

Activity report on climate-related research 2022

Confidence
must be earned

Amundi
ASSET MANAGEMENT

Amundi has been particularly active in terms of climate-related research this year. In addition to analyses dedicated to environmental and climate issues, the year was marked by an increase in the inclusion of climate issues in macroeconomic analyses and quantitative studies.

Working papers

Date of
publication
01-2022

Title of document
**Portfolio Construction with
Climate Risk Measures**

Author(s)
T. le Guenedal, T. Roncalli

Climate risk considerably changes portfolio allocation and the investment framework of both passive and active investors. The goal of this paper is to conduct a survey of the various climate risks measures that are available in the asset management industry and the practices of portfolio construction that use these metrics.

KEY TAKEAWAYS

- The first part of the paper lists the different climate risk metrics - e.g., carbon footprint, carbon transition pathway, carbon transition and physical risks. The second part is dedicated to portfolio optimization, in particular portfolio decarbonization and portfolio alignment (Paris-based benchmarks and net zero carbon objective).
- Among the different findings, two are of great importance for investors:
 1. Portfolio decarbonization is more difficult when we include scope 3 carbon emissions. Indeed, optimizing using the sum of scopes 1, 2 and 3 emissions leads to a portfolio with more tracking error risk than using direct plus first tier indirect carbon emissions.
 2. Portfolio alignment is more complex than portfolio decarbonization. Since aligning portfolios with scope 3 is becoming the standard approach to climate portfolio construction, the impact on portfolio management may be substantial, and the divergence between carbon investing and traditional investing will increase.

Date of publication
02-2022

Title of document
Net Zero Carbon Metrics

Author(s)
T. le Guenedal, T. Roncalli, T. Sekine, F. Lombard

After “Portfolio Construction with climate risk measures”, this is the second working paper studying climate risk measures. In particular, this paper aims at defining the metrics needed to enhance disclosure and debate on corporates’ emissions in the context of portfolio alignment, engagement and net zero emissions policies.

KEY TAKEAWAYS

- Current carbon emissions data are not sufficient to build portfolio alignment. The purpose of this paper is then to define net zero carbon metrics, which are necessary to enhance the disclosure and the debate on corporates’ emissions. This research project proposes a carbon budget approach that incorporates novel metrics for measuring the carbon emissions reduction targets and the relative positioning with respect to the net zero emissions (NZE) scenario.
- These carbon metrics can be divided into two families. The static measures are NZE duration, NZE gap, NZE slope and NZE budget. They can be computed using a target scenario or the linear trend model. The dynamic NZE measures incorporate the past trajectory and the future scenarios of carbon emissions. For instance, we break down the carbon budget by error and revision time contributions.
- We also propose a velocity measure of the carbon emissions trend and two main dynamic NZE measures that are necessary to assess the performance of an issuer compared to the NZE scenario: the zero-velocity scenario and the burn-out scenario. These different measures can then be used to define the PAC framework (Participation, Ambition and Credibility pillars), that analyzes the participation, ambition and credibility of issuers’ NZE policies. Finally, we apply this framework to the CDP database.
- Empirical results show that net zero carbon emissions are challenging for many issuers for two reasons. The first is that some issuers have a lack of ambition concerning their NZE scenario. The second is that some targets are not compatible with past trends.

Date of publication
02-2022

Title of document
Cascading Effects of Carbon Price through the Value Chain: Impact on Firm’s Valuation

Author(s)
T. Adenot, M. Briere, P.Counathe, M. Jouanneau, T. le Berthe, T. le Guenedal

In this paper, the impact of carbon pricing in a global framework considering both the cost of corporate idiosyncratic emissions and their cross-sector diffusion is assessed.

KEY TAKEAWAYS

- The impact on corporate valuation is shared among intensive companies and less intensive ones through the introduction of a carbon cost pass-through in a sector diffusion model, based on a World Input-Output table.
- Focusing on the constituents of the MSCI World Index, we show that apart from the usual carbon-intensive sectors, such as Energy, Utilities and Materials, less carbon-intensive ones, such as Industrials, Consumer Staples, Consumer Discretionary or Information Technology can contribute significantly to the global risk, due to the expected pass-through of the carbon cost in the value chain. World indices could experience large changes in their investment universe and sector composition.

Date of publication
03-2022

Title of document
The shift from Carbon Emissions to Net Zero Carbon metrics on Portfolio Construction

This paper is a summary of two working papers that study climate risk measures: “*Portfolio Construction with climate risk measures*” and “*Net Zero Carbon Metrics*”.

KEY TAKEAWAYS

- Mobilization of the asset management industry for net zero requires the development of precise and specific net zero carbon metrics. For that reason, new climate risk measures have recently been established to complement those traditionally adopted (carbon emissions and carbon intensity), for example temperature scores, taxonomy, green revenues or capex values.
- Whilst portfolio decarbonization is a static problem, portfolio alignment involves a dynamic approach to comply with a given climate policy (e.g., Paris-based benchmark approach or Net Zero Carbon objective approach).
- We notice that the slope of the tracking error risk/volatility curve is steeper when the carbon intensity reduction is high.
- Our analysis showed that the decarbonization of portfolios (i.e., construction of a portfolio with lower carbon risks) is more difficult when considering full scope 3 carbon emissions.
- The two main hurdles that issuers are facing to achieve Net Zero Carbon Emissions are **1.** issuers’ lack of ambition concerning their NZE scenario and **2.** lack of alignment of NZE targets with their past trends.

Date of publication
04-2022

Title of document
Multi-Period Portfolio Optimization and Application to Portfolio Decarbonization

Author(s)
E. Lezmi, T. Roncalli, Jiali Xu

In this article, we consider a multi-period portfolio optimization problem, which is an extension of the single-period mean-variance model.

KEY TAKEAWAYS

- We discuss several formulations of the objective function, constraints and coupling relationships. We then derive three numerical algorithms that can be used to solve such problems: the alternating direction method of multipliers, the block coordinate descent algorithm and the augmented quadratic programming method.
- We illustrate the differences between single-period and multi-period solutions by considering three asset allocation problems: transition management (Ratray, 2003), total variation regularized portfolio (Corsaro et al., 2020) and trading trajectory modeling (Gârleanu and Pedersen, 2013).
- Finally, we solve the portfolio alignment problem of Le Guenedal and Roncalli (2022) when the fund manager has to dynamically control the carbon footprint of his investment portfolio by integrating a carbon reduction scenario.
- Results: Comparing the single-period and multi-period solutions shows that the active share between the two portfolios may be greater than 25%. This figure can also reach 40% if we include carbon trends and they are increasing.

Date of publication
11-2022

Title of document
**Net Zero Investment Portfolios
- Part 1. The Comprehensive
Integrated Approach**

Author(s)
I. Barahhou, M. Ben Slimane, N. Oulid Azouz, T. Roncalli

The academic literature generally concludes that implementing net zero portfolios and sustainable investing is not costly. This paper is part of a research project on net zero investing dedicated to the comprehensive integrated approach. A second part that focuses on the core satellite approach, relevant for multi-asset portfolios, strategic asset allocation of asset owners as well as thematic investing will follow.

KEY TAKEAWAYS

- The Comprehensive Integrated Approach is a method to deal with the multi-faceted dimensions of Net Zero investing, in particular the decarbonisation and transition dimensions implemented by equity and fixed-income mutual funds and ETFs.
- Results: Net zero investing goes beyond the simple exercise of dynamic decarbonization.

Recommendations:

- Use three constraints for an optimization-based approach for aligning a portfolio. The first one targets the time-varying decarbonisation rate, the second imposes a minimum green revenue share, and the last one uses carbon momentum metrics to forecast the self decarbonisation rate.
 - Scope 3 must be considered by AM for NZ aligned portfolios.
 - Decarbonizing a portfolio is easier than aligning a portfolio.
- It is impossible to achieve Net Zero alignment without allowing the exclusion of companies from the benchmark.
 - The cost of implementing net zero investing with respect to traditional investing will be higher for equity portfolios than bond portfolios and the fixed-income market will benefit more quickly from the transition to a low-carbon economy.
 - Active management makes sense if we want to implement net zero investing.
 - The comprehensive integrated approach is not relevant when we consider multi-asset portfolios or strategic asset allocation of asset owners. In this case, it is better to implement the core-satellite approach, which consists of the decarbonisation dimension for the core investment and the transition dimension for the satellite strategy.

Investment Insights

Date of publication

03-2022

Title of document

The Green risk premium and the performance(s) of ESG investing

Author(s)

T. Roncalli, E. Laugel

KEY TAKEAWAYS

- The two authors answers five of the most pressing questions on green risk premium and performance(s) of ESG Investing on **1.** the impact of climate investing on portfolios' returns, **2.** the existence of an ESG risk premium, **3.** whether ESG is a new risk factor, **4.** whether investors face a crowding of green assets risk, and **5.** whether there is a bubble in the ESG investing market.
- Risk premium of brown assets is positive, implying that the risk premium of green assets is negative.
- Brown assets will continue to suffer because this is just the beginning of climate investing.
- The current value of the Greenium is negative, but it is relatively low (close to -5bps). It is unknown if brown assets will offer the same Sharpe ratio as green assets.
- Currently, we do not witness the existence of an ESG bubble.
- Still a lot of uncertainties: ESG as a risk factor, concept of an ESG risk premium, pricing of brown assets vs. green assets.

Date of publication

05-2022

Title of document

Keeping up with climate change in setting long-term asset class views

Author(s)

P. Blanque, M. Defend

KEY TAKEAWAYS

- The inevitability of climate change has become a reality. Stakeholders such as policymakers, financial institutions, corporates, and civil society need to coordinate with planning, implementing and correcting their objectives over time, if they want to be aligned with the Paris Agreement.
- Studies two scenarios (central and alternative) and gives asset allocation implications, market trends, asset class return forecasts.
- Asset allocation implications for the green transition: Investors hunting for higher returns will most likely seek to take advantage of the equity market. In the fixed income space, the preference is for developed market governments, favouring US bonds for the carry and Japan for diversification purposes, with higher allocations to Asian equity and Emerging Markets.
- For green assets: green bond investors are likely to pay a premium (accept lower yields).
- In terms of expected returns, it seems that contrary to the last decade, we should count on a mix of Value and Growth sectors to outperform.
- The potential impact of ESG and climate-related flows may mitigate or reinforce expected returns, but they are not necessarily homogeneous from one region to another.
- Transition risk primarily impact developed countries whereas emerging countries are more concerned by physical risk.
- Need to advocate for a greater integration of ESG analysis and credit analysis when assessing sovereign risk.

Economy & Markets

Date of publication
03-2022

Title of document
Asset Classes Views: Keeping up with climate change

Author(s)
P. Blanque, M. Defend, V. Gisimundo, J.H. Kim Moon, L. Portelli

The 2022 edition of asset class return forecasts, for the first time ever, integrates climate scenarios.

KEY TAKEAWAYS

- The severity and global nature of climate change has quickly become a reality due to the accelerating frequency and severity of weather-related events. Climate mitigation efforts will require thoughtful planning and decisive implementation on multiple fronts, and correction as new data surfaces and technologies develop.
- In particular, this paper provides an outlook for the multi-asset universe accounting for both the near-term post-COVID landscape and the possible long-term repercussions of climate change.
- The paper is divided into four main sections:
 1. A first comparison of climate change policy scenarios and key asset class highlights;
 2. Drivers and assumptions of asset class returns;
 3. ESG thematics with previous papers from Amundi on green risk premium, sovereign ESG and green preferences;
 4. A closing appendix with the methodology used in the analysis.

Date of publication
05-2022

Title of document
Asset Class Return Forecasts - Q2 2022

Author(s)
M. Defend, V. Gisimundo, J.H. Kim Moon, L. Portelli

KEY TAKEAWAYS

- The continuing surging inflation due to the supply shocks and the Ukrainian conflict have dominated headlines compounding to the possible repercussions surrounding climate change, further affecting economic and financial indicators in the medium term and beyond.
- Tighter financing conditions and aftershocks of structural shifts in the energy sector will most likely result in higher default rates and wider rates across the spectrum. In such situations, high-yield corporate bonds are likely to undergo significant widening with consequent higher volatility and uncertainty.
- Continuing supply-side and material constraints together with higher borrowing rates will put all equities under severe constraints. Medium term focus will be on the reshuffling of innovative, profitable companies with higher prospective growth able to absorb the impending fiscal push in defence and energy sectors versus weaker and non-productive names, ultimately resulting in higher volatility and lower expected returns with respect to figures not incorporating climate change.

ESG Thema – Thematic analysis

Date of publication
02-2022

Title of document
Financing the energy transition in Asia

Author(s)
S. Chen

KEY TAKEAWAYS

- Climate change commitments have stepped up recently but have yet to fully answer the call. National commitments should not constitute a limitation or constraint for a business entity to set ambitious net zero targets that are aligned with the Paris Agreement.
- As Asia is reliant on coal with a relatively young age of coal power fleets at 13 years old vs. 30 to 40 years elsewhere, more innovative mechanisms are expected to be part of the regional coal phase-out and energy transformation journey.
- Clean energy investment in emerging and developing economies in general need to expand by more than 7 times to above US\$1 trillion under a net zero scenario by 2050.
- Besides transition risk, Asia stands out to be one of the regions most exposed to physical climate risk. The loss in economic value for Asia would be around 15-20% of GDP by mid-century.
- Climate transition in Asia has its distinct challenges. Balancing economic development, climate actions and social inclusion will be critical to ensure a just transition pathway that leaves no one behind.

Date of publication
11-2022

Title of document
Special COP27 – Not a lost COP after all

Author(s)
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KEY TAKEAWAYS

- Pledges by governments ahead and through the COP27 improved the announced stated scenarios from 1.8°C to 1.7°C (compared to 2.1°C ahead of COP26).
- G20 leaders agreed to pursue efforts to limit the global temperature increase to 1.5°C, and confirmed they stood by the most ambitious temperature goal of the 2015 Paris Agreement on climate change.
- 1. Loss and damage : compension and adaptation agenda**
 - Countries have finally decided on a conclusion for responding to loss and damage funding for climate vulnerable countries.
 - The sum pledged up to this point is well short of the hundreds of billions of dollars that experts estimate will be required annually by 2030 to assist communities in repairing and rebuilding after disasters.
- 2. Rethinking the global financial system**
 - Barbadian Prime Minister's Bridgetown Initiative to mobilize international financial institutions, with contributions from the IMF, is getting traction.
- Just Energy Transition Partnership (JETP) is meant to become the reference framework for ambitious developing countries climate action financing.
- Debt-for-Nature Swaps were highlighted as one of the main tools to facilitate debt relief for emerging countries.
- 3. Breakthrough Agenda**
 - Countries with more than 50% of the world's GDP have set sector-specific «Priority Actions» to decarbonize steel, power, and transportation by COP28. They have also vowed to increase the production of lowemission hydrogen and hasten the transition to sustainable agriculture.
- 4. Reaffirming the Net Zero Objective**
 - At COP27, no new agreement between countries was reached regarding the reduction of greenhouse gas emissions, despite the additional pledges and countries' commitment to achieving the 1.5°C goal.

Insurance & retirement related papers

Date of publication

07-2022

Title of document

Amundi Pension Funds Letter n°15

Author(s)

A. Preininger, S. Rougeron, P. Banque, P. Blanchet, M. Defend, J-X. Bourre

The shift to a low-carbon economy has gone from a pressing issue to an absolute priority as we try to live with the effects of climate and with the energy shortages due to the current conflict in Ukraine. The latest edition of the Amundi Pension Funds letter examines what this shift in regimes will mean for pension funds.

KEY TAKEAWAYS

- We now face what we at Amundi have named the Great Transformation. This new regime will be defined by higher inflation, lower growth and increased global desynchronisation and fragmentation. The social inequalities brutally exposed by the pandemic and the escalating climate crisis represent huge challenges to society and will require colossal investment to overcome.
- Meanwhile, the shifting international frameworks have led Europe to rethink its reliance on imports and its ability to compete in the digital revolution and in innovation overall. But untangling decades of interconnected supply chains and finding the funding for a project of this scale is no easy task. What will this ultimately mean for pension funds?
- However, the major transformation of our times remains climate change and the essential mitigation and adaptation efforts needed to avoid climate disaster. What impact will these measures have on asset prices? Amundi Institute looks at how these factors impact return forecasts and what the consequences will be for investors.
- Finally, we conclude with our regular look at what the recent market movements have meant for pension funding ratios and take a closer look at the uncertainty and implications brought by soaring inflation.

Date of publication

07-2022

Title of document

Insurers' buy and maintain portfolios and sustainable investment

Author(s)

G. Dauphine, R. Munera, R. Muller

KEY TAKEAWAYS

- This paper explores how new guidelines such as temperature or carbon intensity should be implemented in the management of Buy & Maintain (B&M) portfolios for long-term investors.
- B&M institutional investors such as insurers have historically shown a strong preference for asset managers to position their portfolios as SFDR Art. 8
- 1. It was key then to define the most efficient way to combine the requirements for SFDR Art. 8 portfolios with the inherent features of B&M, such as stability and low turnover.
- 2. Recently, investors have been incentivized to take a step further towards SFDR Art. 9 (portfolios that have sustainable investment and impact objectives) or net zero strategies. Due to their relevance to long-term investments, the authors consider that the inclusion of such climate criteria should be implemented in most, if not all, B&M portfolios.
- The paper concludes with three business cases that detail how an SFDR Art. 8 portfolio can be transformed into an SFDR Art. 9 portfolio or one with a net zero objective.