

THE SPACE VALUE OF MONEY

Rethinking Finance
Beyond Risk & Time

Armen V. Papazian



*E pur si muove...*¹

¹ 'And yet it moves', refers to the Earth and is attributed to Galileo Galilei (1564–1642).

Preface

Finance, just like all human inventions, is designed and structured in human reason and imagination first. It is actualised, institutionalised, and digitised, in some shape or form, perfectly or imperfectly, only after its purpose, principles, tools, and models have been defined, debated, and negotiated in society.

Digitisation does not automatically imply improvement. An unfair and unequal process can remain so after digitisation. The architecture of our markets, the procedural mechanisms behind money creation, the principles and equations of a valuation model change not when they are digitised, but when they are reinterpreted in their fundamental assumptions, and are rebuilt upon an entirely new value framework. In the age of digital transformation, we are more than ever exposed to the risk of digitising confusion, and reinforcing suboptimal frameworks, structures, and models.

As the world becomes more aware of the devastating impact of climate change and recognises that we have littered every environment we have come to touch—debris in orbit, carbon in air, plastic in oceans, waste in rivers and on land—the necessity for change has become a mainstream agenda. Whatever the perceived and real levels of commitment, the growth in sustainable finance is a testimony to this parallel and simultaneous transformation.

This book is a theoretical treatise on sustainability in finance and aims to contribute to the debate. The main argument and purpose are straightforward. If we are to ensure an effective transition, and a long-term change in our trajectory, we must integrate sustainability into the core principles and

equations of finance, in theory and practice. I offer an approach and a set of equations that can achieve such an objective.

To entrench sustainability into finance, we must introduce space, as an analytical dimension and our physical context, into our models and equations. The main insights and ideas presented aim to provide a roadmap to an entirely new type of finance, where space and our impact, in it and on it, are an integral element of our value models. The book proposes a change in the logic of the value of money as taught and applied in finance theory and practice, in academia and industry. It entrenches our spatial responsibility into our value paradigm heretofore entirely focused on risk and time.

The ideas and analysis proposed in this book have been in development for more than a decade. I have, throughout the last many years, starting in 2009, at different occasions and through different mediums and publications, shared different elements of the key concepts and metrics. Many of the pieces of the puzzle that I have previously discussed have been changed and transformed through the completed framework and analysis. I expect that these propositions will continue to evolve through the collective debate that improves and refines all ideas.

Whether a layperson or finance student or scholar, or practitioner, when considering the concepts presented and discussed in this book, I urge you to uphold an optimistic interpretation of human nature, and to recognise the immense creative power we possess as individuals, and as a global collective. Indeed, the incredible innovations in technology over the last many decades should be enough evidence that the human mind is capable of great feats, and it is time to expect innovative improvements in finance theory and practice as well.

The principle and metrics I propose and discuss in this book are not statistically tested, yet, because the aim is not to look for correlations in the past—a past from which our future must be so very different. The statistical testing will become possible only after the principle and metrics are adopted in theory and practice. While the equations proposed can be applied immediately, my focus is on making the case for a transformed value framework that takes us beyond risk and time, beyond the risk-averse return maximising individual investor.

I introduce humanity and the planet as the two stakeholders yet to be formally accounted for in our financial value equations. This is important given that the analytical framework of the discipline has been built around the risk-averse investor concerned with the risk and time value of expected cash flows. A framework that has brought us to the edge of an existential crisis with potentially catastrophic implications for our ecosystem.

We face the pressing need to transform money and finance, a discipline and industry that have, sometimes unwittingly and sometimes intentionally, damaged the very fabric of our ecosystem and thwarted the evolution of our species. Indeed, the root cause of our current predicament is not the carbon in our air, the plastic in our oceans, the radioactive waste on land, the sewage and garbage in our rivers, or the debris in orbit, but the lack of human responsibility, a monetary architecture that absolves it, and a discipline that has legitimised both.

If we are to truly change course and secure the health of our home planet, and the future of our children, we must reimagine the value of money and the institutional structures that create it. We face an evolutionary choice that will determine our survival and the sustainable expansion of human productivity on this planet and beyond.

United Kingdom
22 February 2022

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About the Author



Armen V. Papazian is a financial economist, a visionary thinker and innovator. His research work on sustainability and money have been on the cutting-edge of theoretical finance, and his industry work has led to the creation of new markets, products, and a software platform that reimagines analytics.

He is the first winner of the Alpha Centauri Prize for his work on money mechanics for space (2013). He was a finalist for the Finance for the Future Awards for his work on Space Value of Money (2016). His innovative analytics platform was selected as one of top 33 UK Tech Startups (2019), listed amongst top innovative technologies, and shortlisted for various awards (2022).

He is a former stock exchange executive, an investment banker, a lecturer in finance, a consultant, and a researcher. He is the author of numerous articles and thought leadership contributions across professional and academic publications and global media. He earned his Ph.D. at the Cambridge University Judge Business School, King's College Cambridge.

An eclectic thinker with a passion for real life application and industry, Armen is a radical humanist whose work and ideas have served and contributed to a more holistic interpretation of our place in the universe, and the role of finance in securing the resources needed for the sustainable expansion of our creative reach.



Our financial imagination is as important as our technological imagination when it comes to extending our reach into the cosmos.

Armen V. Papazian, Starship Congress, 2013

"Every once in a while, a book comes along that makes a fundamental contribution that is both profound and practical. A book that every member of the National Space Council, including the NASA Administrator and the Space Force Chief of Space Operations should read. *The Space Value of Money* will be of interest to ESG and impact investors, government regulators, financial theorists, and outer space enthusiasts."

—**Lt Col Peter Garretson**, Senior Fellow in Defense Studies at the American Foreign Policy Council

"No doubt, the pressing environmental challenges we face make the concept of the space impact of investments even more compelling."

—**Dr. Pascal Blanqué**, Chairman of Amundi Institute, Former Group CIO of Amundi Asset Management

"*The Space Value of Money* brings much needed conceptual rigour, whilst further advocating the case for a new paradigm shift in financial valuation. This work gives us the lasting frameworks that aggregate impact across all spatial dimensions. Dr. Papazian culminates over ten years of research in this rich book, providing the springboard for further innovation and system implementation in this area."

—**Domenico Del Re**, Director, Sustainability and Climate Change, PwC

"Enthralling and captivating. Papazian offers a clear, thorough, and comprehensive discussion. *The Space Value of Money* gives us an opportunity to reframe our thinking and to explore what is possible. A great read!"

—**Daud Vicary**, Founding Trustee of the Responsible Finance and Investment Foundation

"Armen has developed a novel way to create financial models that are better suited to dealing with the many parameters required if we are to properly consider environmental factors and sustainability in economics and finance. I have found this engaging and look forward to seeing its future use."

—**Dr. Keith Carne**, First Bursar, King's College, University of Cambridge

The Space Value of Money introduces a fresh and innovative perspective on sustainability and finance. It expands our financial value framework, heretofore built around risk and time, by factoring in space, as an analytical dimension and our physical context. The proposed principle and metrics entrench our responsibility for space impact into our value equations, making finance inherently sustainable and acting as a theoretical bridge between core finance theory and the growing field of sustainable finance. The book offers a novel approach to value design, measurement, and creation, discussing the theoretical, mathematical, institutional, technological and data elements of the transformation. The space value framework enables the financial instruments that can help us address our evolutionary challenges/investments, like the transition to Net Zero.



Armen V. Papazian is a financial economist, a visionary thinker and innovator. He is a former stock exchange executive, investment banker, lecturer in finance, consultant, and researcher. He earned his PhD at the Cambridge University Judge Business School, King's College Cambridge.

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ISBN 978-1-137-59487-7



www.palgrave.com