt Cap (USD, Bln)</td>
<td>49</td>
<td>935</td>
<td>2,310</td>
<td>47x</td>
</tr>
<tr>
<td>As a % of GDP</td>
<td>1%</td>
<td>9%</td>
<td>17%</td>
<td>17x</td>
</tr>
<tr>
<td>As a % of World Mkt Cap</td>
<td>0%</td>
<td>3%</td>
<td>6%</td>
<td>31x</td>
</tr>
<tr>
<td>Access to Foreigners Mkt Cap (USD, Bln)</td>
<td>17</td>
<td>133</td>
<td>1,136</td>
<td>655x</td>
</tr>
<tr>
<td>As a % of GDP</td>
<td>0%</td>
<td>1%</td>
<td>80%</td>
<td>+80%</td>
</tr>
<tr>
<td>(Across All Mkts) As a % of Total</td>
<td>0%</td>
<td>2%</td>
<td>62%</td>
<td>+62%</td>
</tr>
</tbody>
</table>
CHINA’S ECONOMY

Real Exports vs Trading Partner
- Real Exports (Y/Y, 3mma)
- Trading Partner Growth

Real Exports vs Foreign-Sensitive Industrial Production
- Real Exports (Y/Y, 3mma)
- Foreign-Sensitive IP Index

Industrial Production (Y/Y)

Fixed Asset Investment Growth (Y/Y)

Infrastructure Investment Growth (Y/Y)

Manufacturing PMI
- NBS
- Markit

Please review the “Important Disclosures and Other Information” located at the end of this presentation.
THE ECONOMIC RESTRUCTURING

Global Venture Capital Investment in Leading Technologies (USD, Bln)

- **Fintech**
  - CHN
  - USA
  - GBR
  - DEU
  - JPN

- **AI + Machine Learning**
  - USA
  - GBR
  - CHN
  - JPN
  - AUS

- **Wearables**
  - USA
  - CHN
  - DEU
  - CAN
  - GBR

- **Virtual Reality**
  - USA
  - CHN
  - JPN
  - GBR
  - FRA

- **Education Technology**
  - USA
  - CHN
  - JPN
  - GBR
  - IND

- **Autonomous Driving**
  - USA
  - CHN
  - JPN
  - AUS
  - GBR

**Share of Global Unicorns by Count**
- USA: 47%
- CHN: 19%
- Other: 34%

**Share of Global Unicorn Value**
- USA: 43%
- CHN: 12%
- Other: 45%

DEBT AND DEBT SERVICE BY SECTORS

Please review the "Important Disclosures and Other Information" located at the end of this presentation.
## CHINA'S MARKETS

**Global Rankings of Economies and Asset Markets (USD, Bln)**

<table>
<thead>
<tr>
<th>Rank</th>
<th>Nominal GDP</th>
<th>Govt Bonds Outstanding</th>
<th>Corp Bonds Outstanding</th>
<th>Total Equity Market Cap</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>United States $21,049</td>
<td>United States $12,152</td>
<td>United States $4,860</td>
<td>United States $31,881</td>
</tr>
<tr>
<td>2</td>
<td>China $13,974</td>
<td>Japan $8,311</td>
<td>China $2,310</td>
<td>China $9,359</td>
</tr>
<tr>
<td>3</td>
<td>Japan $5,000</td>
<td>China* $7,478</td>
<td>France $1,078</td>
<td>Japan $5,587</td>
</tr>
<tr>
<td>4</td>
<td>Germany $3,867</td>
<td>United Kingdom $2,619</td>
<td>Germany $1,019</td>
<td>United Kingdom $2,918</td>
</tr>
<tr>
<td>5</td>
<td>United Kingdom $2,822</td>
<td>France $2,105</td>
<td>United Kingdom $955</td>
<td>Canada $2,249</td>
</tr>
<tr>
<td>6</td>
<td>India $2,688</td>
<td>Italy $1,790</td>
<td>Canada $745</td>
<td>India $2,146</td>
</tr>
<tr>
<td>7</td>
<td>France $2,687</td>
<td>Germany $1,286</td>
<td>Japan $613</td>
<td>Switzerland $1,727</td>
</tr>
<tr>
<td>8</td>
<td>Italy $1,984</td>
<td>Spain $1,071</td>
<td>Netherlands $450</td>
<td>Australia $1,459</td>
</tr>
<tr>
<td>9</td>
<td>Brazil $1,783</td>
<td>India $750</td>
<td>Italy $245</td>
<td>Korea $1,434</td>
</tr>
<tr>
<td>10</td>
<td>Canada $1,686</td>
<td>Korea $549</td>
<td>Australia $227</td>
<td>Taiwan $1,051</td>
</tr>
</tbody>
</table>

*Includes policy bank bonds and local government bonds

### Size and Trading Volume of Government Bond Market (%US)

![Size and Trading Volume of Government Bond Market (%US)](chart)

Please review the "Important Disclosures and Other Information" located at the end of this presentation.
Please review the "Important Disclosures and Other Information" located at the end of this presentation.
### Key Chinese Dependencies on Non-Chinese Technology

<table>
<thead>
<tr>
<th>US Commerce Dept. List (&quot;14 Technologies&quot;)</th>
<th>&quot;Made in China 2025&quot; Industry Impacted</th>
<th>Largest Chinese Companies in these Vulnerable Sectors</th>
<th>Some Key Foreign Inputs Dependencies</th>
<th>Key Providers Today</th>
<th>Vulnerability</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Microprocessors</td>
<td>Information Technology (Hardware)</td>
<td>Huawei, ZTE, Xiaomi, Hikvision, SMIC, Dahua, Sogon, Higon, Chengdu Haigang Integrated Circuit, Chengdu Haigang Microelectronics, Wuxi Jiangnan Institute of Computing Technology (Research Institute)</td>
<td>Chip Design</td>
<td>Intel, AMD, Samsung, Micron, ARM</td>
<td>Very high in near term, could take several years for China to catch up fully</td>
</tr>
<tr>
<td>2. Advanced Computing</td>
<td>Information Technology (Hardware)</td>
<td>Tencent, Alibaba, Baidu, JD.com, Meiya Pico, Megvii, iFlyTek</td>
<td>Chip Assembly</td>
<td>Taiwan Semiconductor, Intel, Samsung, SK Hynux</td>
<td>High, Some domestic manufacturers, but new plants take years, billions of dollars, and advanced equipment from US and Europe</td>
</tr>
<tr>
<td>3. Advanced Surveillance Technologies</td>
<td>Information Technology (Software)</td>
<td>High-Powered Computing All Imported, see above</td>
<td>Operating System</td>
<td>Microsoft, Alphabet, Apple</td>
<td>US dominant right now</td>
</tr>
<tr>
<td>4. Brain-Computer Interfaces</td>
<td>Information Technology (Software)</td>
<td>Enterprise Database Software Oracle, SAP</td>
<td>Enterprise Database Software Oracle, SAP</td>
<td>Oracle/SAP are dominant. Not easy to replace given the dependencies.</td>
<td></td>
</tr>
<tr>
<td>5. Data Analytics</td>
<td>Information Technology (Software)</td>
<td>Process Simulation Software Siemens</td>
<td>Advanced Process Control Software Siemens, Alstom, some limited domestic alternatives</td>
<td>European companies are dominant players. For some areas there are Chinese alternatives already available</td>
<td></td>
</tr>
<tr>
<td>6. Artificial Intelligence and Machine Learning</td>
<td>Information Technology (Software)</td>
<td>Advanced Industrial Robots Japan, Korea, some domestic</td>
<td>Advanced Industrial Robots Japan, Korea, some domestic</td>
<td>Most robots used in China are imported today</td>
<td></td>
</tr>
<tr>
<td>7. Quantum Information and Sensing Technology</td>
<td>Information Technology (Software)</td>
<td>New materials</td>
<td>New materials</td>
<td>Medicine and Medical Devices</td>
<td></td>
</tr>
<tr>
<td>8. Position, Navigation, and Timing Technology</td>
<td>Information Technology (Software)</td>
<td>Polycrystalline Silicon Domestic, some imported from Japan, Korea</td>
<td>Polycrystalline Silicon Domestic, some imported from Japan, Korea</td>
<td>Low, lots of domestic production</td>
<td></td>
</tr>
<tr>
<td>9. Logistics Technology</td>
<td>Information Technology (Software)</td>
<td>Green Energy Suntech, LDK</td>
<td>Green Energy</td>
<td>Suntech, LDK</td>
<td>Low, lots of domestic production</td>
</tr>
<tr>
<td>10. Robotics</td>
<td>Information Technology (Software)</td>
<td>Green Vehicles Every Chinese carmaker</td>
<td>Green Vehicles</td>
<td>Every Chinese carmaker</td>
<td>Low, China has a lot of influence in Africa</td>
</tr>
<tr>
<td>11. Additive Manufacturing</td>
<td>Information Technology (Software)</td>
<td>Agricultural Machinery</td>
<td>Agricultural Machinery</td>
<td>Agricultural Machinery</td>
<td></td>
</tr>
<tr>
<td>12. Hypersonics</td>
<td>Information Technology (Software)</td>
<td>New materials</td>
<td>New materials</td>
<td>Medicine and Medical Devices</td>
<td></td>
</tr>
<tr>
<td>13. Advanced Materials</td>
<td>Information Technology (Software)</td>
<td>Polycrystalline Silicon Domestic, some imported from Japan, Korea</td>
<td>Polycrystalline Silicon Domestic, some imported from Japan, Korea</td>
<td>Low, lots of domestic production</td>
<td></td>
</tr>
</tbody>
</table>

Please review the "Important Disclosures and Other Information" located at the end of this presentation.
THE EMERGENCE OF CHINA

GDP (2018 USD, Tln, Est PPP-Adjusted)

Share of Global Output

Share of Global Equity Mkt Cap

Share of Global Debt Securities

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