Investing for a Zero-Risk Economy

What if the economy itself is a source of investment risk?

Addressing how to construct portfolios to maximize performance gains while reducing risk has led to countless theories and methodologies, many of which offer ideas abstracted from the real economy. But the economy does not live in a vacuum, nor does investing. If the economy is the primary source of investment risk, then the investments we make can be used to affect global stabilization, including portfolio risk.

Green Alpha®
ADVISORS

About Green Alpha

*Green Alpha Advisors has been redefining asset management since 2007 by **Investing in the Next Economy**™ —a low risk, endlessly thriving economy driven by companies creating disruptive solutions to key systemic risks like the climate crisis, resource degradation and scarcity, worsening inequality and deteriorating social cohesion, biodiversity and habitat loss, and human disease burdens.*

We consider companies that produce innovative solutions to these risks to be the greatest contributors to economic productivity gains, and therefore the leading growth drivers of the 21st century. Consequently, these companies are our chief opportunity for investments that preserve and grow clients' purchasing power. In terms of impact, directing capital to solutions providers is the most direct way to catalyze change, and public equities—most investors' largest asset class—offers the largest scale means to create change with investment dollars.

About the Author

***Garvin Jabusch**, Chief Investment Officer and chair of the Investment Committee, leads Green Alpha's investment research processes; conducts macroeconomic, scientific, and technological analysis; and develops and communicates the firm's proprietary Next Economy™ investment approach.*

Garvin's unique background elevates Green Alpha's long-term approach to research and portfolio management. He studied in the Ph.D. program in physical anthropology and archaeology for five years at the University of Utah. He was also a field Director for the American Expedition to Petra, Jordan for two excavation seasons, and served as archaeologist and crew chief at many sites in the American West.

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Key Highlights

- **The Ideal:** Investing for an economy that can thrive indefinitely, even in the face of multiple systemic threats, requires a fresh first principles-based approach, leveraging the best expertise and methodologies available.
- **The Pragmatic:** The world isn't ideal or simple, so it's imperative to identify and respond to pressing obstacles standing in the way of a de-risked economy.
- **The Portfolio:** To actualize a zero-risk economy, we must direct investment capital to it. Portfolio construction requires a framework that transcends industry-endemic limitations, wherein structural risk is addressed foremost, and selecting for indefinite environmental and economic sustainability is the ultimate goal.

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Overview

The question is as old as it is simple: how can we construct portfolios to maximize performance gains and reduce risk? In pursuit of an answer, countless theories and methodologies have been developed, not the least of which are Modern Portfolio Theory (MPT)[1], random walk[2] theory, and their portfolio construction offspring, indexing. These approaches each have their insights, but they share one thing in common: they treat portfolio construction as though it exists independent of the real economy.

The conceit of MPT is that one can diversify broadly enough that any one company's "unique" risk has been diversified away. In MPT, frame setting around a company's contribution to or mitigation from structural risk is disregarded.

Investing in stocks is not an abstraction of the economy, but a reflection of it, a cause of it, and a perpetuator and changer of it. Structural risks like the climate crisis, resource degradation, eroding social cohesion, and human disease burdens are outputs of economic activities.

MPT's approach of putting together groups of stocks that differ from each other's historical returns diversifies some kinds of risk but does nothing to defray the structural portfolio risks emerging from what the underlying companies are doing in the real economy.

Therefore, we pose another question: what if it is not portfolio theory, but the economy itself that is the source of investment risk? Should our goal then be to not realize a zero-risk portfolio, but also a zero-risk economy? Can we use our investments to affect stabilization of the global economy, and thus de-risk our investments? We can.

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Part I: The Ideal

What might a de-risked economy look like? To answer that, we need an awareness of the most significant system-level risks that pose threats to the world today.[3] Having identified those, we must then discern the various causes of those risks to recognize what may defray them. By repeating this process, threat by threat, and leveraging the best expertise and methodologies available, we can begin to construct a model of the elements which need to be in place globally for economies to thrive indefinitely, without succumbing to one or more systemic threats. For a reference of the confluence of global risks, see Figure 1 for the World Economic Forum's Global Risks Interconnections Map 2020.[4]

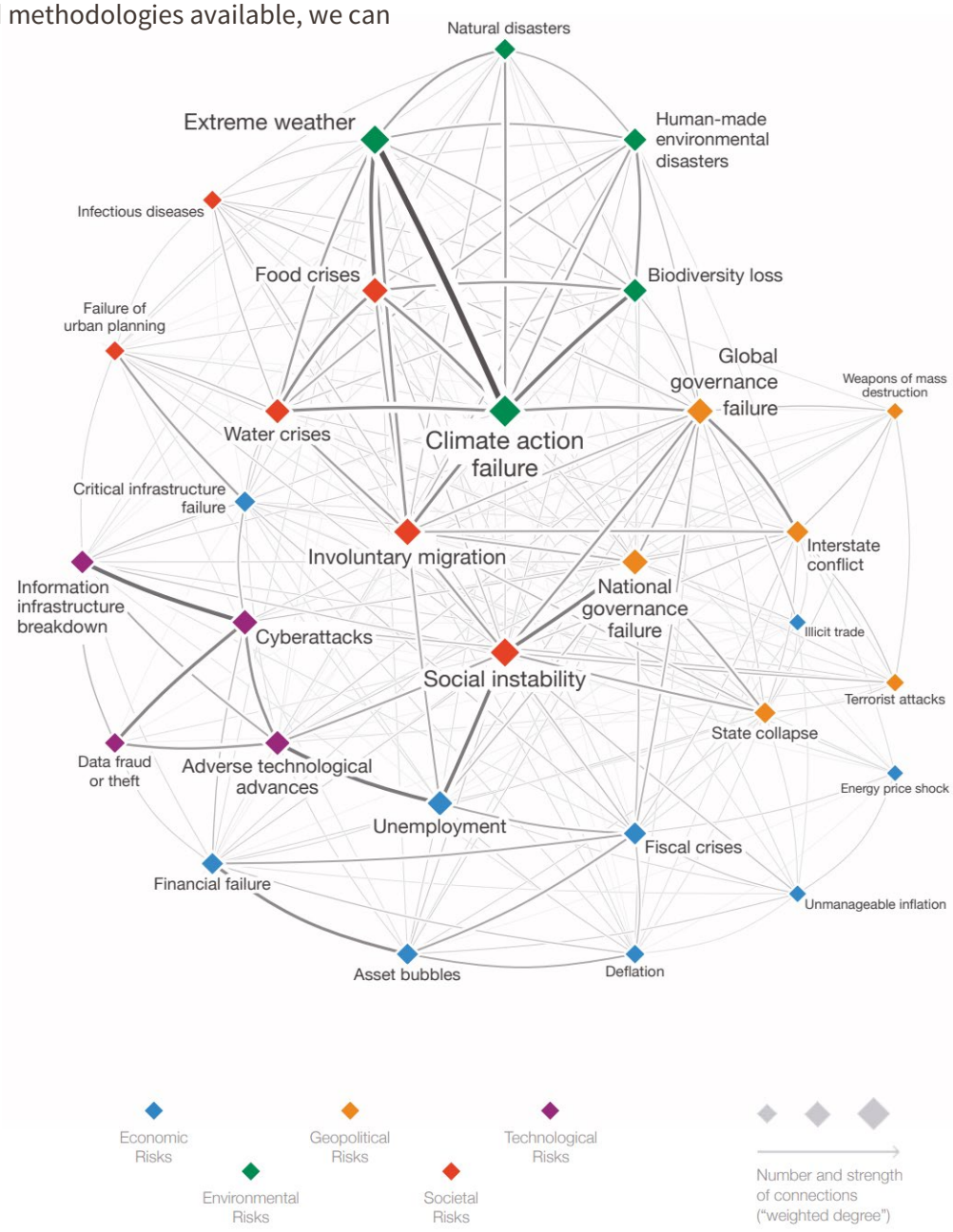


Figure 1: The Global Risks Interconnections Map 2020
World Economic Forum

At Green Alpha, we have been researching and analyzing these dynamics for over 14 years. Our resulting model of a de-risked economy can generally be described as resting on four pillars:

1. **Large, rapid economic productivity gains:** To provide fair standards of living globally without transcending multiple planetary boundaries, the economies of the world need to continue their progress towards becoming much, much more efficient.

   While the world is likely at least 800% more economically productive than it was a century ago, from a structural risk management point of view, the rate of increase needs to accelerate. In economic terms, that means the economy must be capable of generating far greater outputs per unit of input, be those inputs primary geological resources, money, or person hours. To this end, digitalization, automation, artificial intelligence and machine learning, communications networks, and many other continuing innovations will be necessary.

   In short, productive innovation at an exponential rate and scale is required to solve the current planetary crises.

2. **Renewable energies:** The innovative, new means of production must be powered entirely by renewable sources of energy, here defined as those with zero cost of fuel input (see the first pillar). Today, this means wind, water, solar, and some forms of geothermal.

3. **Waste-to-value supply chains:** Extraction of primary geological resources needs to be reduced dramatically, and ultimately halted. Thus, life cycle product management and indefinite reuse of already economically functional material is required.

4. **More equitable distribution of wealth:** This fourth pillar ties the first three together. Historically, education and productivity have always been the most important influences on stability, economic growth, and social well-being. A high degree of social cohesion is required to address risks and achieve true sustainability; conversely, sharply divided civilizations have often experienced collapse.[5, 6] If individuals believe they live in a fair system with equal access to opportunity, civil unrest and its attendant risks are greatly attenuated.

"More importantly, as embodied in the spirit of the first pillar, it means ***investing in the relentless pursuit of innovation itself.****"*

These four pillars serve as our general framework, even though each contains many subcategories, and many solutions can fit under more than one pillar. We have not set a definite time frame for the realization of a global economy so organized, but climate science indicates that speed is paramount and our timeline for avoiding the worst outcomes of the climate crisis is probably something less than 30 years.[7]

With this general model of the sustainable economy in mind, Green Alpha has developed a road map that leads from here to there. Within the fields of forecasting science and decision-making scholarship, this is sometimes known as future backcasting.[8] For us, this means identifying, evaluating, and investing in the best exemplars we presently have in the incumbent economy of each of the four pillars above.

More importantly, as embodied in the spirit of the first pillar, it means investing in the relentless pursuit of innovation itself. In other words, we must imagine ourselves living in the sustainable economy, then "remember" which companies led the way here and which did not.

A key step in future backcasting the sustainable economy is conducting a premortem; that is, identifying the risks that will prevent arrival at the goal. There are certainly many risks preventing realization of any of the four pillars of the next economy, and in a meaningful way, many of these risks are the inverse of the pillars themselves. The threats to realization of indefinite sustainability can be broadly categorized as including global warming and the climate crisis, resource degradation, ecocide and biodiversity loss, and worsening social and economic inequality.

Identifying these systemic risks gives us another tool for determining impact investments, as the solutions to these threats can be viewed as constituents of, or at least critical steps on the path to, indefinite economic and environmental sustainability.

Pillars of the Next Economy

- **Economic productivity gains:** Reducing inputs while increasing total output, so economies can thrive without crossing planetary boundaries
- **Renewable energies:** Zero-fuel cost energies, like wind and solar; not biomass, biofuels, or natural gas
- **Waste-to-value supply chains:** Extraction of primary geological resources needs to be reduced dramatically, and eventually halted altogether
- **Equitable distribution of wealth:** A high degree of social cohesion is required to address risks and achieve true sustainability

Part II: The Pragmatic

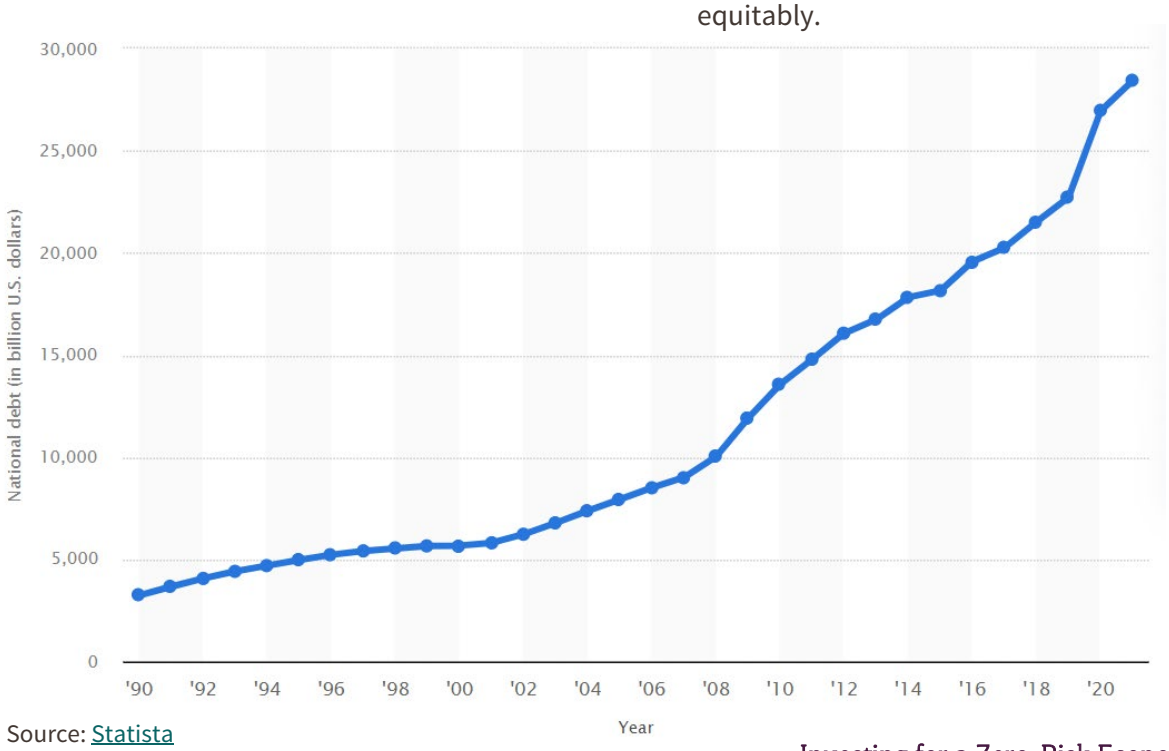
The world is clearly much more complex than an idealized, simplified model of what we can realize going forward. What then, are the immediate key obstacles preventing us from arriving at a de-risked economy?

1. **Inflation.** Overall, the economy has been spending more than it is earning, as evidenced by the existence of over US$30 trillion in debt[9] currently monetized and tradable. As inflation begins, bonds' value becomes eroded, they become harder to sell, their price declines, and so interest rates rise. The risk in this case is that as we lose money to inflation and interest rates rise, we're caught in a squeeze.

   Historically, economies at this stage have had to choose between a debt or inflation crisis as governments print more money to stimulate their economies out of trouble.

   For the asset manager, this at best results in short-to-medium term opportunities to buy conviction stocks at attractive long-term valuations, and at worst results in a longer-term bear market.

2. **The undermining of social cohesion.** In the U.S. right now, we are seeing at once the largest wealth gap, largest income gap, and largest political gap in generations.[10] Although a unified approach to de-fusing this risk is required, polarization and populism enabled by inequity of opportunity make that difficult. We note this on the list of mid-term obstacles, but fixing it is also a long-term requirement, thus making better social equity and cohesion the fourth pillar of a zero-risk economy. The productivity gains stipulated in pillar one will grow the size of economic assets, providing potential to ensure that abundance is shared equitably.



Source: Statista

3. **Changing geopolitical dynamics.** Historically, when an existing power diminishes relative to a new power, a conflict over which gets to set the global rules of commerce, trade, governance, and diplomacy often ensues (sometimes called the Thucydides Trap).

   China is currently the emerging co-hegemon. China's economic, technological, and individual well-being metrics have all improved dramatically over the last few decades. The nation has reached a level of scale where it is both capable of and desires to set the rules in its sphere of influence, and to the extent possible, globally. This can run counter to the existing order of US and European based rules that have held sway since the 1940s, setting up a conflict. While the situation does not have to mean war, historically it often has. Here again, the solution is globally shared prosperity, wherein no nation feels the global system is rigged to unfairly favor another. All four pillars will have to advance rapidly to create the conditions of abundance necessary to give global populations and their leaders enough security to embark on a course of positive-sum collaboration, as opposed to the current paradigm of zero-sum competition.

4. **The climate crisis.** No longer imaginable as something that will happen in the future, and largely ignored as an exacerbator of the above three proximate structural risks, climate change is accelerating nearly all global threats.[11] Like the COVID-19 pandemic, climate change is a global problem manifesting itself in countless ways. Unlike the pandemic, it will get worse, not better, for the foreseeable future. This makes the climate crisis the most important risk to solve for if our goal is a safe, abundant economy.

   Historically, droughts, pandemics, and other large-scale disruptions have toppled more empires than the three currently-present risks enumerated above; the confluence of all four risks does not seem to bode well. The means of helping national regimes overcome these problems occur in innovation and adaptation, given the realities of a finite planet teetering close to its survivable boundaries.[12]

*"In the U.S. right now, we are seeing **at once** the largest **wealth gap**, largest **income gap**, and largest **political gap** in generations."*

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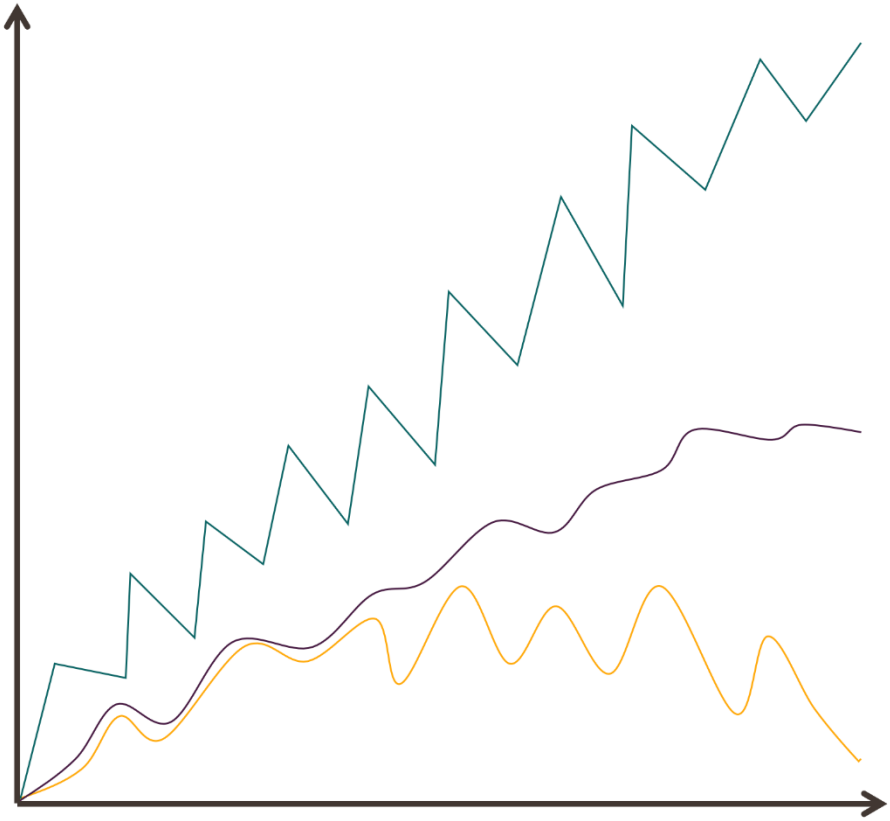
Part III: The Portfolio

Structural risks within the economy are the source of investment risk. Solutions exist and are well understood. Economies emerge from and are created and defined by the direction and velocity of capital. To actualize a zero-risk economy, we must direct investment capital to it.

Yet, equities portfolio construction is notoriously challenged relative to the goal of demonstrating meaningful positive impact on the climate crisis. Problems include ESG strategies that have proven nebulous, ill-defined, and inadequate, as well as negative screening approaches that limit the portfolio manager to constituents of major benchmark indexes, therefore ignoring many promising innovative solutions. Unfortunately, nearly all public equity strategies available to the impact investor today follow some form of one of these approaches.

To overcome these industry-endemic limitations, Green Alpha found it necessary to devise a new impact methodology, created with the endgame of indefinite environmental and economic sustainability as its primary goal. The new approach, Next Economy Portfolio Theory, posits that productive, innovative, scalable solutions to large-scale systemic threats exist in growing markets, are gaining market share, are growing faster than underlying GDP, and therefore will have increasing market value. The same is not true of the causes of structural risk.

Risk & Uncertainty: Not The Same Thing



Next Economy
- ✓ High return potential
- ✓ High volatility
- ✓ Negative systemic risk
- ✓ Low uncertainty re outcome

Legacy Economy
- ✓ Average expected return
- ✓ Lower volatility
- ✓ Low/moderate systemic risk
- ✓ Moderate Uncertainty

Causes of Systemic Risk
- ✓ Potential for losses
- ✓ High volatility
- ✓ High financial and environmental risk
- ✓ No uncertainty re outcomes

To implement a portfolio construction strategy based upon this theoretical framework, it is necessary to approach each company's business and contributions to sustainability on its own merits, individually, before and in addition to evaluation of company fundamentals. In this way, Green Alpha's approach to public equity management more closely resembles methodologies used by private equity and venture capital managers.

Each company is discovered, and purpose selected for its ability to solve systemic risk, and thus for its ability to grow and gain market share from legacy companies that are often the causes of these risks. Because of this, our strategies exhibit high active share versus most benchmark indexes and are not designed to correlate with any given benchmark index; indeed, they generally do not. We posit that it is not possible to simultaneously correlate with the incumbent economy as represented by major indices, and still obtain sufficient portfolio exposure to enablers of the indefinite sustainability required to realize portfolio growth and meaningful impact via the process of equity investing.

Conclusion

Green Alpha believes earning alpha is a function of our ability to determine what will enable the human economic production function to work phenomenally well and indefinitely, without overtopping planetary tolerances,[13] and then own as much of the related IP and production capacity as possible. Institutionalizing this pursuit requires familiarity with current economic developments and new trajectories, understanding what these developments have occurred in response to, and paying special attention to events that cause two or more developments to interact (the intersection of AI and biotech, for example).

As innovation speeds up, the frequency of re-iterating the process of updating prior assumptions increases in proportion. This necessitates paying attention to interacting macrotrends, even if they don't seem immediately relevant.

Finally, it is critical to continually build awareness of these trends and interactions throughout our organization, so that team members are equipped with the tools to scan the horizon for change and make rapid adaptations considering subsequent findings.

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References

[i] "Modern Portfolio theory (MPT)," *CFI*, https://corporatefinanceinstitute.com/resources/knowledge/trading-investing/modern-portfolio-theory-mpt/

[2] Burton G. Malkiel, "A Random Walk Down Wall Street," *W.W. Norton & Company*, 2019, https://wwnorton.com/books/9781324002185/about-the-book/product-details

[3] "The Global Risks Report 2021 16th Edition," *World Economic Forum*, 2021, https://www3.weforum.org/docs/WEF_The_Global_Risks_Report_2021.pdf

[4] "The Global Risks Report 2020" World Economic Forum, January 15, 2020, https://www3.weforum.org/docs/WEF_Global_Risk_Report_2020.pdf

[5] Alana Calvert, "Martin Lewis Warns of 'Civil Unrest' Amid U.K. Cost-of-Living Crisis," *Bloomberg*, April 9, 2022, https://www.bloomberg.com/news/articles/2022-04-10/martin-lewis-warns-of-civil-unrest-amid-worsening-cost-of-living-crisis

[6] Walter Scheideel, "The Great Leveler: Violence and the History of Inequality from the Stone Age to the Twenty-First Century," *Princeton University Press*, September 18, 2018, https://press.princeton.edu/books/paperback/9780691183251/the-great-leveler

[7] "Climate Change Widespread, Rapid, and Intensifying – IPCC," *IPCC*, August 9, 2021, https://www.ipcc.ch/2021/08/09/ar6-wg1-20210809-pr/

[8] Simon Elias Bibri, "Backcasting in Futures Studies: A Synthesized Scholarly and Planning Approach to Strategic Smart Sustainable City Development," *European Journal of Futures Research 6, 13*, July 27, 2018, https://eujournalfuturesresearch.springeropen.com/articles/10.1186/s40309-018-0142-z

[9] Erin Duffin, "Public Debt of the United States 1990-2021," *Statista*, October 19, 2021, https://www.statista.com/statistics/187867/public-debt-of-the-united-states-since-1990/

[10] Lucas Chancel, Thomas Piketty, Emmanuel Saez, Gabriel Zucman, et al., "World Inequity Report 2022," *World Inequity Lab*, 2021, https://wir2022.wid.world/www-site/uploads/2022/01/Summary_WorldInequalityReport2022_English.pdf

[11] Climate Change: A Threat to Human Wellbeing and Health of the Planet. Taking Action Now Can Secure Our Future," *IPCC*, February 28, 2022. https://www.ipcc.ch/2022/02/28/pr-wgii-ar6/

[12] Johan Rockstrom, "9 Ways to Pull Our Planet Back from the Brink," *World Economic Forum*, January 19, 2015, https://www.weforum.org/agenda/2015/01/9-ways-to-pull-our-planet-back-from-the-brink/

[13] Johan Rockstrom, "9 Ways to Pull Our Planet Back from the Brink," *World Economic Forum*, January 19, 2015, https://www.weforum.org/agenda/2015/01/9-ways-to-pull-our-planet-back-from-the-brink/