Russia/Ukraine investor implications

March 2022

Michael Cembalest, Chairman of Market and Investment Strategy

INVESTMENT AND INSURANCE PRODUCTS ARE:
• NOT FDIC INSURED • NOT INSURED BY ANY FEDERAL GOVERNMENT AGENCY
• NOT A DEPOSIT OR OTHER OBLIGATION OF, OR GUARANTEED BY, JPMORGAN CHASE BANK, N.A. OR ANY OF ITS AFFILIATES
• SUBJECT TO INVESTMENT RISKS, INCLUDING POSSIBLE LOSS OF THE PRINCIPAL AMOUNT INVESTED
Liberalism vs Realism in the postwar era

The Rights of the Individual versus the State

100 = greatest protections of the Individual

Judicial independence
Due process
Press Freedom
Religious Freedom
Freedom of Association
Corruption
Military involvement in law/politics

Factors included
• Judicial system independence
• Due process under the law, preservation of the rights of the accused
• Freedom of the press
• Freedom of expression and information (state control over the internet, access to foreign newspapers, access to cable, political influences on media content)
• Religious freedoms (freedom to establish and operate religious organizations, harassment of religious groups, gov't interference with freedom of religion)
• Freedom of association, of assembly and to establish/operate political parties
• Perception of public sector corruption
• Protection of individual property rights
• Military involvement in rule of law or politics

Liberalism vs Realism in the postwar era

NATO enlargement
Black: Original members (1949)
Brown: 1950-1980
Purple: 1999-2004
Red: 2009-2020
Blue: NATO Membership Action Plan
Orange: “Intensified NATO dialogue”
Gray: not in NATO

Ukraine
1994: Budapest Memorandum offered Ukraine security assurances against future use of force by the US, UK and Russia in exchange for dismantling nuclear weapons

2008: NATO leaders: “Georgia and Ukraine will become members of NATO”

2008: Russia invades Georgia

2014: Pro-Russian president of Ukraine overthrown in Maidan Revolution, Ukraine pursues closer ties with the EU, Russia annexes Crimea, Russia backed separatists control Donetsk and Luhansk regions of Ukraine

2022: Biden Administration refuses to rule out Ukraine membership in NATO, or renegotiate NATO deployments in Eastern Europe
20/20 foresight department: Finlandization of the Ukraine might not have been the worst option

“Opposition to NATO Expansion”, by 50 foreign policy experts, politicians and military officers, June 1997

- Bill Bradley, Gary Hart, Sam Nunn
- Paul Nitze (Secretary of the Navy)
- Stansfield Turner (Navy Admiral, President of Naval War College, commander of Second Fleet, Supreme Allied Commander NATO Southern Europe and CIA Director of Central Intelligence)
- Robert McNamara (Secretary of Defense)

“I think the Russians will gradually react quite adversely and it will affect their policies. I think it’s a tragic mistake. There was no reason for this whatsoever. No one was threatening anyone else”
- George Kennan in 1998

“Why the Ukraine Crisis Is the West’s Fault: The Liberal Delusions That Provoked Putin”, John Mearsheimer, University of Chicago, 2014
A different Russia than in the late 1990’s

Russia foreign exchange reserves
US$, billions


Reserves by investment:
GBP + EUR - 41%
Gold - 20%
Yuan - 14%
USD - 13%
Other - 11%

Russia current account balance
Percent of GDP

Source: Bloomberg, JPMAM. Q3 2021.
Sanctions checklist

- Sanctions on Russian banks including VEB, VTB and Sberbank (60% of all Russian deposits and 50%+ of Russian wage/pension payments)
  - Exempts transactions related to energy and agricultural exports
- Certain Russian banks blocked from SWIFT network
- Limits on Russian Central Bank FX activity
- Export restrictions on telecom and technology exports to Russia (49 firms added to Commerce Dep’t entity list)
- Expanded list of Russian companies walled off from investment and lending
- US entities prohibited from transacting in secondary market for Russian sovereign debt (primary market and direct lending to gov’t entities already prohibited)
- Germany freezes Nord Stream 2 gas pipeline project
- Sanctions on 5 families “close to Putin”

Not yet

- Explicit energy flow import or export restrictions
- Biden: we will try and shield US consumers from impact
Russia galvanizes opposition in unusual places

• Germany to supply anti-aircraft and other weapons to Ukraine
• Additional small arms contributions from Netherlands and Belgium
• Germany to close airspace to Russian aircraft
• BP to exit Rosneft stake
  • 19.75% stake accounted for 1/3 of BP oil and gas production and more than half of its reserves
• What about the Daimler AG joint venture with Russian Kamaz which produces vehicles for the Russian military?
• Norway sovereign wealth fund to dump Russian assets
• Even the Swiss are considering greater sanctions participation
European thermal energy abdication has a price

European reliance on Russian energy
Thousand barrels per day of oil equivalent


Most exposed: Germany, Italy and the Netherlands
European thermal energy abdication has a price

Europe: greater counterparty reliance on Russia for natural gas, percent of total European imports

Most exposed: Germany, Italy and the Netherlands

And the price is high

**US vs Europe: Wholesale electricity prices**
US$ / MWh, 7 day average


**US vs Europe: Wholesale natural gas prices**
$/MMBTU

US LNG to the rescue? In flow terms maybe, but not in cost terms

**European natural gas imports: Russia vs LNG**
Billion cubic meters per week

- **Total LNG**
- **Russia pipeline nat gas**
- **US LNG**

**Wholesale natural gas prices**
$/MMBTU

- **Europe natural gas**
- **Europe LNG imports**
- **US Henry Hub**

Source: Bruegel, EIA, Diesel & Gas Turbine, JPMAM. February 11, 2022.
US LNG to the rescue? Not enough import capacity in Europe yet

Annual capacity of EU27 natural gas imports
TWh
- Russia, 2,800
- Norway, 1,100
- North Africa, 800
- Spain, 700
- Azerbaijan, 130

Europe 2021 LNG imports by source country
Billion cubic feet per day
- US
- Qatar
- Russia
- Nigeria
- Algeria
- Other

Source: Bruegel, JPMAM. 2022.
Source: EIA, JPMAM. 2021.
Europe: Decarbonizing the grid is very different than decarbonizing energy use

**OECD Europe energy consumed by end-use sector and fuel type**
Quadrillion BTUs of final energy consumed; dotted segments = electricity consumed

Source: EIA, JPMAM. 2021.
Oil maneuvers: next steps

• Russian oil: currently supplying 2 mm bpd to Western Europe, 0.75 mm bpd to Eastern Europe, 0.2 mm bpd to the US
• Russia could divert ~1 mm bpd to China
• US working on release of oil from Strategic Petroleum Reserve
• French, Russian and UK negotiators appear to be reviving nuclear agreement with Iran, potentially adding 1 mm bpd from Iranian floating storage, with Iran ramping up production from 2.5 to 3.3 mm bpd by December
• All things considered: ~$100 oil for the next few months with interim spikes
• China may help Russia withstand G7 sanctions with loans, as they did in 2014; Russia is the biggest recipient of loans from Chinese official sector institutions
Russia/Ukraine war exacerbates existing tight conditions in energy and grain markets

**Global fossil fuel use vs energy capital spending**

- Global primary energy fossil fuel use
- Capital spending by S&P Global 1200 Energy companies

**Wheat and corn supply remains tight**

- Stocks-to-use ratio of major exporters


“Reports of my death are greatly exaggerated”

Excess return of renewables vs fossil fuels
% rolling annual out (under) performance

Source: Bloomberg, JPMAM. February 24, 2022. Renewables composite is the average of 5 energy indices: CELS, ECO, EORE, SPGTCED, SUNIDX.
Agriculture and industrial metals

Agriculture price index
Index (100 = Jan 1990)

Source: Bloomberg, JPMAM. February 24, 2022.

Industrial metals price index
Index (100 = Jan 1990)

Source: Bloomberg, JPMAM. February 24, 2022.
Supply chain conditions not set up for war-related disruptions, which are usually inflationary

**US manufacturing delivery times**

Index

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Index</td>
<td>15</td>
<td>20</td>
<td>25</td>
<td>30</td>
<td>35</td>
<td>40</td>
<td>45</td>
<td>50</td>
</tr>
</tbody>
</table>

- Longer lead times
- Shorter lead times


**Container freight rate and anchored containerships**

<table>
<thead>
<tr>
<th>Freight rate, US$ / 40ft box</th>
<th>Number of containerships</th>
</tr>
</thead>
<tbody>
<tr>
<td>$25,000</td>
<td>Freightos China to West Coast (lhs)</td>
</tr>
<tr>
<td>$20,000</td>
<td>WCI Shanghai to LA (lhs)</td>
</tr>
<tr>
<td>$15,000</td>
<td>Anchored containerships in LA / Long Beach (rhs)</td>
</tr>
<tr>
<td>$10,000</td>
<td>$5,000</td>
</tr>
<tr>
<td>$0</td>
<td>$5,000</td>
</tr>
</tbody>
</table>

Source: Cornerstone Macro, Bloomberg. February 24, 2022.
Rising input costs almost always translate into rising revenues
The bigger question: will there be a recession

Annual change in S&P 500 revenue and COGS
y/y % change

Let's start with the Fed

Market implied Fed hikes, derived from futures market
Number of expected 25 bp hikes over the next 12 months

- Russia and Ukraine account for less than 1% of US imports and exports
- $10 increase in oil prices = minimal impact on core inflation, lowers real GDP growth by 0.1%
- Wage-price dynamic will drive the Fed to tighten as planned absent major escalation outside Ukraine

Fed needs to accomplish first non-recessionary landing on record now that headline inflation is > 5%
This might be the Fed’s best chance: most of the inflationary spike still appears related to supply chain disruptions in goods markets.

**US goods vs services inflation**

y/y % change in core CPI

Source: BLS, JPMAM. January 2022.
But pressure on the Fed is increasing

- Inflation broadening to services
- Regional median CPI measures rising as well
- Wage-price spiral risks rising
- Tight real estate markets resulting in 8%-15% annual increase in new/existing leases

**Wage tracker**
% composite of avg hourly earnings and employment cost index

Source: GS US Economics Analyst. 2022
Silver lining for the Fed: Consumers are not expecting inflation spike to last more than one year

Inflation expectations
% median expected inflation rate

Some of the models we follow agree: producer and consumer prices should fall along with global business conditions

**US manufacturing PMI prices paid**

Index (50+ = expansion)

Source: Piper Sandler. February 27, 2022.

**US headline CPI**

y/y % change

Source: BLS, Piper-Sandler. February 27, 2022.
Equity market reactions: a sharp reversal

**Cyclicals vs defensives**

Index (100 = Jan 2001)

Source: Bloomberg, JPMAM. February 24, 2022.
Equity market reactions: value stocks have regained some ground, but growth stocks still way ahead

Russell 1000 value vs growth: performance

Value index

Value index / growth index

Source: Bloomberg, JPMAM. February 25, 2022.
Market repricing: some of the weakest links crumbling

Weak links crumbling
Total return index (Aug 2020 = 100)

Market repricing: low margin stocks finally come back to earth

Relative return of low operating margin companies
Percent, cumulative return

Market repricing: average NASDAQ stock down ~40% from peak levels

Drawdowns of individual NASDAQ stocks from their respective peaks, Number of stocks

Market repricing: the price for “innovation” is getting cheaper

The Tortoise and the Hare
Index (100 = Dec 2016)

UKM Innovation ETF

Old economy basket: farm equipment, industrial REITs and office cleaning supplies / uniforms

Source: Bloomberg, JPMAM. February 24, 2022.
Market repricing: biotech is now in deep value territory

**Large cap biotech relative return vs US large cap stocks**

% twelve-month relative returns

**Free cash flow yield of large cap biotech relative to tech & interactive media stocks**


Bright spots: capital spending and growth impulses were positive, pre-war

**US Business Roundtable CEO capital spending survey**
Index (50+ = expansionary)


**US and European economic surprises**
Citi Economic Surprise Index

Geopolitics are usually not drivers of equity markets 3-6 months later (July 2014 *Eye on the Market*)
But the exception is the 1973 Arab Israeli war and its energy consequences...

Pre-conflict market and economic trends are almost always what drives equity markets
The exception: Israeli-Arab War of 1973, which led to a Saudi oil embargo against the US and a quadrupling of oil prices
...which is yet another reminder of how important energy independence can be

### US net energy deficit, in dollar terms
Energy imports - energy exports, % of GDP

Source: Bureau of Economic Analysis, Haver Analytics, JPMAM. Q3 2021.

### US net energy deficit, in energy terms
Net imports of oil, natural gas and coal in million tonnes of oil equiv.

Source: EIA, JPMAM. November 2021.
Wrapping up

- Near term equity market reaction may continue to be negative since most institutional and individual investors were not positioned for largest land war in Europe since WWII, and the largest jobs-workers gap as well
  - As usual, it will be difficult to time the bottom absent a global recession
  - A lot of the growth premium has now been eliminated, particularly for unprofitable YUC companies
- Energy consequences for Europe may result in eventual Western acceptance of the facts on the ground, even as tougher sanctions remain in place
- Fed to continue tightening and has difficult challenge ahead, but the unorthodox nature of the inflation spike due to the pandemic should help
  - Both policy rates and long rates still negative in real terms by end of 2022
- Still expecting 3.0% real US GDP growth in 2022, although year-end core inflation may still be over 3.5% and not decline to 2.5% until end of 2023
One day, we may discuss Taiwan and the decision by the West to accept China into the World Trade Organization in the early 2000’s…but that is a topic for another time.

**Chinese military incursions to Taiwan**

Number of Chinese military aircrafts entering Taiwan's defense zone

![Bar chart showing the number of Chinese military aircrafts entering Taiwan's defense zone from Sep-20 to Dec-21.](chart)

IMPORTANT INFORMATION

This report uses rigorous security protocols for selected data sourced from Chase credit and debit card transactions to ensure all information is kept confidential and secure. All selected data is highly aggregated and all unique identifiable information, including names, account numbers, addresses, dates of birth, and Social Security Numbers, is removed from the data before the report's author receives it. The data in this report is not representative of Chase's overall credit and debit cardholder population.

The views, opinions and estimates expressed herein constitute Michael Cembalest’s judgment based on current market conditions and are subject to change without notice. Information herein may differ from those expressed by other areas of J.P. Morgan. This information in no way constitutes J.P. Morgan Research and should not be treated as such.

The views contained herein are not to be taken as advice or a recommendation to buy or sell any investment in any jurisdiction, nor is it a commitment from J.P. Morgan or any of its subsidiaries to participate in any of the transactions mentioned herein. Any forecasts, figures, opinions or investment techniques and strategies set out are for information purposes only, based on certain assumptions and current market conditions and are subject to change without prior notice. All information presented herein is considered to be accurate at the time of production. This material does not contain sufficient information to support an investment decision and it should not be relied upon by you in evaluating the merits of investing in any securities or products. In addition, users should make an independent assessment of the legal, regulatory, tax, credit and accounting implications and determine, together with their own professional advisers, if any investment mentioned herein is believed to be suitable to their personal goals. Investors should ensure that they obtain all available relevant information before making any investment. It should be noted that investment involves risks, the value of investments and the income from them may fluctuate in accordance with market conditions and taxation agreements and investors may not get back the full amount invested. Both past performance and yields are not reliable indicators of current and future results.

Non-affiliated entities mentioned are for informational purposes only and should not be construed as an endorsement or sponsorship of J.P. Morgan Chase & Co. or its affiliates.

For J.P. Morgan Asset Management Clients:

J.P. Morgan Asset Management is the brand for the asset management business of JPMorgan Chase & Co. and its affiliates worldwide.

To the extent permitted by applicable law, we may record telephone calls and monitor electronic communications to comply with our legal and regulatory obligations and internal policies. Personal data will be collected, stored and processed by J.P. Morgan Asset Management in accordance with our privacy policies at https://am.jpmorgan.com/global/privacy.

ACCESSIBILITY

For U.S. only: If you are a person with a disability and need additional support in viewing the material, please call us at 1-800-343-1113 for assistance.

This communication is issued by the following entities:

In the United States, by J.P. Morgan Investment Management Inc. or J.P. Morgan Alternative Asset Management, Inc., both regulated by the Securities and Exchange Commission; in Latin America, for intended recipients' use only, by local J.P. Morgan entities, as the case may be; in Canada, for institutional clients' use only, by JPMorgan Alternative Asset Management (Canada) Inc., which is a registered Portfolio Manager and Exempt Market Dealer in all Canadian provinces and territories except the Yukon and is also registered as an Investment Fund Manager in British Columbia, Ontario, Quebec and Newfoundland and Labrador. In the United Kingdom, by JPMorgan Asset Management (UK) Limited, which is authorized and regulated by the Financial Conduct Authority; in other European jurisdictions, by JPMorgan Asset Management (Europe) S.à r.l. In Asia Pacific (“APAC”), by the following issuing entities and in the respective jurisdictions in which they are primarily regulated: JPMorgan Asset Management (Asia Pacific) Limited, or JPMorgan Funds (Asia) Limited, or JPMorgan Asset Management Real Assets (Asia) Limited, each of which is regulated by the Securities and Futures Commission of Hong Kong; JPMorgan Asset Management (Japan) Limited, which is a member of the Investment Trusts Association, Japan, the Japan Investment Advisers Association, Type II Financial Instruments Firms Association and the Japan Securities Dealers Association and is regulated by the Financial Services Agency (registration number “Kanto Local Finance Bureau (Financial Instruments Firm) No. 330”); in Australia, to wholesale clients only as defined in section 761A and 761G of the Corporations Act 2001 (Commonwealth), by JPMorgan Asset Management (Australia) Limited (ABN 55143832080) (AFSL 376919). For all other markets in APAC, to intended recipients only.
Important Information

For J.P. Morgan Private Bank Clients:

ACCESSIBILITY

J.P. Morgan is committed to making our products and services accessible to meet the financial services needs of all our clients. Please direct any accessibility issues to the Private Bank Client Service Center at 1-866-265-1727.

LEGAL ENTITY, BRAND & REGULATORY INFORMATION

In the United States, bank deposit accounts and related services, such as checking, savings and bank lending, are offered by JPMorgan Chase Bank, N.A. Member FDIC. JPMorgan Chase Bank, N.A. and its affiliates (collectively “JPMCB”) offer investment products, which may include bank-managed investment accounts and custody, as part of its trust and fiduciary services. Other investment products and services, such as brokerage and advisory accounts, are offered through J.P. Morgan Securities LLC (“JPM”) (a member of FINRA and SIPC). JPMCB and JPM are affiliated companies under the common control of JPM. Products not available in all states.

In Luxembourg, this material is issued by J.P. Morgan Bank Luxembourg S.A. (JPMBL), with registered office at European Bank and Business Centre, 6 route de Treves, L-2633, Senningerberg, Luxembourg, R.C.S Luxembourg B10.958. Authorized and regulated by Commission de Surveillance du Secteur Financier (CSSF) and jointly supervised by the European Central Bank (ECB) and the CSSF. J.P. Morgan Bank Luxembourg S.A. is authorized as a credit institution in accordance with the Law of 5th April 1993. In the United Kingdom, this material is issued by J.P. Morgan Bank Luxembourg S.A., London Branch, registered office at 25 Bank Street, Canary Wharf, London E14 5JP. Authorised and regulated by Commission de Surveillance du Secteur Financier (CSSF) and jointly supervised by the European Central Bank (ECB) and the CSSF. Deemed authorised by the Prudential Regulation Authority. Subject to regulation by the Financial Conduct Authority and limited regulation by the Prudential Regulation Authority. Details of the Temporary Permissions Regime, which allows EEA-based firms to operate in the UK for a limited period while seeking full authorisation, are available on the Financial Conduct Authority’s website.

In Spain, this material is distributed by J.P. Morgan Bank Luxembourg S.A., Sucursal en España, with registered office at Paseo de la Castellana, 31, 28046 Madrid, Spain. J.P. Morgan Bank Luxembourg S.A., Sucursal en España is registered under number 1516 within the administrative registry of the Bank of Spain and supervised by the Spanish Securities Market Commission (CNMV). In Germany, this material is distributed by J.P. Morgan Bank Luxembourg S.A., Frankfurt Branch, registered office at Taunustor 1 (TaunusTurm), 60310 Frankfurt, Germany, jointly supervised by the Commission de Surveillance du Secteur Financier (CSSF) and the European Central Bank (ECB), and in certain areas also supervised by the Bundesanstalt für Finanzdienstleistungsaufsicht (BaFin). In Italy, this material is distributed by J.P. Morgan Bank Luxembourg S.A., Milan Branch, registered office at Via Catena Adalberto 4, Milan 20121, Italy and regulated by Bank of Italy and the Commissione Nazionale per le Società e la Borsa (CONSOB). In the Netherlands, this material is distributed by J.P. Morgan Bank Luxembourg S.A., Amsterdam Branch, with registered office at World Trade Centre, Tower B, Strawinskylaan 1135, 1077 XX, Amsterdam, The Netherlands. J.P. Morgan Bank Luxembourg S.A., Amsterdam Branch is authorized and regulated by the Commission de Surveillance du Secteur Financier (CSSF) and jointly supervised by the European Central Bank (ECB) and the CSSF in Luxembourg. J.P. Morgan Bank Luxembourg S.A., Amsterdam Branch is also authorized and supervised by De Nederlandsche Bank (DNB) and theAutoriteit Financiële Markten (AFM) in the Netherlands. Registered with the Kamer van Koophandel as a branch of J.P. Morgan Bank Luxembourg S.A. under registration number 71651645. In Denmark, this material is distributed by J.P. Morgan Bank Luxembourg, Copenhagen Br, filial af J.P. Morgan Bank Luxembourg S.A. with registered office at Kalvebod Brygge 39-41, 1560 København V, Denmark. J.P. Morgan Bank Luxembourg, Copenhagen Br, filial af J.P. Morgan Bank Luxembourg S.A. is authorized and regulated by Commission de Surveillance du Secteur Financier (CSSF) and jointly supervised by the European Central Bank (ECB) and the CSSF. J.P. Morgan Bank Luxembourg, Copenhagen Br, filial af J.P. Morgan Bank Luxembourg S.A. is also subject to the supervision of Finanstilsynet (Danish FSA) and registered with Finanstilsynet as a branch of J.P. Morgan Bank Luxembourg S.A. under code 29009. In Sweden, this material is distributed by J.P. Morgan Bank Luxembourg S.A., Stockholm Bankfiltial, with registered office at Hamngatan 15, Stockholm, 11147, Sweden. J.P. Morgan Bank Luxembourg S.A., Stockholm Bankfiltial is authorized and regulated by Commission de Surveillance du Secteur Financier (CSSF) and jointly supervised by the European Central Bank (ECB) and the CSSF. J.P. Morgan Bank Luxembourg S.A., Stockholm Bankfiltial is also subject to the supervision of Finansinspektionen (Swedish FSA). Registered with Finansinspektionen as a branch of J.P. Morgan Bank Luxembourg S.A. In France, this material is distributed by JPMorgan Chase Bank, N.A. (“JPMCB”), Paris branch, which is regulated by the French banking authorities Autorité de Contrôle Prudentiel et de Résolution and Autorité des Marchés Financiers. In Switzerland, this material is distributed by J.P. Morgan (Suisse) SA, which is regulated in Switzerland by the Swiss Financial Market Supervisory Authority (FINMA).
Important Information

For J.P. Morgan Wealth Management Clients:

Purpose of This Material: This material is for information purposes only. The views, opinions, estimates and strategies expressed herein constitutes Michael Cembalest's judgment based on current market conditions and are subject to change without notice, and may differ from those expressed by other areas of J.P. Morgan. This information in no way constitutes J.P. Morgan Research and should not be treated as such.

J.P. Morgan is committed to making our products and services accessible to meet the financial services needs of all our clients. If you are a person with a disability and need additional support, please contact your J.P. Morgan representative or email us at accessibility.support@jpmorgan.com for assistance.

J.P. Morgan Wealth Management is a business of JPMorgan Chase & Co., which offers investment products and services through J.P. Morgan Securities LLC (JPMS), a registered broker-dealer and investment advisor, member FINRA and SIPC. Annuities are made available through Chase Insurance Agency, Inc. (CIA), a licensed insurance agency, doing business as Chase Insurance Agency Services, Inc. in Florida. Certain custody and other services are provided by JPMorgan Chase Bank, N.A. (JPMCB). JPMS, CIA and JPMCB are affiliated companies under the common control of JPMorgan Chase & Co. Products not available in all states.

This material is intended for your personal use and should not be circulated to or used by any other person, or duplicated for non-personal use, without our permission. If you have any questions or no longer wish to receive these communications, please contact your J.P. Morgan representative.

LEGAL ENTITY, BRAND & REGULATORY INFORMATION

The views, opinions and estimates expressed herein constitute Michael Cembalest's judgment based on current market conditions and are subject to change without notice. Information herein may differ from those expressed by other areas of J.P. Morgan. This information in no way constitutes J.P. Morgan Research and should not be treated as such. The views contained herein are not to be taken as an advice or a recommendation to buy or sell any investment in any jurisdiction and there is no guarantee that any of the views expressed will materialize. Any forecasts, figures, opinions or investment techniques and strategies set out are for information purposes only; based on certain assumptions, current market conditions and are subject to change without prior notice. All information presented herein is considered to be accurate at the time of writing, but no warranty of accuracy is given and no liability in respect of any error or omission is accepted. Any forecasts, figures, opinions or investment techniques and strategies set out are for information purposes only; based on certain assumptions, current market conditions and are subject to change without prior notice. All information presented herein is considered to be accurate at the time of writing, but no warranty of accuracy is given and no liability in respect of any error or omission is accepted.

This material does not contain sufficient information to support an investment decision and it should not be relied upon by you in evaluating the merits of investing in any securities or products. In addition, investors should make an independent assessment of the legal, regulatory, tax, credit, and accounting implications and determine, together with their own professional advisers, if any investment mentioned herein is believed to be suitable to their personal goals. Investors should ensure that they obtain all available relevant information before making any investment. It should be noted that investment involves risks, the value of investments and the income from them may fluctuate in accordance with market conditions and investors may not get back the full amount invested. Both past performance and yield may not be a reliable guide to future performance.

Non-affiliated entities mentioned are for informational purposes only and should not be construed as an endorsement or sponsorship of J.P. Morgan Chase & Co. or its affiliates.

J.P. Morgan Asset Management is the brand for the asset management business of JPMorgan Chase & Co. and its affiliates worldwide. J.P. Morgan Institutional Investments, Inc.

- For J.P. Morgan Private Bank Clients: Please read the Legal Disclaimer.
- For J.P. Morgan Asset Management Clients: Please read the Legal Disclaimer
- For J.P. Morgan Securities: Please read the Legal Disclaimer.
- For Chase Private Client: Please read the Legal Disclaimer.

© 2022 JPMorgan Chase & Co. All rights reserved.