CHAPTER 1

Emerging Risks: An Overview

Thomas Walker, Dieter Gramlich, Kalima Vico, and Adele Dumont-Bergeron

One of the core functions of financial institutions is risk management. Until recently, most institutions have focused on concepts such as cyclical variations in their business and the economy, their exposure to low and even negative interest rates, and the consequences of various other macroeconomic developments and internal decisions on their profit margins, solvency, and efficiency, among others. Our world is changing, and individuals and businesses are increasingly affected by factors that arise from outside the economy and the financial markets, yet display multiple interactions with the eco-financial system. Today—arguably more than ever—financial

T. Walker (✉)
Department of Finance, John Molson School of Business, Concordia University, Montreal, Canada
e-mail: thomas.walker@concordia.ca

D. Gramlich
Department of Banking, Baden-Wuerttemberg Cooperative State University, Heidenheim, Germany
e-mail: dieter.gramlich@dhbw-heidenheim.de

K. Vico • A. Dumont-Bergeron
John Molson School of Business, Concordia University, Montréal, QC, Canada

T. Walker et al. (eds.), *Ecological, Societal, and Technological Risks and the Financial Sector*, Palgrave Studies in Sustainable Business In Association with Future Earth,
https://doi.org/10.1007/978-3-030-38858-4_1

institutions face a variety of new challenges that require them to seriously rethink their risk management and investment practices. Climate change, mass migration, political extremism, trade wars, terrorism, cybersecurity threats, and the current evolution of financial technology (FinTech) are just some examples of ecological, societal, and technological factors that affect and interact with our financial markets. This book aims to highlight not only the threats but also the opportunities associated with these emerging risks, thereby providing an inspiration for academics, practitioners, and regulators who already work in or are interested in this field.

Our environment is rapidly changing: natural disasters, heat waves, and rising sea levels affect our personal lives as well as businesses and the overall economy; new technologies continuously reshape the way we communicate, entertain ourselves, and make purchase decisions; and globalization requires companies—many of which are increasingly spread out across continents—to rely on ever more complicated supply chains, transportation systems, and tax management. As a result, the public perception of sustainability is shifting and is paving the way for new business, investment, and regulatory approaches to address today's ecological, societal, and technological challenges.

Almost all of the emerging risks discussed in this book come with their own unique opportunities and threats. For instance, Internet-based technologies facilitate the way we carry out business and conduct financial transactions. Yet, cybersecurity vulnerabilities and the hackers who exploit them can be highly detrimental to consumers as their personal and financial information can be compromised and potentially sold around the globe. Mobility is facilitated by ever faster land, air, and sea transportation; however, the consequences of energy consumption and carbon dioxide (CO_2) emissions have to be considered as well. With such a variety of new developments, firms and investors must adjust their behaviors and regulators must reconsider existing laws to better mitigate and adapt to the arising challenges. The adoption of a less carbon-intensive economy and the consideration of environmental, social, and governance (ESG) factors in business and investment decisions are two possible ways of reacting to these challenges from a risk management perspective.

Our financial, banking, and governmental systems are also changing. They are far from immune from technological developments, emerging risks, and the social uprising around them. Climate change affects the way central banks manage their inflation controls, and FinTech is changing the way transactions are made. Thus, the social, environmental, and technological developments discussed in this book have strong repercussions for the financial system and the way it operates.

As global citizens, we need to be informed about these possible risks, the ways they affect us, and the solutions to counter—and abate—them. We need to change how we invest and how we strategize our businesses. The roles of analysts and managers must be redefined, and the sooner we implement these changes, the better equipped we will be to face the transition risks and any other emerging risks that may still be coming.

Social, environmental, and technological risks are relatively new topics, but they have gained momentum recently as different books and researchers have addressed similar themes. Ackerman (2017) addresses extreme cases of climate risk and financial crises in institutions and the financial system. Aldridge (2017) describes the market microstructure and modern risks with a focus on FinTech. Taplin (2016) focuses on cyber risks in the financial sector. Tadokoro et al. (2018) discuss emerging risks from a social perspective taking the heterogeneity among different countries into consideration. Finally, the World Economic Forum (WEF 2019) provides a basic overview of today's economic, environmental, geopolitical, societal, and technological risks. There are many other works on the topic of emerging risks, but these are arguably the most comprehensive and significant contributions related to our book.

Unlike many of the works mentioned above, our book draws on both the academic and practical worlds. The views and research exhibited in this book stem from academics and practitioners with a vast diversity of experiences. We offer a transdisciplinary approach, linking the social and natural sciences, with a specialized focus on the emerging risks affecting finance (see Fig. 1.1). We consider businesses, financial products, the stock and bond markets, as well as the global economy to offer a comprehensive and connected approach to assess new risk categories that affect each of them.

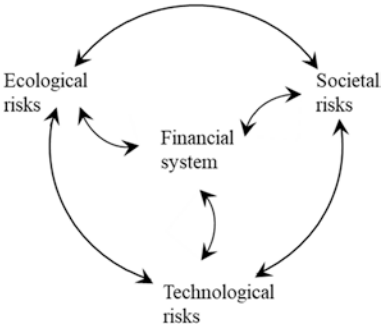

Fig. 1.1 Emerging risks and the financial system

Finally, we feature different countries, from Pakistan to the United States, England, and Canada, to show how emerging risks affect different societies with different ecosystems. In the end, these specific examples demonstrate that the emerging risks discussed in this book unify us on a global level.

Our book is divided into three parts, each examining a different type of emerging risk and its associated opportunities for the financial markets.

Part I: Ecological Risks

The first part of this book contains chapters related to ecological risks and finance. In "Climate Change: Macroeconomic Impact and Implications for Monetary Policy", Sandra Batten, Rhiannon Sowerbutts, and Misa Tanaka, from the Bank of England, address climate change–related challenges from the perspective of a central bank. Specifically, the authors highlight how climate change increases the difficulty of managing certain monetary policy objectives such as maintaining a low and stable inflation rate. They describe climate change risks as being both physical and transitional in nature, given that climate change imposes not only direct risks on various entities but also the risk associated with the current economy transitioning toward a greener one. These risks are not only felt by central banks but also by the labor market and thereby the overall economy and the financial markets.

The following chapter, "Global Warming and Extreme Weather Investment Risks" by Quintin Rayer, Peter Pfleiderer, and Karsten Haustein, explains the ways in which extreme weather events affect the financial markets. They review historical meteorological data and show that global warming has decreased the frequency but increased the intensity of hurricanes. The increased intensity causes higher disaster-related damages and liabilities for companies that operate in disaster-prone areas and ultimately affects their share price. In order to address the perceived inaction by some players, they explore why there are climate change deniers and whether these deniers may have economic incentives that drive their stance on the climate change question. They conclude that change (and the pressure to change) needs to come not only from carbon-intensive companies but also from the legal, academic, scientific, and financial community, as well as the general public.

James Leaton, a senior credit officer at Moody's, examines climate risks from a lender's and an investor's perspective in his chapter "Mapping Out

When and Where Climate Risk Becomes a Credit Risk". He discusses different climate change–related risks and highlights the physical and transitional risks for various industry sectors using examples from the coal mining industry, the European utility sector, and car manufacturing. The author examines the different transmission channels that make the transitional risks felt in these industries and discusses a variety of techniques that can be used to determine the financial impact of these risks.

Martin Boyer, Michèle Breton, and Pascal François analyze the ways in which climate change, as embodied through more severe hurricanes, affects the insurance market in their chapter "Designing Insurance Against Extreme Weather Risk: The Case of HuRLOs". Their work focuses on Hurricane Risk Landfall Options (abbreviated as HuRLOs in their title)—an investment tool that has been designed as a result of the market's increased concern about hurricanes. These options allow investors to take positions on hurricane landfalls, thereby providing a hedging instrument against catastrophic losses. In their chapter, the authors evaluate the effectiveness of this unique hedging instrument in a realistic setting.

Chapter 6, "The Evolving Risk Management Opportunity and Thinking Sustainability First", by Stephen Kibsey, Stéfanie D. Kibsey, Amr Addas, and Cary Krosinsky, addresses the need of defining investors' and corporations' fiduciary duties in the context of sustainability-oriented management and investing in order to reduce any ambiguity in their decisions. The chapter highlights the importance and necessity of ESG themes in the decision making and risk management process. It uses certain examples such as increasing talent diversity, implementing stronger cybersecurity, and transitioning to a lower-carbon economy to highlight how incorporating ESG considerations can lead to opportunities and benefits for both companies and investors.

Part II: Societal Risks

The second part and the six chapters therein relate to societal risks and how they affect our financial system. In the chapter entitled "Terrorism and Trading: Differential Equity and Bond Market Responses During Violent Elections", Allan Dwyer and Tashfeen Hussain examine how the efficient market hypothesis applies to the emerging countries market. They use data on electoral violence in Pakistan and analyze the stock and bond market's response to news about related terrorism events. In doing

so, they also investigate country risk and the credit rating process in an emerging market such as Pakistan and how it responds to political violence.

Chapter 8, "The Effect of Corporate Tax Avoidance on Society", by Gio Wiederhold, discusses how tax avoidance, on both corporate and individual levels, affects global welfare. In this context the chapter highlights the difficulties of taxing intangible goods, such as intellectual property and related patents, and the services offered by Internet information providers. Wiederhold canvasses how multinational corporations and wealthy individuals avoid taxation using various intermediaries and complex corporate and investment structures. He offers suggestions for several actions governments can take to help mitigate the effects of tax avoidance.

In her chapter "Planning for the Carbon Bubble", Carla Santos Skandier discusses the problem of stranded assets for fossil fuel companies. She compares the current carbon bubble to the recent subprime mortgage crisis, which has the potential to burst and become a new financial crisis as it did in 2008. She promotes the Federal Reserve as the institution with the best means for addressing and mitigating the carbon bubble which she argues looms over the financial markets. She proposes several unique ideas such as a re-envisioned financial system and public banks, as well as green banks.

Carmela Cucuzzella and Jordan Owen review a recent policy change that attempted to increase social housing and the related benefits in the Montreal real estate market. In their chapter "Economic Risks from Policy Pressures in Montreal's Real Estate Market", they examine the factors behind the increased demand for social housing as well as the recent policies that affect it. Supporting their research with a case study, they demonstrate the effects of the newly passed policies on new real estate projects. They conclude their study with an analysis of both the costs and the social and economic effects of the recent policy changes.

In the next chapter, entitled "Climate Change and Reputation in the Financial Services Sector", Robert Bopp, from Ernst & Young, focuses on climate change–related reputational risks for financial institutions. He first defines firm's reputation, differentiating it from an image or a brand. He argues that reputation is a major concern for stakeholders and that the way companies conduct their business in relation to climate change influences both their profitability and social responsiveness. The chapter examines how financial institutions respond to stakeholders' experiences and expectations. The author concludes by highlighting the need to integrate

climate change to remain relevant and outlines a variety of new business implications and strategic considerations that come with it.

The last chapter of this part, "Financial Risk Management in the Anthropocene Age", is written by Bradly Condon and Tapen Sinha. They take a global perspective and discuss various channels through which climate risk can lead to societal risks. Specifically, they address the issue of mass migration and the associated growth in climate refugees, while supplying an estimate of the related costs of climate change per country. They review past market successes and failures surrounding sulfur dioxide (SO_2) related air pollution. Based on the experiences obtained from SO_2, they suggest a series of voluntary and compulsory steps to help reduce current CO_2 emissions. Specifically, they focus on the role of insurance companies in mitigating some of these effects.

Part III: Technological Risks

The last part of this book addresses technological risks and their impact on the financial world. The first chapter of this part, entitled "An Incentives-Based Mechanism for Corporate Cyber Governance Enforcement and Regulation", by Constantin Gurdgiev and Shaen Corbet empirically examines how institutional structures can help propagate risk contagion effects and how cyber threats pose a potential systemic risk to financial stability. The authors highlight the vulnerabilities of private sector companies, central banks, and regulators in the face of a major cyberattack. They discuss the use of white knights and incentives to help reduce this threat and provide an implementation guideline to do so.

Next, Matthias Horn, Andreas Oehler, and Stefan Wendt examine the opportunities and threats associated with FinTech in their chapter "FinTech for Consumers and Retail Investors: Opportunities and Risks of Digital Payment and Investment Services". They take on both a consumer's and retailer's viewpoint, provide a series of recent examples of technical innovations in the payment and investment realm, and analyze the benefits and threats of new technologies. Specifically, they discuss the societal and ecological risks of mobile payments, cryptocurrencies, and crowdfunding, as well as newly emerging investment methods such as social trading, robo advisors, and crowd investing.

The chapter "Empirical Modelling of Man-Made Disaster Scenarios" by Melanie Windirsch from Allianz Global uses historical data to model man-made disaster scenarios. She concentrates on fire- and

explosion-related events that have occurred recently and describes the inherent difficulties in modeling man-made disaster scenarios. She argues that—contrary to natural catastrophes—man-made disasters are more challenging to model due to their wider variety of loss triggers and their low frequency of occurrence. She further argues that if their risk is not properly managed, man-made disasters can trigger market shocks and subsequent economic downturns.

Mohd Hafdzuan Bin Adzmi, Huiying Cai, and Masachika Suzuki examine the effect of policy changes and climate change mitigation strategies in the coal industry. In their chapter "Changing Dynamics of Financial Risk Related to Investments in Low Carbon Technologies", they look at the effects of divesting from fossil fuels and the problem of stranded assets. To do so, they review recent measures taken around the globe to encourage a low-carbon shift, honing in on their impact on the coal industry and the potential actions by companies to address these risks.

The final chapter in this part, "A New Era in the Risk Management of Financial Firms", by Sureyya Burcu Avci, analyzes the effect of emerging technologies and their associated risks on the risk management of financial institutions. The chapter defines and reviews traditional risks and risk management principles and argues that these remain relevant for emerging risks, yet have to be adjusted. She reviews the business continuity principles for financial companies and proposes a set of new principles for the financial industry. Avci details the different processes within a business in order to better understand the challenges imposed by new technological risks. She concludes with a proposed series of new business principles that firms should follow in order to better manage and mitigate technological risks.

Summary

In summary, the chapters presented in this book aim to provide detailed insights and introduce ground-breaking new approaches for the management of newly emerging risks that affect today's financial system. Our world is marked by an ever-changing ecological, societal, and technological environment as well as changing business models, customer preferences, and market regulations that have a profound effect on the financial markets. In striving to make our markets more resilient and sustainable, these developments must be addressed as soon as possible to limit the risks

that affect not only our central banks, but also businesses, the real estate market, and our financial and economic system per se.

The second chapter in our book quotes Carney (2018) who noted that "… the longer the implementation of these policies and the transition to a low-carbon economy are delayed, the sharper the future reduction in carbon emission to meet the climate goal will need to be, and the higher the transition risks". The alarm has been sounded and a sense of urgency is associated with emerging risks. As demonstrated and discussed throughout the chapters, adaptation is as necessary as it could be profitable, while inaction may lead to missed opportunities and even financial distress. There is more pressure to be sustainable, not only from regulators but also from investors and consumers. A company's reputation could also be at stake if it fails to be ecologically/socially sustainable or if it suffers from a cybersecurity breach.

What appears clear and consistent, however, is that there are plenty of solutions to address the emerging risks we face today: sustainable strategies as well as diversity can help a company's reputation and their competitive advantage as they mitigate risks and employ stronger talent to implement change; intangible assets such as corporate responsibility and social stewardship can ultimately increase a firm's profitability; investment gains can be achieved (or losses can be avoided) by trading on hurricanes and social unrest; and money can be saved by using ESG principles to manage business risks. In addition, new jobs can be created, for example, by employing white knights to mitigate private and public cybersecurity risks.

New regulations and policies can support this transition: greener banks and public banks can be implemented, taxation can be improved to reduce tax-havens, and the insurance system can create incentives to deter us from producing more emissions. Moreover, through stricter regulations, the government can help increase the cybersecurity of consumers, thereby protecting their personal and financial information. Indeed, in almost all areas reflected upon in this book, financial market regulators can help by implementing modified regulations and better frameworks to address the risks discussed.

Ultimately, we need to implement a variety of changes at the personal, business, investor, and regulatory levels and be transparent about them. Transparency is needed, both to address the environmental, social, and governmental risks companies and other entities face and to identify the risks for the associated stakeholders.

The chapters featured in this book should be of interest to anyone who owns or works at a financial institution, who uses a bank or FinTech service, or who seeks to minimize their risks and increase their profitability (which ultimately encompasses every investor who actively or passively invests in the market). The chapters not only provide ample food for thought but also offer detailed suggestions for changes by highlighting, for example, the risk management strategies in dealing with cybersecurity and climate change risks. Our world is changing and the need to adapt is now. We hope this book inspires our readers to become more educated and to be better corporate citizens, not only for the good of the planet but also for more profitable and safer business and investment strategies.

References

Ackerman, F. (2017). *Worst-case economics: Extreme events in climate and finance*. London: Anthem Press.

Aldridge, I. (2017). *Real-time risk: What investors should know about FinTech, high-frequency trading, and flash crashes*. Hoboken, NJ: John Wiley & Sons, Inc.

Carney, M. (2018, November 21). *Remarks at the accounting for sustainability summit 2018 accounting for sustainability forum*, London.

Tadokoro, M., Egashira, S., & Yamamoto, K. (Eds.). (2018). *Emerging risks in a world of heterogeneity: Interactions among countries with different sizes, polities and societies* (Vol. 10). Berlin: Springer.

Taplin, R. (2016). *Managing cyber risk in the financial sector: Lessons from Asia, Europe and the USA*. Abingdon: Routledge.

WEF—World Economic Forum (2019). The global risks report, 14th edition, Geneva.