

the day after

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*Rethinking
the macro
and cross-asset
research:
what we have
learned from
the Covid-19
crisis*

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ASSET MANAGEMENT

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“Realize that everything connects to everything else (Leonardo da Vinci)”

Covid-19 accelerated markets' entropy and risk takers will evolve their investment approaches

Crises create disruption and Covid-19 is no exception, bringing new complexities, new opportunities and new risks to the investment landscape.

From our research angle, we realised that the pandemic triggered:

1. A fast-evolving macro financial environment.

It has become much more difficult to anticipate and to predict performance, in both the short and medium term, because of the lack of hard data (even the calculation of consumer prices has become difficult because of lockdowns!) and the unknown consequences of the unconventional policies put in place.

2. A common global 'health' shock affecting economies and spill-overs to the full spectrum of asset classes.

Financial market volatility initially spiked on increased uncertainty regarding the short-term effects of the virus on lives and due to the potential long-term changes to livelihoods. Later, a sequencing of policy announcements, measures implemented and pandemic-driven news resulted in volatility increasing.

3. A deep disconnect between macro fundamentals and markets.

We have seen a crisis of global confidence and a sudden contraction of global growth. Asset classes saw very significant declines based on the common 'unknown', the virus. Then, they bounced back based on a liquidity-driven rally fuelled by central banks' implementation of aggressive accommodative policies. In contrast to the past, economic policy interventions have occurred very quickly, and CBs have

been creative and unconventional in their responses to the emergency. Analysts had to provide forecasts at a time when companies stopped providing guidance on earnings per share and top lines. Policy accelerators caused risk assets to drift higher, overshadowing the pain being experienced by the real economy.

4. A larger role for central authorities in market functioning. Monetary policies in particular have been overwhelming asset classes' specific drivers, blurring market correlations and inducing (dangerous) mispricing.

Central banks increased their stimulus over and over again. They have been crossing new frontiers¹, elongating the cycle once again via more debt creation. They are managing yield curves while increasing the risk of asset bubbles, should fiscal policies not deliver as needed.

Governments addressed the health emergency *first* (international travel restrictions, domestic measures, improvement of medical treatment) and then implemented fiscal policies, not only reacting (state aid/grants), but also trying to be pre-emptive in order to address the profound damage Covid-19 will inflict on labour markets and growth.

The net effect of these interventions remains difficult to ascertain, but it is clear we need to evolve our thinking in order to analyse this new macro financial ecosystem.

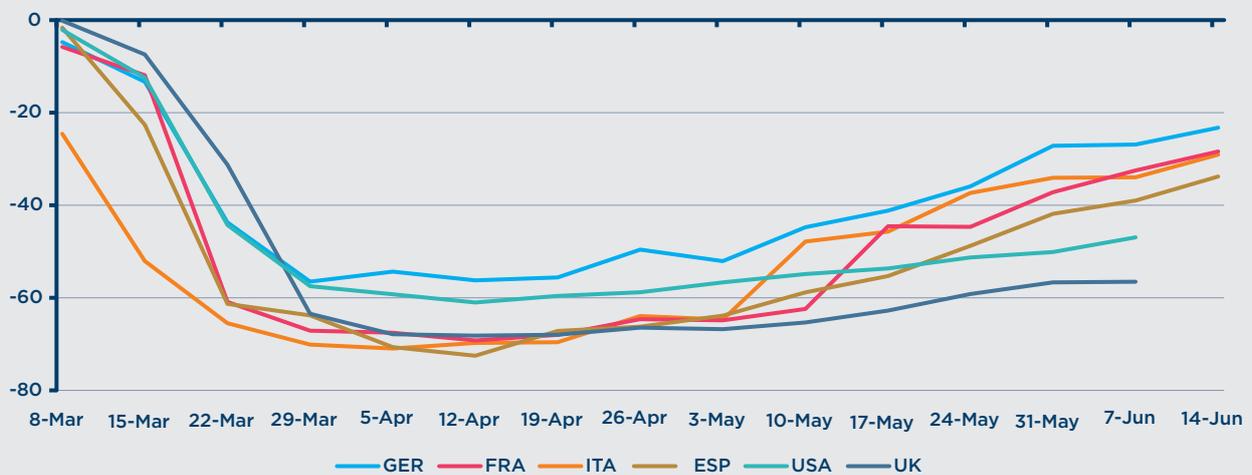
How we have analysed this evolving situation and our findings

We soon realised that the global health crisis was having a huge impact on economies via an unusual shock potentially triggering some structural changes. However, **we remain convinced that macro factors anchored financial markets**. Growth, inflation, rates, policy efforts and liquidity are likely to remain pivotal, so, **the nature of this crisis requires an evolution in the way we look at these factors.**

1. [New Frontiers for Central Banks](#), The Day After #5, D. Borowski, May 2020.

Chart 1: High-frequency data activity tracker

Pandemic-hit countries in a sequence and they are recovering in the same sequence. Primarily based on mobility/leisure/energy consumption data, our indicator shows Germany, France and Italy to be recovering faster than the UK and the US.



Source: Amundi Global Research elaboration on Bloomberg data as of 25 June 2020. Mobility, restaurant bookings, lockdown stringency, energy consumption, same-store retail sales, and some country-specific high-frequency data are considered.

In particular:

- 1. We moved away from the traditional macro/markets/micro causalities towards using non-linear big data nowcasting indicators to trace the new cross-sectional risk factors commonalities that we believe will behave as the new market movers. In this way, we track asymmetry and velocity of the current macro environment to fine-tune forecasts.**

During the Covid-19 outbreak, our Bayesian approach to macro forecasts is providing highly volatile outcomes which are subject to continuous re-assessment.

The overall fluidity of the situation, the lack of hard data, and uncertainty on the size and timing of fiscal policies are distorting the contribution to the fundamental identity of national income accounting. Consumption, investment, public expenditure and net trade are running on evolving statistical relationships. They are constrained by a large number of assumptions and they will likely face a structural break.

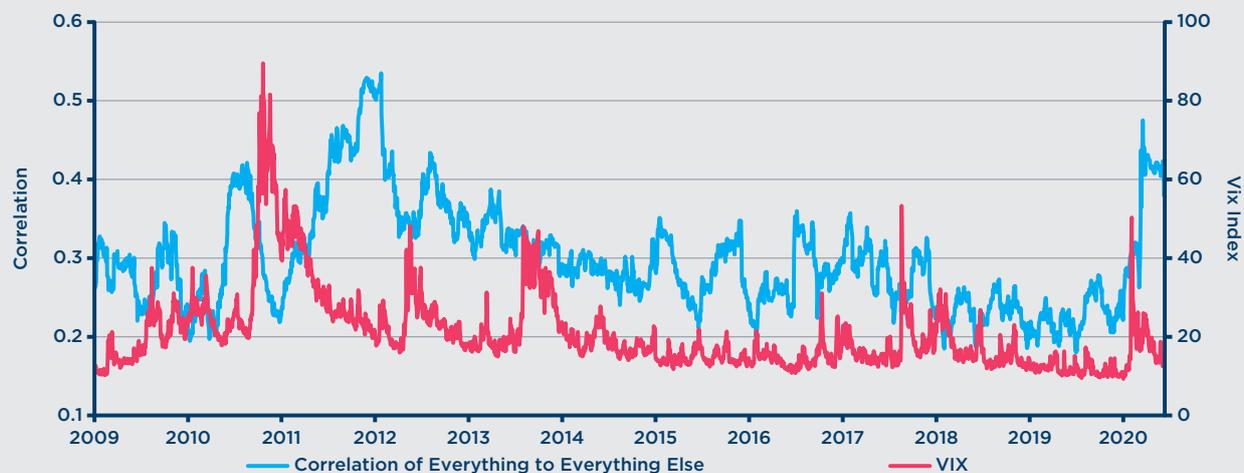
Are consumers' preferences structurally going to change? How fast and synchronised will deglobalisation be? Which sectors will see local on-shoring? Will their weights in the economy change? When will

labour-intensive sectors, such as hospitality, recover? The answers to these questions will likely affect productivity and address growth in the medium to long term. However, as risk-takers, we needed to get a better focus on the short-term reality to understand the appropriate investment positioning. Therefore, we complemented our structural approach to macro forecasts with the support of fast data and micro evidence.

- **We utilized big data to process a vast quantity of panel data, being conscious that *n-dimensional* problem solving required managing large databases. This shift needed higher analytical capacity.**
- **We expanded our coverage to almost 300 asset classes to catch the deeper co-movements that had been taking place across and within asset classes.** We thought about valuable regularities but we needed to detect them automatically: technology with the Python coding has been of great help. The major advantage of learning system is the ability to adapt to a changing environment. At the same time, the identification of specific

Chart 2: Correlation of everything vs everything else

While used to volatility spikes, we are less used to fast-evolving correlations. The most recent spike refers to the capitulation that took place in mid-March, when everything was drifting lower, including safe havens.



Source: Amundi, Bloomberg. Daily data. The «Correlation of Everything to Everything Else» is calculated as the average magnitude of 15 cross-asset correlations. These being the crosses, on a rolling return/change basis, between (1) S&P500, (2) Bonds Yields (avg of USD 2y & 10y), (3) Yield Curve (USD 10y-2y), (4) Credit Spreads (Moody's BAA - USD 10y), (5) Dollar Index (DXY) & (6) Commodities (GSCI Spot). Data as of 16 June 2020.

financial regimes², rather than random sampling, improves the application of machine learning to investments, automating the calculations at a time of growing data management complexity.

2. We built GREAT (Global Risks Exposure Attribution Tool) to systematise our analyses.

Once we verified that the macro factors we had identified are the key drivers of financial markets, we realised that the **factors' cyclicity** play a prominent role. For example, DM equities' sensitivity to prices (CPI, PPI) shifts from positive when in a period of disinflation/reflation to negative in hyperinflation. These sensitivities shifts are asset class-specific, even within the same cluster (equity, fixed income and commodity). For example, Japanese equities' sensitivities to monetary aggregates is 3x the sensitivity

of US equities. As a consequence, we identified for each factor a 'low', 'medium' and 'high' level and distinguished the sensitivity of each asset class in the three cases ("importance of the macro factor's first derivative"). Lastly, we ensured that in addition to the statistical significance, results were economically sound.

All this information will be entered into GREAT and used for top-down assessment of risk exposure, as we will discuss in the next paragraph.

3. If macro factors influence markets dynamics in a more complex and unusual manner, then **a macroeconomic (risk) factor-based approach³ is suited to capturing the broad common risks across a investment universe**. This is why we calculate asset classes' sensitivities to these factors on some proxies based on our internal forecasts and elaborations.

2. This is what we are referring to when writing 'state-dependent' in the remainder of this document. As economic cycles and financial regimes influence financial markets, we set them as the cornerstones of our scenario-based dynamic asset allocation framework. We used growth, inflation, monetary aggregates and global debt to explore 120 years of history and cluster the dataset into 5 financial regimes: contraction, slowdown, recovery, late cycle and 'asset reflation', relying on unconventional policies. Each phase is identified in terms of distance from the macro risk factor and characterised by recurring persistency in returns streams. We identified some recurrences and consistencies whereby these regimes feature different patterns for financial markets not only in terms of asset class returns, risks and targets, but also in terms of cross asset interactions and exposure to relevant macro financial factors. Cesarini F, Defend M, Portelli L, The Advanced "Investment Phazer", 2011.

3. This paper focuses on macroeconomic factors, as a reference for style factors (value, minimum volatility, momentum, quality): see "Investment Cycles and Asset Allocation", Mijot E, Economica, 2018.

Table 1: An evolving research framework

	Pre- Covid19 (since GFC)	Post Covid-19	Amundi Research in the Day After
Economics	<p>Monetary policy is the only game in town</p> <p>Hard Data</p> <p>Growth, Inflation, rates, monetary aggregates, debt, liquidity are the key macro factors</p>	<p>Monetary policy evolved further beyond new frontiers and a nexus with fiscal policy has been created</p> <p>High Frequency data</p> <p>Growth, Inflation, rates, monetary aggregates, debt, liquidity are the key macro factors</p>	<p>Bayesian Vector Autoregressive forecasts is complemented with nonlinear nowcasting indicators</p> <p>Advanced Investment Phazer to map base and alternative scenarios (medium term)</p> <p>Composite Economic Momentum Indicator (CEMI) to track short term fluctuations and turning points</p>
Financial Markets	<p>From Asset Reflation to late cycle</p> <p>Economic backdrop, valuation, risk sentiment and technical are the strategic and tactical markets drivers</p>	<p>From contraction to recovery</p> <p>Economic backdrop, valuation, risk sentiment and technical are the strategic and tactical markets drivers</p>	<p>Parametric and non parametric approach are integrated.</p> <p>GREAT to wrap and systematize asset classes (non linear) sensitivities to macro risk factors</p>
Investment Consequences	<p>Rigid SAA-TAA⁶ framework</p> <p>Diversification across asset classes</p>	<p>Dynamic framework</p> <p>Diversification across macro risk factors</p>	<p>Macro risk factor asset allocation, state dependent or regime based</p>

Source: Amundi Global Research elaboration, as of 15 June 2020.

We revisited and consolidated our macro factor-based approach to asset allocation to enforce portfolio diversification, reduce volatility, and possibly improve portfolios outcome.

The investment universe continues and will continue to fast co-move with diverse sensitivity to common factors that are now driving the markets: **namely, central banks' support for markets and pandemic-related news**. As a result, correlations are biased and unusual: for example, the mid-March capitulation, when all asset classes was drifting lower, followed by the most recent rally, which has included fallen angels.

Moreover, the risk is that such an environment exacerbates the weakness of traditional asset allocation which operate on silos of asset-class bucket holdings (equity, fixed income, commodities, FX). Covid-19 has been the **opportunity for our Regime-Based Approach to move one step forward towards operating**

in a more explicit factor-based fashion, using non-linear thinking and artificial intelligence to empower the search for cross-asset opportunities amid unconventional market behaviours. In our opinion, a **macro (risk) factor⁴ asset allocation** that allows for the budgeting of risk assigned to each macro factor while positioning cross asset according to the investor's high convictions⁵ is the right approach in an environment in which macro factors are not only influencing markets, but are the "minimum common factor" on the a global scale.

GREAT allows for the calculation of portfolio exposure to risk factors (beta) while tracking beta changes and risk budget consistency when different factor tilts are input.

The entire process has been fascinating and as well as challenging.

Remaining in control of the full process was paramount. Our regime-based framework

4. Macro risk factors refer to economic factors that influence overtime asset classes and investments volatility.

5. [Multi Asset: a solid total portfolio approach for a complex world](#), M. Germano, E. Tazè Bernard, May 2020.

6. SAA stays for strategic asset allocation, TAA tactical asset allocation.

Table 2: Mapping risk factors

Macro Risk Factor	Proxies	Rationale
Growth	Real Global GDP (US, EZ, Japan, GEM), Revenues and EPS US	Exposure to global business cycle
Inflation	US: CPI, PPI, ULC. Eurozone: CPI, PPI. Japan: CPI	Exposure to price changes
Nominal rates	UST 2,5,10 YRS. Bund 2,5,10 YRS	Exposure to DM yield curve buckets changes
Debt and monetary aggregates	US Fed Rate and M1, M1 & M3 Eurozone, G4 CBs' balance sheets (Fed, ECB, BOJ, BOE), global leverage	Exposure to leverage and transmission of un/conventional monetary policy)
Liquidity	(all proprietary indicators) Global Financial Conditions Index, CAST, COMBO	Exposure to financial conditions and risk sentiment, is the only factor that returns a digital signal ON/OFF

Source: Based on Amundi Global Research elaboration, Bloomberg, as of 15 June 2020. JPM for bond indices, MSCI for equity indices, ML for credit.

Table 3: Asset class sensitivities to macro (risk) factors⁷

	Global Factors Sensitivities								
	Growth		Inflation		Monetary		Nominal Rates		Liquid / Sentiment
	below trend to trend	from trend to above trend	below trend to trend	from trend to above trend	below trend to trend	from trend to above trend	below trend to trend	from trend to above trend	from off to on
Cash									
Govies									
Inflation Linked									
GEM									
IG									
HY									
Europe Equity									
North America Equity									
Japan Equity									
Pacific Ex Japan Equity									
Emerging Market ASIA Equity									
Emerging Market LatAm Equity									
Emerging Market EMEA Equity									
Oil									
Basic Resources									
Gold									

Source: deep red = negative sensitivity, least sensitive deep green = positive sensitivity, most sensitive. Based on Amundi Global Research elaboration, Bloomberg, as of 15 June 2020. JPM for bond indices, MSCI for equity indices, ML for credit.

7. Macro (risk) factor proxies are based on forecasts, tools and analyses elaborated by Amundi Cross Asset Research.

articulated in the base and alternative scenarios with some clear references in terms of macro-economic assumptions and financial consequences had been quite helpful to fix reference values to initialise with some a priori the clustering procedure when flooded with tons of results. Furthermore, we also had to move beyond the comfort zone of time series analysis and parametric estimation. Consistency, reliability and significance of results become more challenging when directed at large volumes of information and evolving structural relationships. Machines deliver faster than humans, but it is the human brain that has to define the problem, to apply the most suitable pragmatic technique, and, eventually, to use common sense and judgement to interpret the significance of the final solution. We haven't changed our thinking in that regard.

Factor-based asset allocation cuts across traditional asset classes, diversifying returns streams on a 'truly' cross-asset dimension.

We identified these macro (risk) factors as the key top-down discriminants cross assets amid the five financial regimes we defined ex ante. We derived state-dependent sensitivities for our investment universe.

As the path to reach the new equilibrium in *the day after* will not be straight, we have been adopting non-linear thinking to elaborate big data aimed at improving the comprehension of asset class sensitivities around risk factors.

Connecting dots

The pandemic made a virtue of necessity.

- 1. We penciled in base and alternative scenarios and framed them into our financial regimes' mapping to spot some asset class behaviour references.**

Our base scenario sees a global deep, short-lived recession in H120, followed by a short rebound in Q320. In a sequencing progression, regions will slowly revert to pre-crisis levels (EM in Q221, AEs Q422). The game changers for the alternative scenarios are the discovery of a vaccine and the effectiveness of policy boosters on the real economy⁸. We then populate this frame with the information resulting from high-frequency macro and micro evidence to add more accurate fluctuations around the medium-term trends detected by the scenarios.

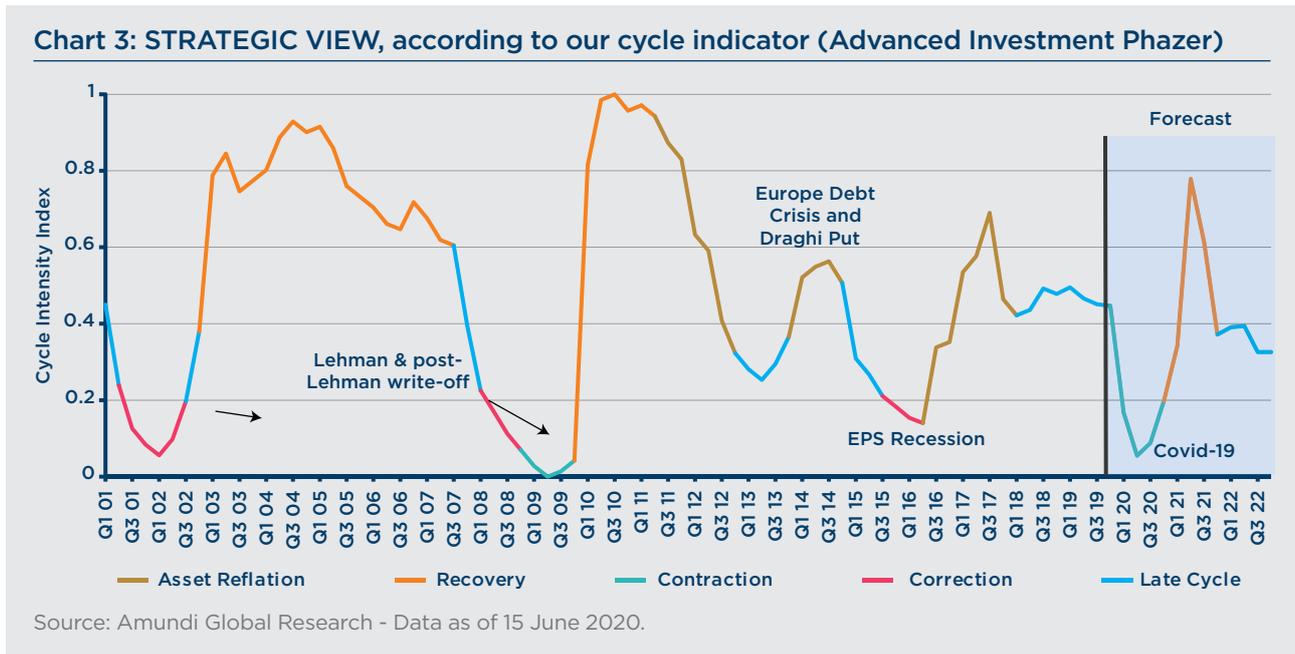
The pandemic altered financial regimes' cycles we thought at the beginning of the year: we entered a contraction (risk-off phase) possibly bottoming in Q320, thanks to policy boosters we will progress into a sequencing recovery with significant divergences across and within regions.

In this environment, growth, rates, inflation, monetary and fiscal policies are strongly interconnected. The potential mismatch of one regarding others could affect the results overall. If we change perspective, though, this situation is building common factors that are now driving the markets. As a result, markets will move with diverse sensitivity to these common factors, paving the way for a macro factor-based asset allocation.

- 2. We calculate expected returns on a broader asset class spectrum and frame them into base and alternative scenarios. We accelerated and sharpened our use of artificial intelligence to capture non-linear connections between macro factors and markets and dynamically assess the exposure to the macro (risk). To control and ensure the consistency of the outcome in terms of market sequencing and investment consequences, the algorithms run within the base and alternative scenarios information window⁹.**

8. "Investing in a de-freezing cycle", Amundi 2H20 Outlook, June 2020.

9. Ultimately, we pencilled base and alternative scenarios as the probabilistic combination of our 5 financial regimes. For 2020, we assumed a correction for the downside scenario, a combination late-cycle/correction for the base scenario and a late-cycle for the upside scenario. For 2021, we assumed a recovery regime.



3. We use GREAT to nest our high convictions (including those on risk factors specifically) and derive the asset allocation preference.

High convictions and asset class preferences

Recovery is our central case. Hence, growth factors remain paramount. The recession should be confined to H120, followed by a short rebound in Q320, and then slow and bumpy convergence to pre-crisis levels (2022). Price dynamics should evolve from disinflation to below CB targets, with potential

spikes down the road on components base effects (oil). Policy accelerators support risk assets. However, the decoupling from their fundamentals increases downside risks. In the medium term, we expect EPS to bounce back in a V-shaped fashion.

- GROWTH factor to increase from low to medium.
- INFLATION factor to stay low.

We expect ultra-accommodative monetary policies to persist, leading to stable and low interest rates worldwide. Potential upside

Table 4: Asset class preference

Macro Factors	Low	Medium	High
Asset class preference according to macro factor state			
Growth	Govies, IG, PXJ equity, gold	Inflation linkers, DM HY, US & LatAm equity, oil	Inflation linkers, GEM bond, European & Japan equity, base metals
Inflation	Govies, IG, PXJ & Latam equity, gold	Inflation linkers, GEM bond, European & Japanese equity, oil	Cash, inflation linkers, GEM bond, EMEA Latam equity, gold
Debt & Monetary agg	Cash, govies, PXJ equity, oil	HY, IG, Asian equity, gold	Govies, IG, European & Japan equity
Rates	Govies, IG, US & Latam equity, gold	Inflation linkers, HY, Japan & European equity, oil	Cash, IG, Asia & Latam equity, base metals
Liquidity	Govies, US equity, gold	Not applicable as the signal is digital (ON/OFF)	HY, IG, European equity, base metals

Source: Amundi Global Research on Bloomberg, as of 15 June 2020. PJX, Pacific ex Japan, JPM for bond indices, MSCI for equity indices, ML for credit. Shaded boxed underpin our main outlook conviction in the next 6 months.

for rates will be tempered by the strong demand coming from central banks while the recalibration vs the short end of curves will ease tensions in the long end. In fact, governments are financing the emergency with short-dated issuance. Central banks' purchasing programmes and state guarantees safeguard default rates, at least in the short term. Turbocharged monetary policy should support easy financial conditions. *Carry appeal in a low-yield environment overcomes the compressed expected returns.*

- DEBT& MONETARY AGGREGATES from medium to high
- NOMINAL RATES FACTOR to stay low.
- LIQUIDITY FACTOR to stay high.

In the table, we present the asset class preference according to our outlook convictions. Sensitivity to (geo)political risk is not explicitly considered. This is when we intervene with the qualitative layer to exclude PXJ and Latam equities from the recommendations, for example. Govies, gold and IG tick almost all our boxes, while European and US equity represent a more tactical play.

Learning never exhausts the mind

As a result of Covid-19, the financial world has become increasingly complex, irrational, non-linear and does not fit into a rigid and static analysis architecture. **Macro factor expectations are more than ever driving financial markets.**

The crisis triggered a **transition to a new economic and financial equilibrium dynamically evolving into waves.**

The current situation is a perfect storm: the world's entropy has increased exponentially.

In such an environment, **we believe that assessing macro risk factors is key to**

generating returns for investors and a cross-asset approach is required. In our opinion, **tilting to individual macro-economic risk factors and combining asset classes under this new framework should facilitate diversification, improve risk budgeting and eventually improve portfolio returns.**

Very often in the past, many investment ideas perceived as alpha opportunities have been involuntary beta transfer on factors not fully understood by risk takers. For this reason, a disciplined top-down approach that evaluates a factor in its articulation and interdependence across asset classes allows for the transformation of a specific risk into clear investment opportunity.

Research methodology has to evolve to fit the need to find answers to external shocks quickly in a flexible manner.

Over the last quarter, we moved forward on our **implementation of machine learning and big data to economics**, taking advantage of the learning systems' ability to adapt to a changing macro financial environment.

Our approach to asset allocation evolved as well: **we shifted from asset class to risk factor diversification**, as Covid-19 is a shock shared across all economies and asset classes. **Risk exposure is global, but the impacts on asset classes are local.**

We believe to be competitive asset mixes will likely need to be defined on factor tilts rather than traditional risk/return combinations, and eventually looking at return streams to decide asset allocation will change and portfolio objectives will shift from being benchmark-based to being goal-oriented⁷.

*“You cannot use up creativity. The more you use, the more you have.”
Dr Maya Angelou*



Important Information

Unless otherwise stated, all information contained in this document is from Amundi Asset Management S.A.S. and is as of 15 June 2020.

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