

**THE LONG-TERM RISK SIGNAL
VALLEY OF DEATH**
EXPLORING THE TRAGEDY OF THE HORIZON

Project briefing note – November 2015



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foundation

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Cover page picture: Racetrack Playa in Death Valley National Park, 2006 LAURENCE G. CHARLOT

ABOUT US

ABOUT 2° INVESTING INITIATIVE

The 2° Investing Initiative [2°ii - pronounced "Two Degrees Investing Initiative"] is an international think tank working to align the financial sector with the 2°C climate goal and long-term investment needs. With offices in Paris, London, and New York City, 2°ii engages a global network of over 40 research partners and members, including financial institutions, issuers, equity research and credit rating agencies, financial policymakers, research institutes, experts, and NGOs. Representatives from all of the key stakeholder groups are also sponsors of our research.

Our work primarily focuses on three pillars of financial markets – metrics and tools, investment processes, and financial regulation; our work on time horizons informs all three. We work on long-term investment metrics and risk models, overcoming short-term biases in investment process, and mobilising financial regulation. 2°ii developed the first 2°C portfolio assessment framework and helped shape the first climate-related financial regulation in developed markets. This project on time horizons in partnership with The Generation Foundation constitutes the next step of this research.

www.2degrees-investing.org

For more information, please contact

Mona Naqvi at mona@2degrees-investing.com

ABOUT THE GENERATION FOUNDATION

The Generation Foundation (the 'Foundation') was part of the original vision of Generation Investment Management LLP since the firm was founded in 2004. The Foundation was established alongside Generation in order to strengthen the case for *Sustainable Capitalism*. Our strategy in pursuit of this vision is to mobilise asset owners, asset managers, companies and other key participants in financial markets in support of the business case for Sustainable Capitalism and to persuade them to allocate capital accordingly. In our effort to accelerate the transition to a more sustainable form of capitalism, we primarily use a partnership model to collaborate with individuals, organisations and institutions across sectors and geographies and provide catalytic capital when appropriate. In addition, the Foundation publishes in-house research, gives select grants related to the field of Sustainable Capitalism, engages with the local communities where we operate and supports a gift-matching programme for the employees of Generation. All of the activities of the Foundation, a not-for-profit entity, are funded by a distribution of Generation's annual profitability.

www.genfound.org

For more information, please contact

Daniela Saltzman at genfound@generationim.com

ADDRESSING THE TRAGEDY OF THE HORIZON: A 2° INVESTING INITIATIVE - THE GENERATION FOUNDATION PROJECT

ABOUT THE PROJECT

The Generation Foundation and 2° Investing Initiative have formed a partnership to explore and address the tragedy of the horizon, describing the potential sub-optimal allocation of capital due to the inability of the finance sector to capture long-term signals with short-term risk-assessment frameworks. Like the Death Valley ‘sailing stones’ that can sit still for a decade but move when the right conditions are combined, certain risks are unlikely to materialise over the next 3 years, but highly material on longer horizons. The partnership will explore how related risk signals get lost in the ‘valley of death’ of financial risk-assessment. Stages of the 3-year project include:

1. Informing the debate by quantifying time horizons across the investment chain, for example, with respect to the liabilities of asset owners, mandates of asset managers, maturity of credit, equity portfolio turnover, time periods analysed by analysts when performing discounted cash flow calculations, time horizons of risk models, backward-looking / forward-looking time horizons of data, and the lifetime of industrial assets, etc.);

1. Identifying the unintended consequences of risk management practices including barriers to the transmission of long-term risk signals and the implications for efficient and productive capital allocation;

1. Developing responses in partnership with the two key stakeholder groups, financial policymakers and long-term asset owners, to overcome the tragedy of the horizon, for example, by addressing reporting, risk management practices, products and tools, as well as policy frameworks.

The project will be developed by the 2° Investing Initiative research team, in collaboration with other research organisations and key stakeholders, including investment consultants, equity researchers, rating agencies, regulators, etc.

ABOUT THE AUTHORS

The authors of this briefing note are Jakob Thomä, Chris Weber, Stan Dupré, and Mona Naqvi (2° Investing Initiative). The note benefited from inputs from Daniela Saltzman and Shalini Rao (The Generation Foundation).

We are interested in input on this briefing note and its content, and welcome collaboration during The Generation Foundation – 2°ii partnership. Please contact us to join the conversation.

Main contact:

Mona Naqvi | 2° Investing Initiative | New York

Mona@2degrees-investing.org

Paris (France): 47 rue de la Victoire, 75009 Paris, France

New York (USA): 205 E 42nd Street, 10017 NY, USA

London (UK): 40 Bermondsey Street, SE1 3UD, London UK

CONTEXT

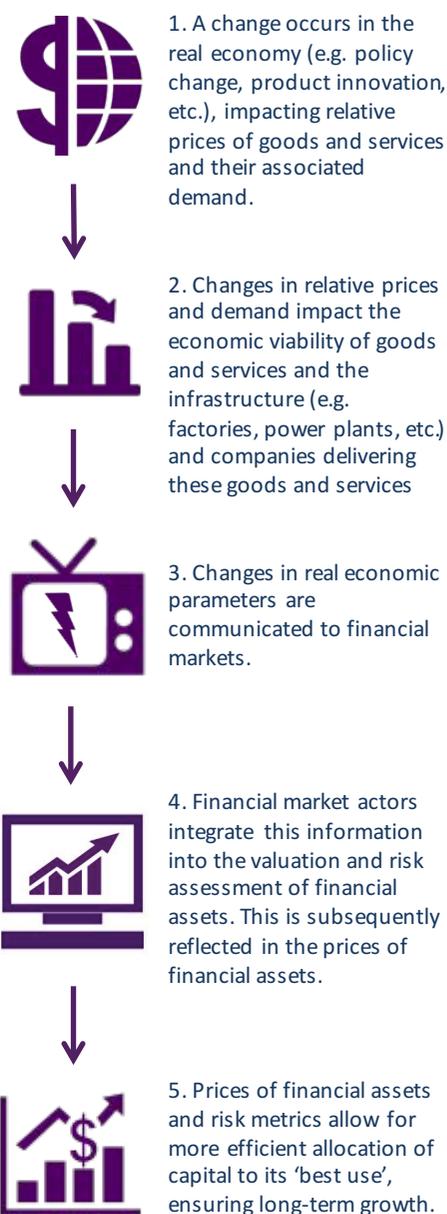
Tomorrow does not look like today. The question will not be whether economies will be disrupted, but by how much. Tomorrow's markets will look different due to a combination of mega trends and the collapse of unsustainable business models because of new technologies and public policy responses. From an investor's perspective these changes are financial risks and opportunities to be managed.

At least some disruption is predictable and indeed such prediction is key to efficient capital allocation. While uncertainty makes it difficult to forecast disruptive changes and, indeed, impossible to predict exactly what tomorrow will look like, some risks can be anticipated through proper scenario development and forward-looking financial analysis. With the right type of information and analysis, risk and price signals could move along the investment chain, resulting in more efficient capital allocation (Fig. 1). Such signal transmission is key to both the provision of long-term, productive capital, and financial stability. In practice, the transmission is far from perfect, skewed by unpriced externalities and suffering from market failures like principal-agent problems.

The climate change example. While far from the only example, climate change is an important case study for the failure of long-term risk signalling, given short-term focused actors along the investment chain. Both its associated physical changes (weather, sea levels, water availability, etc.) and policy and technological forces will disrupt the core infrastructure connecting and powering today's economy. The past years have seen the rise of a narrative around 'stranded carbon assets' (e.g., The Generation Foundation, 2013) and the 'carbon bubble' concept related to the transition to a low-carbon economy, a narrative that has gained traction with policymakers and financial regulators (lower right). Importantly, one of the main proposed solutions is to enhance disclosures of risk-relevant information, for example, relating to impairment tests for decarbonisation scenarios. To genuinely impact the efficient long-term allocation of capital, however, the associated risk/price signals must actually reach intermediaries and investors who will adjust their financial decisions accordingly.

The elephant in the room - disconnected time horizons. Largely missing in the debate so far, is how short-term horizons in financial markets limit the effective transmission of long-term risk signals and, as such, inhibit a more efficient long-term allocation of capital – what Mark Carney has termed the "tragedy of the horizon" (Carney, 2015). A body of literature on short-termism in financial markets has grown since the financial crisis that questions whether short-termism exists, what causes it, and whether it is a problem and for whom (e.g. The Generation Foundation, 2012). To date, however, such analysis has largely been siloed, looking at only one specific part of the investment chain at a time without reference to its broader context. Thus, identified solutions have usually emphasised one part of the chain. Fully understanding the problem and its potential solutions requires a high-level view of the entire investment chain, the time horizons of different actors, and the incentives, rules, and practices driving them.

Fig. 1: The theory on the transmission of financial risk and its role for efficient capital allocation (Source: Authors)



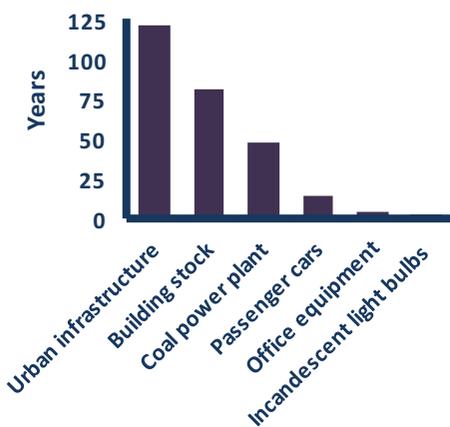
"A classic problem in environmental economics is the tragedy of the commons. The solution to it lies in property rights and supply management. Climate change is the Tragedy of the Horizon ... The horizon for monetary policy extends out to two to three years. For financial stability it is a bit longer, but typically only to the outer boundaries of the credit cycle – about a decade. In other words, once climate change becomes a defining issue for financial stability, it may already be too late."

- Mark Carney, Bank of England

THE FINANCIAL RISK ASSESSMENT VALLEY OF DEATH

Understanding how predictable long-term risks, such as carbon risks, travel from physical assets to asset owners requires an in-depth understanding of time horizons across the investment chain. A key feature of this transmission mechanism may be described as a valley of death: where the horizons of long-term assets (left) are compressed, due to a mix of natural and artificial factors, thus creating a void between assets and the long-term liabilities (right) of asset owners. The preliminary results and figures presented here are based on a review of currently available literature and data. In many cases the figures we have used are based on a set of best estimations, of which the purpose of The Generation Foundation – 2°ii partnership is to further quantify and understand.

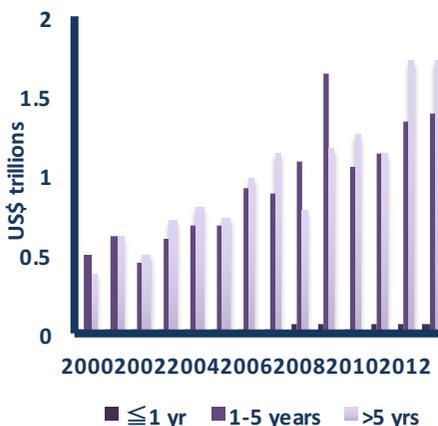
Fig. 2: Average lifetime of energy related assets (Source: 2°ii 2014)



Physical assets. The lifetime of physical assets that can be affected by disruptive changes (like the strengthening of carbon polices) can range anywhere from a few years to over 100 years (Fig. 2). Infrastructure, like roads, mines, airports, etc. is built to last decades, and can have pay-back periods exceeding a decade. It is therefore in the best interest of their owners to anticipate long-term risks.

Stocks and bonds. Companies, like diamonds, are designed to last forever. When equity research analysts value companies, they assess and include their future cash flows. On paper, the net present value is heavily based on the long-term: for instance, the value based on cash flows after 10 years is more than 50% for airlines and car manufacturers, and more than 60-70% for electric utilities and oil & gas (2°ii 2014). For debt investors and banks, however, horizons can be much shorter as over 40% of corporate bonds have a maturity of less than 5 years (Fig 3), and over half of commercial bank loans in the U.S., for example, have a maturity of less than 3 years, excluding real estate (Federal Reserve, 2015). In either scenario, risks materialising beyond a quarter are real.

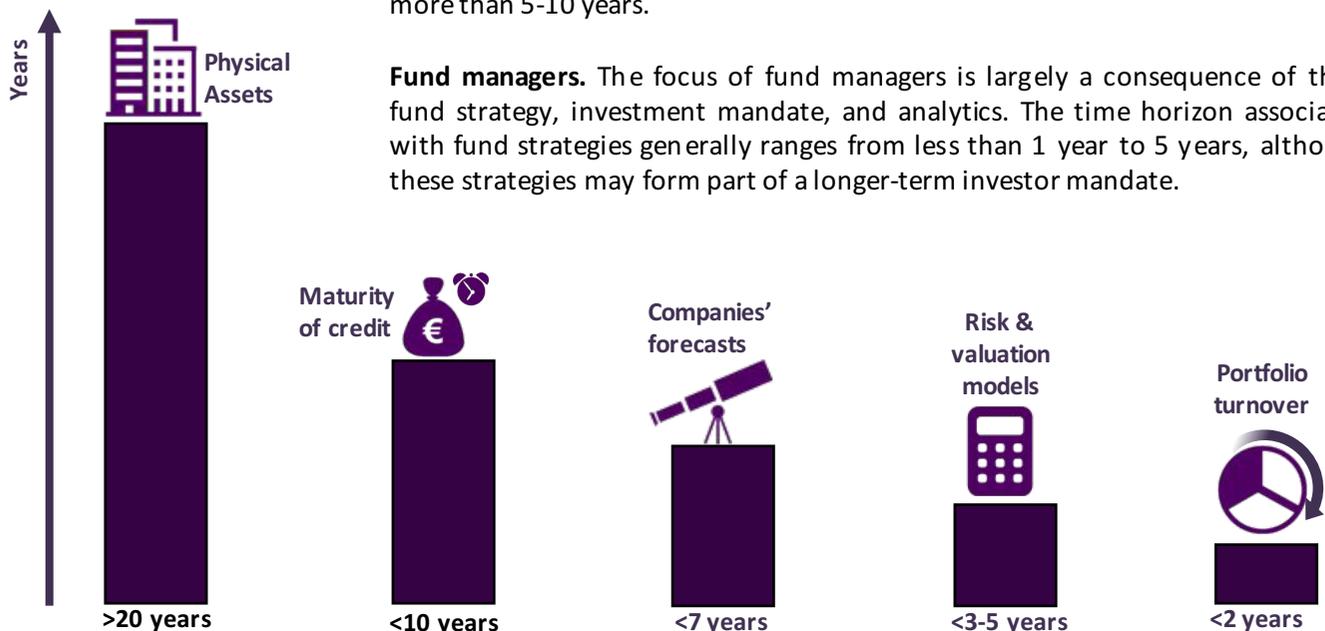
Fig. 3: Maturity of corporate bond issuances (Source: Tendulkar & Hancock, IOSCO, 2014)



Corporate reporting. Despite the abovementioned long-term stakes, forward-looking disclosure of companies usually focuses on to 3-5 years. Some industry-specific databases allow the estimation of future production directly through expected capital changes, but it is usually limited to short projections of 3-7 years (2°ii 2015). All the same, the risk section of 10k reports almost never discusses in detail the long-term sustainability of the business model and the assumption scenarios used for impairment tests. (See The Generation Foundation (2015) analysis of the current state of play in ‘Implementing Integrated Guidance’.)

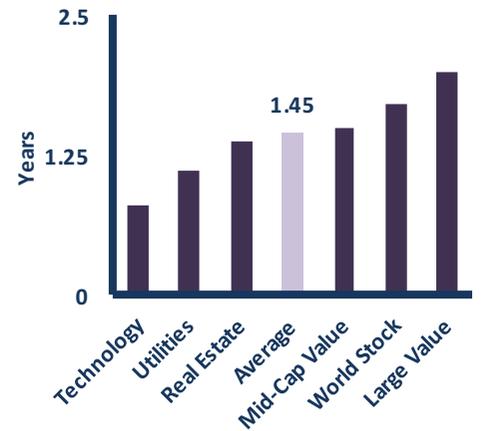
Financial analysts. Based on our analysis of Morningstar DCF databases and analyst interviews, initial findings suggest that risk and valuation models are broadly aligned with a 1-5 year horizon: most analysts only perform forward-looking analysis on this time frame and then simply extrapolate current trends, not allowing for serious consideration of disruptive changes likely to materialise in more than 5-10 years.

Fund managers. The focus of fund managers is largely a consequence of their fund strategy, investment mandate, and analytics. The time horizon associated with fund strategies generally ranges from less than 1 year to 5 years, although these strategies may form part of a longer-term investor mandate.



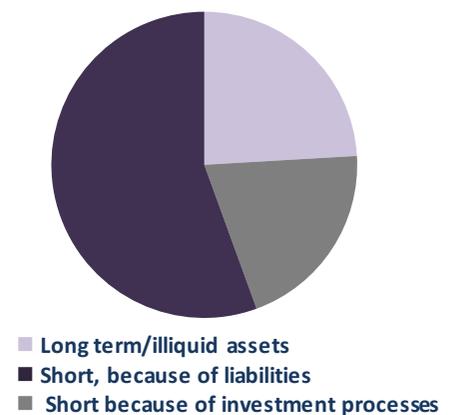
However, while mandates can naturally be adjusted, they constrain the time horizon of fund managers. For example, one parameter of an investor mandate relates to tracking performance vs. a benchmark on a frequent basis, foregoing the time associated with creating long-term value. This may create short-term performance incentives, especially when combined with short-term focused remuneration. According to a Greenwich Associates report (2014), for example, only 15-18% of portfolio manager compensation was based on long-term success in 2013, but over 40% was based on annual performance. As a result, research suggests that fund managers' investment horizons are, in practice, much shorter than what their mandates prescribe. Assuming that 100% annual portfolio turnover implies a time horizon of one year, a 2010 study from Mercer on 900 active long-only equity managers suggests that two third have a higher portfolio turnover (admittedly imperfect indicator) than expected, and concludes that 80% have a time horizon of two years or less. A 2014 study by MFS Investment Management also appears to confirm this result, as it highlights investment managers have an average stock holding period of approximately 1.45 years (Fig 4).

Fig. 4: Stock holding periods by investment managers for a selection of 20 largest Morningstar equity categories (Source: MFS, Morningstar, 2014)

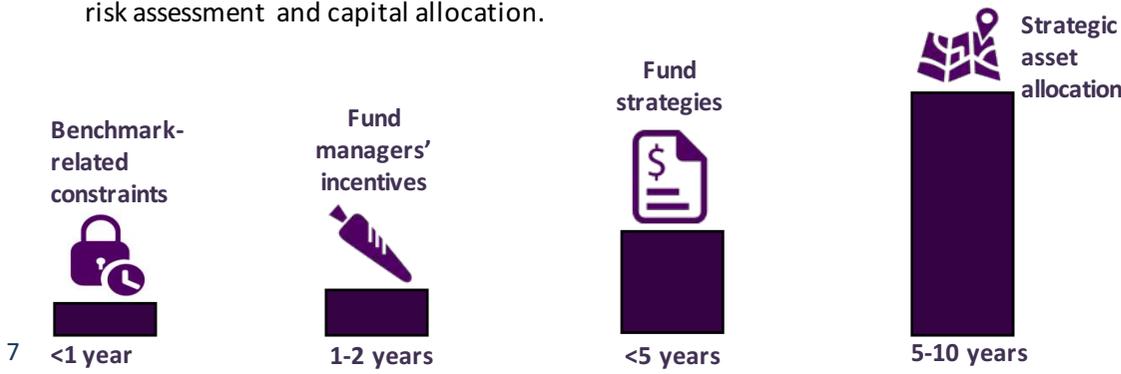
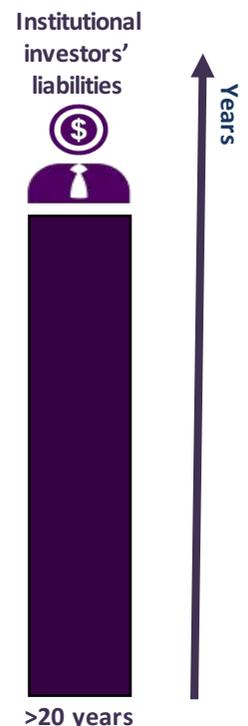


Strategic asset allocation. Strategic asset allocation (SAA) usually involves longer-term time horizons, especially for long-term investors like pension funds with liabilities beyond 20-30 years. Even these, however, are unlikely to reflect the time horizon of the ultimate asset owner. Schrodgers Asset Management, in a report from 2012, highlights a 5-10 year time horizon for strategic asset allocation. In 2011, a study from the World Economic Forum also highlighted that roughly 20% of long-term institutional investor portfolios should be allocated to illiquid/long-term assets from an Asset Liability Management perspective, but are actually invested in liquid/short-term assets due to a combination of short-term focused governance frameworks, metrics and incentives (Fig 5). A 2015 report issued by Northern Trust also suggests that current, optimal SAA for endowments should comprise approximately one third long-term/illiquid assets. Finally, strategic asset allocation generally lacks sufficient granularity over specific industries or securities, often limited to broader considerations such as asset class. As a result, the ability of investors to integrate disruptive long-term changes and point-in-time risks in their assessment of risks is limited, since such risks do not affect industries and asset classes uniformly.

Fig. 5: Drivers of short-term asset allocation of investors (Source: WEF 2011)



The Valley of Death. The investment horizons of the owners of long-term assets (pension funds, sovereign wealth funds, insurance companies, etc.) are typically greater than 20 years and, at the short-to-medium end of the spectrum of physical asset lifespan, may match the physical assets themselves. However, long-term risk signals that are material at a physical asset level are not necessarily able to cross the valley of death to reach the asset managers and/or owners. Our research project intends to assign figures to the time frames of each stage of the chain based on quantitative research, test our assumptions on what is 'natural' and what is 'artificial', and better understand the unintended consequences for long-term risk assessment and capital allocation.



IMPLICATIONS FOR CAPITAL MISALLOCATION AND RETURNS

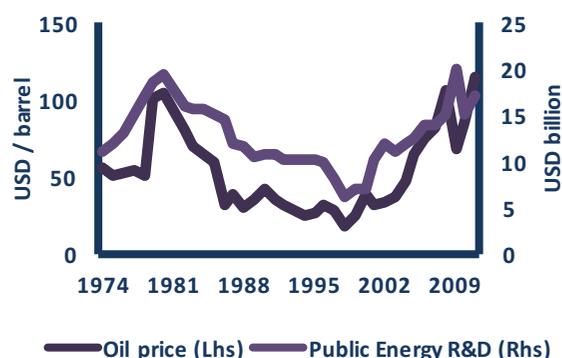
Notwithstanding a given degree of uncertainty, the investment chain's short-term features mean certain types of risk and opportunity – that are somewhat predictable, disruptive, and long-term – get lost in the 'valley of death'. Part of this problem is natural and reflects the balance of short and long-term needs, as well as the challenge of predicting long-term disruptive trends.

Certain types of risk get lost in the 'valley of death'. The short-term incentives, regulations, tools, and practices in the capital allocation chain will leave certain types of manageable risks and opportunities unpriced and unmanaged. Specifically, this applies to risks and opportunities that are disruptive and predictable enough to be material over 10 year+ timescales, but also unlikely to materialise in the 3-5-year window of tools, models, and mandates. These characteristics describe several types of risk, including:

- **Slow-building risks:** where linear BAU trends are assumed but actual risk profiles increase at a greater-than-linear rate (e.g. energy transition risk for carbon-intensive companies, where the likelihood and severity of climate mitigation grows with time but fossil fuel companies project linear sales (CTI, 2015))
- **Doomed business models:** where expected earnings rely on continued legal or regulatory barriers to entry for competitors or new techs (e.g. technological innovations like Uber where regulations protect incumbents)
- **Point-in-time risks:** where the probability of a high-impact event occurring in the short-term may be small, but almost certain to materialise at some unforeseen point-in-time (e.g. a Fukushima-style nuclear meltdown), that will dramatically alter the 'business-as-usual' perspectives of a sector regarding cash flows.

Risk vs. opportunity - a matter of perspective? The discussion around time horizons in the context of climate change is frequently focused on risk. It speaks equally, however, to long-term investment and financial opportunities contributing to sustainable economic growth and resilience. A key example of this connection is R&D. R&D requires patient capital with a long-term time horizon. Even public R&D, however, seems to be driven by short-term changes. Striking in this regard is the extent to which energy R&D (public shown, taken as a proxy for total) tracks year-to-year changes in oil price, as if the long-term needs in energy innovation are simply a function of the Brent or WTI spot price that year.

Fig. 6: Public sector R&D and oil prices (Source: Authors, based on IEA 2014)



Partly natural, partly artificial. Some short-termism in financial markets is 'natural': not every investor, strategy, mandate, etc. can or should have a long-term focus. There would be no point for a bank with a 3-year loan on its balance sheet to assess risks affecting its client in 20 years. Finally, some trends are impossible to reasonably predict though they are of course still impactful. In these cases, short-term strategies may slow down the internalisation of externalities but also help build finance sector resilience to these risks. But short-termism can also be 'artificial' and be rooted in backward-looking performance metrics, misaligned incentives, and principal agent-concerns. Skewed price and risk signals can then inhibit the ability of asset owners to allocate capital efficiently. In this case, capital misallocation comes not only at the expense of the general public impacted by the externalities, but also potentially at the expense of the asset owner.

Lack of "demand" for long term risk assessment. The speed at which risk is repriced into the system will determine which actors feel the pain - long-term risks may suddenly be repriced into the system through "triggers", such as sudden policy or regulatory shifts, or technological breakthroughs, etc. (Carney, 2015). Without such triggers, returns and losses to long-term investors will instead accumulate slowly, for example, as decarbonisation in the case of carbon risk inches along, punctuated by periodic losses related to catastrophic physical events. Despite these potential impacts, artificial short-termism in any of the above risk scenarios leads to a situation where there is no 'true demand' for long-term risk-assessment – however long-term may be defined. Creating such demand requires a holistic "bridge" across the valley of death, by lengthening the time horizons of each of the actors and tools that get lost in the valley.

BRIDGING THE VALLEY OF DEATH: PATHWAYS TO LONG-TERMISM IN FINANCIAL MARKETS

Some aspects of artificial short-termism could potentially be solved through a change in incentives, disclosure practices, and regulations coupled with enhanced products and tools. However, the robustness of these bridges across the valley of death is currently unknown, and research is needed to evaluate their feasibility, strengths, and weaknesses. In any event, each component of the toolbox is likely needed to cross the valley.

Various policies, regulations, tools, and changes to incentives have been proposed to correct artificial short-termism. Our research project will explore and develop these recommendations, and suggest further innovations to develop a more sustainable long-term investing toolbox throughout The Generation Foundation – 2^oii partnership:

- **Forward-looking data:** Financial and Environmental, Social & Governance (ESG) databases could be supplemented with more forward-looking metrics, such as R&D and planned capital expenditure. Such data likely face a disclosure-ceiling due to confidentiality, and may require a trusted actor to facilitate disclosure and mask/aggregate where appropriate.
- **Forward-looking benchmarks:** Research from an EU-funded consortium (SEI Metrics) led by the 2^oii now allows asset owners to define long-term exposure benchmarks for asset management, comparing the long-term trajectory of portfolios relative to energy transition scenarios.
- **Accounting and Reporting:** Enhanced corporate disclosures relating to ‘predictable’ long-term risk, such as impairment tests for ambitious decarbonisation scenarios, could help to mitigate some of the difficulty in long-term risk assessment.
- **Long-term performance incentives:** As discussed recently by Tomorrow’s Company, corporate and investment manager incentives are oftentimes not sufficiently linked to long-term performance (Tomorrow’s Company 2015). New incentives at least partially tacked to long-term performance are feasible and being discussed at many levels.
- **The role of public incentives and regulation:** The likelihood of public incentives for long-term investing is likely to vary considerably region-to-region. Significant research is needed to analyse the feasibility of such incentives and their design and will be a significant focus of The Generation Foundation – 2^oii partnership.

Fig. 7: Potential methods to extend investment chain time horizons, i.e. bridging the valley of death (Source: Authors)



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