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Anticipatory macroeconomic governance: exploring future-oriented strategies for economic resilience and sustainability

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Abstract

This paper aims to identify and discuss the integration of anticipatory practices in the macroeconomic governance regime, an emerging yet crucial dimension in the field. It examines the contextual differences shaping these practices at the intersections of society, innovation, policy, and governance, focusing on the interrelationship between institutions, cultures, and national contexts. The study also investigates the multi-dimensional relationships between anticipatory practices and various economic dynamics, addressing a significant gap in the literature. It explores how these practices manifest in different settings, analyzing the challenges and opportunities in adapting them to diverse contexts. The paper analyzes the connections between micro, meso, and macroeconomic spheres, and examines the institutionalization and temporal dynamics of anticipatory practices. It also delves into the cultures of anticipation within macroeconomics, analyzing their influence on decision-making processes and the visibility of different voices. By offering a comprehensive exploration of anticipatory practices in macroeconomic governance, this interdisciplinary study provides valuable insights for practitioners, policymakers, and scholars, contributing to a holistic understanding of the roles and challenges at the intersection of innovation, policy, and society within macroeconomic contexts.

Keywords Macroeconomics, Anticipatory practices, Governance

Introduction

In an era characterized by rapid technological advancements, global interconnectedness, and unprecedented environmental challenges, the need for forward-thinking approaches in macroeconomic governance has never been more critical. The integration of anticipatory practices into economic decision-making processes represents a frontier in policy formulation, offering the potential to enhance resilience, sustainability, and adaptive capacity in the face of an increasingly uncertain future. This paper explores the landscape of anticipatory macroeconomic governance, examining its contextual variations, interconnections, and implications for fostering economic resilience and sustainability.

This paper aims to develop a conceptual framework for understanding and studying anticipatory practices in macroeconomic governance. Rather than attempting a comprehensive empirical analysis, we seek to identify key theoretical dimensions and relationships that can guide future research in this emerging field. Our framework integrates insights from multiple theoretical traditions to propose testable hypotheses about how anticipatory practices function across different contexts and levels of economic governance. The objectives of this conceptual exploration are threefold: First, to develop an integrated theoretical framework for analyzing anticipatory practices in macroeconomic governance; second, to identify

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key research questions and hypotheses for future empirical investigation; and third, to propose methodological approaches for studying these phenomena. Through this conceptual work, we aim to establish a foundation for a more systematic research agenda in this field.

Anticipatory practices, broadly defined as methods and strategies for systematically exploring, envisioning, and preparing for possible futures, have gained traction across various disciplines in recent decades. From climate science to urban planning, the value of incorporating future-oriented thinking into decision-making processes has been widely recognized (Poli 2010, 2017). However, the application of these practices within the realm of macroeconomic governance remains relatively underexplored, presenting both significant opportunities and challenges for policymakers, economists, and society at large. Nevertheless, the integration of anticipatory practices into macroeconomic governance is not merely an academic exercise; it has profound implications for how nations and global institutions navigate complex economic landscapes. As the world engage with issues such as climate change, technological disruption, and shifting geopolitical dynamics, the ability to anticipate and prepare for various economic scenarios becomes increasingly vital. In this respect, anticipatory macroeconomic governance offers the potential to move beyond reactive policy-making towards a more proactive, flexible, and sustainable economic paradigm.

Despite the growing recognition of the importance of future-oriented thinking in economics, there is still a significant gap in our understanding of how anticipatory practices are implemented, interpreted, institutionalized, and adapted across different contexts. This research gap is particularly pronounced within the macroeconomic sphere. By addressing this gap, this paper aims to contribute to a more detailed and comprehensive understanding of anticipatory macroeconomic governance.

The objectives of this study are threefold: First, it aims to examine the contextual differences that shape anticipatory practices in macroeconomic governance across various institutional, cultural, and national settings. Second, it seeks to investigate the interconnections between anticipatory practices and the micro, meso, and macro levels of economic decision-making, with a focus on how these practices facilitate or constrain links between innovation, policy, and societal expectations. Third, the study intends to analyze the institutionalization and temporal dynamics of anticipatory practices in macroeconomics, including their historical evolution and the cultures of anticipation that influence their implementation and effectiveness. To achieve the objectives mentioned above, this paper puts forward several key questions. It first asks how anticipatory practices in macroeconomic governance manifest differently across various institutional, cultural, and national contexts. The study then examines the role anticipatory practices play in facilitating or constraining the links between macroeconomic policies, innovation strategies, and societal expectations. Additionally, it investigates how anticipatory practices in macroeconomics have evolved over time, and what factors drive their institutionalization in regulatory and governance frameworks. Finally, the paper also explores how cultures of anticipation within macroeconomics influence decision-making processes, and whose voices are (in)visible in these anticipatory practices.

The significance of this research lies in its potential to inform more effective, resilient, and sustainable macroeconomic governance strategies. By shedding light on the complex interplay between anticipatory practices, innovation, policy, and society, this study aims to provide valuable insights for policymakers, economists, and scholars alike. Moreover, by examining the contextual differences and temporal dynamics of anticipatory practices, this research contributes to a better understanding of how future-oriented strategies can be tailored to diverse economic environments.

This paper adopts an interdisciplinary approach, drawing on insights from futures studies, economics, innovation studies, and policy science. This interdisciplinary lens allows for a holistic examination of anticipatory macroeconomic governance, aligning with the growing recognition of the need for integrated approaches to complex economic challenges. By bridging these diverse fields, this study aims to contribute to the broader discourse on the role of anticipation in shaping economic futures.

While this paper covers some ground in examining anticipatory practices across multiple dimensions, we acknowledge that this breadth necessarily limits the depth of analysis possible for each individual aspect. Our aim is to provide a conceptual framework that maps the terrain of anticipatory macroeconomic governance while being explicit about which conclusions are well-supported by existing evidence, which are preliminary suggestions requiring further investigation, and which remain speculative and require substantial empirical validation.

The rest of the paper is structured as follows: First, in the next section, a literature review presents the existing body of knowledge on anticipatory practices, emphasizing their diverse applications across disciplines and highlighting the gap in literature regarding their incorporation into macroeconomic frameworks. Next, the third section explores how anticipatory practices manifest in different institutional, cultural, and national settings, aiming to shed light on the challenges and opportunities

associated with adapting anticipatory strategies to diverse contexts. The subsequent section investigates the interconnections between macroeconomic spheres at micro, meso, and macro levels, scrutinizing the role of anticipatory practices in facilitating or constraining the links between macroeconomic policies, innovation strategies, and societal expectations. This is then followed in the fifth section by an examination of the institutionalization of anticipatory practices, including an analysis of the regulatory and governance frameworks that shape their implementation. This section also explores the temporal dynamics of macroeconomic anticipatory practices, tracing their historical evolution and unveiling trends and shifts in their impact on economic decision-making and policy formulation over time. Finally, the sixth section investigates the cultures of anticipation within macroeconomics, analyzing how these cultures influence decision-making and whose voices are (in)visible in anticipatory practices.

Conceptual framework and literature review

Conceptual framework

The study of anticipatory practices in macroeconomic governance requires a theoretical framework that can capture the complexity and interconnectedness of these practices while remaining analytically tractable. Figure 1 presents the proposed conceptual framework, which identifies three key dimensions of analysis: contextual factors, operational levels, and temporal dynamics.

The framework posits that anticipatory practices in macroeconomic governance are fundamentally shaped by a complex interplay of contextual factors. At the core are institutional structures and processes that provide the formal mechanisms through which anticipatory practices are implemented. These institutional elements interact with broader cultural and societal factors that influence how future-oriented thinking is valued and interpreted within different contexts. National economic characteristics further modify these relationships, as the specific economic conditions, resources, and challenges of each country create distinct environments for anticipatory practices.

These contextual factors manifest differently across various operational levels of economic activity. At the micro level, they influence individual and organizational decision-making processes, shaping how economic actors interpret and respond to future possibilities. The meso level encompasses sectoral and regional dynamics, where anticipatory practices help coordinate responses to emerging challenges and opportunities across different economic sectors and geographical regions. At the macro level, these practices inform national and international policy coordination, helping to align diverse economic interests and objectives across broader spatial and temporal scales.

The framework recognizes that these interactions are not static but evolve dynamically over time. This temporal dimension operates through multiple mechanisms. Learning and adaptation processes allow organizations and institutions to refine their anticipatory practices based on experience and outcomes. Institutional change processes gradually modify the formal and informal rules

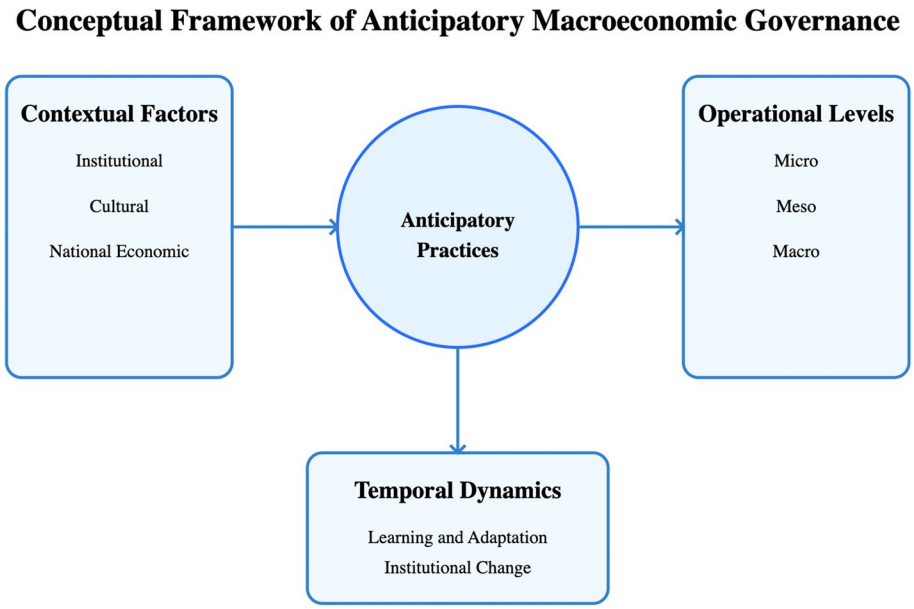

Fig. 1 Conceptual framework

that govern how anticipatory practices are implemented. Furthermore, broader shifts in economic paradigms can fundamentally alter how future-oriented thinking is integrated into macroeconomic governance.

This conceptual structure suggests several testable hypotheses about how anticipatory practices function in macroeconomic governance. For example, one testable hypothesis is that central banks with higher degrees of institutional independence will develop more sophisticated anticipatory practices than those with less independence. This could be tested through comparative analysis of anticipatory tools and frameworks across central banks, using measures of institutional independence as explanatory variables. Another testable hypothesis is that countries with stronger long-term cultural orientation (as measured by Hofstede's cultural dimensions) will demonstrate more extensive use of long-term scenario planning in their economic governance institutions. This could be empirically investigated through a cross-national study combining cultural indices with detailed assessment of anticipatory practice implementation. A third hypothesis is that the effectiveness of anticipatory practices increases with the diversity of stakeholder voices included in their development - this could be tested through analyzing the performance of different anticipatory frameworks against measures of stakeholder inclusion. These hypotheses provide concrete starting points for future empirical research while acknowledging that the relationship between institutional structures, cultural factors, and anticipatory practices is complex and context-dependent. Future empirical research testing these hypotheses could employ various methodological approaches. Quantitative studies might use econometric analysis to examine relationships between institutional characteristics and measurable outputs of anticipatory practices, such as forecast accuracy or policy effectiveness. Qualitative comparative case studies could investigate how different institutional and cultural contexts shape the development and implementation of anticipatory practices. Process tracing methodologies could help establish causal mechanisms linking institutional features to anticipatory outcomes. Mixed-method approaches might be particularly valuable, combining statistical analysis of cross-national data with in-depth case studies to provide both breadth and depth of understanding. Longitudinal studies tracking the evolution of anticipatory practices over time could help test hypotheses about temporal dynamics and path dependencies. While this paper focuses on developing the conceptual framework, these methodological approaches offer concrete paths for future empirical validation of the framework's key propositions.

The integration of anticipatory practices into macroeconomic governance represents an emerging field at the intersection of futures studies, economics, and policy science. The following literature review examines the current state of knowledge regarding anticipatory practices across disciplines, their application in macroeconomic contexts, and the theoretical frameworks that link anticipation, innovation, policy, and society.

Anticipatory practices across disciplines

Anticipatory practices have gained significant traction across various disciplines in recent decades. Poli (2017) provides a comprehensive overview of the field of anticipation, defining it as the study of how individuals, organizations, and systems use ideas about the future to inform actions in the present. In the context of organizational studies, Sarpong and Maclean (2016) explore how strategic foresight practices enable firms to navigate uncertain futures and maintain competitive advantage.

In sustainability science, Vervoort and Gupta (2018) examine the role of anticipatory governance in addressing complex environmental challenges. They argue that anticipatory approaches can help bridge the gap between long-term sustainability goals and short-term decision-making processes. Similarly, in urban planning, Fernández Güell and Lopez (2016) demonstrate how scenario planning and other foresight methods can be used to envision and prepare for alternative urban futures.

The field of science and technology studies has also contributed significantly to our understanding of anticipatory practices. Jasanoff and Kim (2015) introduce the concept of "*sociotechnical imaginaries*," which explores how collective visions of desirable futures shape the development and governance of science and technology. This work highlights the importance of considering cultural and societal factors in anticipatory processes.

Anticipatory practices in macroeconomic governance

Despite the widespread adoption of anticipatory practices in various fields, their integration into macroeconomic governance remains relatively limited. Beckert (2016) argues that economic forecasting, a common form of anticipation in economics, often fails to account for the fundamental uncertainty inherent in complex economic systems. He proposes a shift towards more flexible and adaptive approaches to economic anticipation.

Ramírez and Wilkinson (2016) explore the use of scenario planning in policy-making contexts, including economic governance. They argue that scenario-based approaches can help policymakers navigate complex and uncertain environments by considering multiple possible futures. However, the authors note that the adoption of

such practices in macroeconomic governance remains sporadic and unsystematic.

In a more specific macroeconomic context, Borio (2014) examines the role of financial cycles in shaping economic outcomes and argues for a more forward-looking approach to monetary and macroprudential policy. This work highlights the potential benefits of incorporating anticipatory practices into central banking and financial regulation.

While traditional economic forecasting dominates anticipatory practices, foresight approaches offer distinct advantages, particularly in addressing long-term uncertainties. Foresight anticipations, such as scenario planning, enable policymakers to envision multiple potential futures and develop robust strategies to navigate them. For instance, the Network for Greening the Financial System (NGFS) incorporates climate scenario analyses into central bank planning, allowing institutions to anticipate systemic risks stemming from climate change. Compared to forecasts, which often rely on quantitative extrapolations of past trends, foresight anticipations encourage broader considerations of structural shifts and disruptive possibilities. These practices are especially valuable in contexts where linear projections fail to capture the complexities of evolving economic dynamics, such as technological disruptions or global pandemics. The integration of foresight into macroeconomic governance thus complements traditional forecasting, providing a holistic framework for anticipating and preparing for the future.

Theoretical frameworks linking anticipation, innovation, policy, and society

Several theoretical frameworks have emerged that help conceptualize the relationships between anticipatory practices, innovation, policy, and society in economic contexts. The multi-level perspective (MLP) developed by Geels (2002) provides a useful framework for understanding how innovations emerge and scale up in socio-technical systems. While not explicitly focused on anticipation, the MLP offers insights into how future-oriented practices might interact with different levels of economic systems.

Building on the MLP, Kivimaa and Kern (2016) propose a framework for "creative destruction" in policy mixes for sustainability transitions. Their work emphasizes the importance of policy coherence and coordination in driving systemic change, which has implications for the implementation of anticipatory practices in macroeconomic governance.

The concept of "responsible research and innovation" (RRI) developed by Stilgoe et al. (2013) provides another relevant framework. While primarily focused on science and technology governance, the RRI framework emphasizes the importance of anticipation, reflexivity, inclusion, and responsiveness in innovation processes. These principles could be adapted to inform anticipatory practices in macroeconomic contexts.

In economic theory, the work of Beckert and Bronk (2018) on "uncertain futures" provides a compelling framework for understanding the role of imagination and expectations in shaping economic outcomes. They argue that economic actors' imaginaries of the future play a crucial role in driving economic change and innovation, highlighting the need for more sophisticated approaches to anticipation in economic governance.

Gaps in the literature

Despite these valuable contributions, several significant gaps remain in our understanding of anticipatory practices in macroeconomic governance. One key area requiring further investigation is the manifestation of these practices across various institutional, cultural, and national contexts. While some studies, such as Jasanoff and Kim (2015), explore the cultural dimensions of future-oriented practices, their specific application to macroeconomic governance remains underexplored. This gap in contextual understanding limits our ability to tailor anticipatory practices effectively to diverse economic environments.

Another critical gap lies in our comprehension of how anticipatory practices facilitate or constrain links between macroeconomic policies, innovation strategies, and societal expectations. While frameworks like the Multi-Level Perspective (Geels 2002) provide some insights, there is a pressing need for more targeted research on these interconnections within the context of macroeconomic governance. Understanding these dynamics is crucial for developing more holistic and effective anticipatory strategies.

The processes by which anticipatory practices become institutionalized in macroeconomic governance, and how these practices evolve over time, also remain understudied. Some research, such as Ramírez and Wilkinson (2016), touches on the adoption of anticipatory practices in policy contexts. However, a comprehensive examination of their institutionalization specifically in macroeconomic governance is lacking. This gap hinders our understanding of how to effectively embed and adapt anticipatory practices within economic institutions over time.

Lastly, there is a dearth of research on how cultures of anticipation within macroeconomics influence decision-making processes and whose voices are (in)visible in these anticipatory practices. While work on sociotechnical imaginaries (Jasanoff and Kim 2015) provides some insights, its application to macroeconomic anticipation

remains limited. This gap leaves us with an incomplete picture of the cultural and social dynamics that shape anticipatory practices in macroeconomics, potentially overlooking important perspectives and sources of bias.

In brief, the general concept of anticipatory practices is rapidly growing in popularity in different fields of knowledge, but the use of such strategies in macroeconomics has not yet developed into an individual area of research. This paper wishes to fill these research gaps by exploring contextual variations, relationship, organizational integration, and cultural aspects of anticipatory practices in macroeconomic policy making. In so doing it aims to add to knowledge about how future-focused policies might be designed for improving economic robustness and development in a progressively hostile and unpredictable global environment.

Foresight-based anticipation in macroeconomics

While forecasting remains the dominant form of anticipation in macroeconomics, several notable examples of more comprehensive foresight-based approaches have emerged in recent decades. These cases demonstrate how systematic foresight practices can enhance macroeconomic governance by considering a broader range of possible futures and their implications.

Singapore's Committee on the Future Economy (CFE) represents one of the most comprehensive applications of foresight in macroeconomic planning. The CFE's approach combines traditional economic forecasting with scenario planning, horizon scanning, and stakeholder engagement to develop robust long-term economic strategies (Neo and Chen 2007). This integrated foresight system has enabled Singapore to anticipate and adapt to major economic shifts, such as the rise of digital technologies and changing global trade patterns. The CFE's success lies in its ability to link foresight exercises directly to policy formation and implementation, creating a continuous feedback loop between future-oriented thinking and current decision-making.

Finland's national foresight system offers another innovative example of foresight-based anticipation in economic governance. The Finnish model integrates foresight activities across government, industry, and academia through its National Foresight Network (Dufva and Ahlqvist 2015). This networked approach has proven particularly effective in identifying emerging economic opportunities and challenges. For instance, Finland's early recognition of the potential of the circular economy, identified through its foresight processes, led to the development of targeted policies and investments that have positioned the country as a leader in this emerging sector.

The European Commission's Strategic Foresight Network represents a supranational approach to foresight-based anticipation. This network explicitly connects foresight activities to economic policy formation through its annual Strategic Foresight Report and ongoing foresight processes (European Commission 2021). The network's work has been particularly influential in shaping the EU's approach to green transition and digital transformation, demonstrating how foresight practices can inform complex, multi-jurisdictional economic policies.

South Korea's long-term industrial policy planning provides a compelling example of how foresight methods can shape industrial development. The Korean government's systematic use of technology foresight exercises, combined with strategic industry analysis, has enabled the country to consistently identify and develop emerging industrial sector (Kim and Seo, 2023). This approach has evolved from simple technology forecasting in the 1970s to sophisticated foresight exercises that consider social, technological, and economic factors in identifying future growth areas.

These examples highlight several key characteristics of successful foresight-based anticipation in macroeconomics, which could be listed as the integration of multiple time horizons, from short-term forecasting to long-term scenario planning; the combination of quantitative and qualitative methods, strong linkages between foresight activities and policy implementation engagement of diverse stakeholders in the foresight process; and finally, regular updating and revision of foresight outputs.

Contextual differences in anticipatory macroeconomic practices

The implementation of anticipatory practices in macroeconomic governance is not a one-size-fits-all approach. Instead, it is deeply influenced by the institutional, cultural, and national contexts in which these practices are embedded. This section explores how anticipatory macroeconomic practices manifest differently across various settings, shedding light on the challenges and opportunities associated with adapting anticipatory strategies to diverse contexts.

Institutional variations

Institutions play a crucial role in shaping the adoption and implementation of anticipatory practices in macroeconomic governance. The structure, norms, and operational procedures of economic institutions significantly influence how future-oriented strategies are developed and executed. This influence operates through specific causal mechanisms that can be identified and analyzed across different institutional contexts.

Central banks, as key players in macroeconomic governance, exhibit varying degrees of engagement with anticipatory practices, with their institutional structures directly shaping their approach to future-oriented policymaking. The Federal Reserve in the United States provides a clear example of how institutional mandate shapes anticipatory practices. Since the 2008 financial crisis, the Fed has systematically expanded its anticipatory toolkit, incorporating extensive scenario analysis and stress testing into its decision-making processes (Bernanke 2015). This expansion was not merely coincidental but directly resulted from institutional learning and mandate expansion following the crisis. The Fed's dual mandate for price stability and maximum employment, combined with its enhanced financial stability responsibilities, created specific institutional pressures for more sophisticated anticipatory practices.

The European Central Bank's (ECB) different institutional context has led to a distinctly different approach to anticipation. The ECB's "two-pillar" strategy, combining economic and monetary analysis, reflects the institutional constraints of operating in a multi-country framework (ECB, 2021). This more structured approach is a direct response to the need for consensus-building across multiple national jurisdictions. The ECB's recent strategy review in 2021, which introduced a symmetric inflation target and increased emphasis on climate change considerations, demonstrates how institutional evolution drives changes in anticipatory practices. The causal link is evident in how the ECB's new institutional mandate regarding climate change has directly led to the development of specific new anticipatory tools for assessing climate-related risks.

The Bank of Japan's (BOJ) experience offers particularly compelling evidence of how institutional context shapes anticipatory innovation. Facing persistent deflationary pressures, the BOJ's institutional framework enabled it to pioneer "yield curve control" as an anticipatory practice for influencing long-term interest rate expectations (Kuroda 2016). The BOJ's high degree of operational independence, combined with its mandate for price stability, created the institutional conditions necessary for this innovation. The success of yield curve control demonstrates how institutional features - in this case, the BOJ's ability to make credible long-term commitments - directly enable certain types of anticipatory practices.

Government economic agencies exhibit equally significant variations in their anticipatory practices, with institutional structures clearly shaping their approach to future-oriented planning. Singapore's Committee on the Future Economy exemplifies how institutional design directly influences anticipatory capacity. By bringing together government, industry, and academic stakeholders in a formalized structure, this institution creates specific mechanisms for long-term economic planning (Committee on the Future Economy 2017). The committee's success in anticipating and preparing for economic transitions can be traced to particular institutional features, including:

- Formal mechanisms for stakeholder engagement
- Clear linkages between planning and implementation
- Institutional memory preservation systems
- Regular review and update processes

In contrast, many Western countries' reliance on more limited anticipatory practices can be traced to specific institutional constraints. The U.K.'s Office for Budget Responsibility (OBR), for example, focuses primarily on five-year economic and fiscal forecasts due to its specific institutional mandate and structure (Office for Budget Responsibility 2021). This focus on shorter time horizons is not merely a choice but a direct result of institutional design - the OBR's legislative framework and governance structure explicitly prioritize medium-term fiscal forecasting over longer-term anticipatory practices.

The recent evolution of central bank practices further illustrates the causal relationship between institutional change and anticipatory practice development. The widespread adoption of quantitative easing (QE) programs represents not just a policy shift but a fundamental institutional transformation in how monetary policy is conducted and anticipated. The Federal Reserve's move to average inflation targeting in 2020 exemplifies how institutional framework changes directly drive innovations in anticipatory practices. Similarly, the BOJ's experience with negative interest rates demonstrates how institutional adaptation enables new approaches to policy anticipation and implementation.

These examples reveal several key causal mechanisms through which institutional structures shape anticipatory practices:

1. Mandate Effects: The scope and nature of institutional mandates directly determine the types of futures that institutions attempt to anticipate.
2. Operational Constraints: Institutional operating procedures create specific pathways and limitations for anticipatory practice implementation.
3. Stakeholder Dynamics: Institutional arrangements for stakeholder engagement shape how different future scenarios are considered and evaluated.
4. Learning Mechanisms: Institutional structures for capturing and processing experience influence how anticipatory practices evolve over time.

Understanding these causal mechanisms is crucial for designing more effective anticipatory practices in macroeconomic governance. It suggests that improving anticipatory capacity requires not just technical enhancements but careful attention to institutional design and evolution.

Cultural influences

Cultural factors, including societal values, historical experiences, and collective mindsets, significantly shape the adoption and effectiveness of anticipatory practices in macroeconomic governance.

Hofstede's cultural dimensions theory, particularly the long-term orientation dimension, provides insights into how different cultures approach future planning (Hofstede 2001). Cultures with a strong long-term orientation, such as many East Asian societies, may be more receptive to anticipatory practices in economic governance. For example, China's five-year plans and Japan's emphasis on long-term industrial policy reflect this cultural predisposition towards future-oriented thinking.

In contrast, cultures with a more short-term orientation may face challenges in implementing anticipatory practices. The United States, for example, with its emphasis on quarterly corporate reporting and short electoral cycles, may find it more difficult to institutionalize long-term anticipatory practices in economic governance.

Another relevant cultural dimension is uncertainty avoidance, which refers to a society's tolerance for ambiguity and uncertainty. Cultures with high uncertainty avoidance may be more inclined to adopt anticipatory practices as a means of reducing perceived future risks. For example, Germany's Mittelstand companies are known for their long-term planning horizons and risk-averse strategies, which align with the country's high uncertainty avoidance score (Simon 2009).

Conversely, cultures with lower uncertainty avoidance may be more comfortable with adaptive, real-time decision-making rather than extensive anticipatory planning. This cultural trait might explain the prevalence of more flexible, market-driven approaches to economic governance in countries like the United Kingdom or the United States.

National context comparisons

The specific economic, political, and social circumstances of individual nations also play a crucial role in shaping anticipatory macroeconomic practices.

Countries heavily dependent on natural resources often develop unique anticipatory practices to manage the volatility associated with commodity markets. Norway's Government Pension Fund Global, commonly known as the Oil Fund, represents a sophisticated anticipatory approach to managing resource wealth (Chambers et al. 2021). By investing oil revenues for future generations, Norway demonstrates a high degree of long-term economic planning.

Similarly, Chile's copper stabilization fund shows how resource-dependent economies can use anticipatory practices to smooth out economic cycles and prepare for future challenges (Frankel 2011). These examples contrast with countries that have struggled to implement effective anticipatory practices despite resource wealth, highlighting the importance of institutional capacity and political will.

Small open economies, particularly vulnerable to external shocks, often develop distinctive anticipatory practices. Singapore's Economic Development Board, for instance, has a long history of anticipatory planning, constantly scanning the global environment for emerging trends and potential disruptions (Ghesquiere 2007). This approach has allowed Singapore to stay ahead of economic shifts and maintain its competitiveness despite limited natural resources.

Similarly, Israel's emphasis on innovation and technology as a means of economic resilience reflects an anticipatory approach tailored to its specific national context (Senor and Singer 2009). By fostering a culture of entrepreneurship and technological innovation, Israel aims to anticipate and adapt to future economic challenges.

Large, diverse economies face unique challenges in implementing cohesive anticipatory practices due to their complex internal dynamics. The United States, for example, must balance the diverse economic needs of its states with federal-level anticipatory planning. The Council of Economic Advisers plays a role in providing forward-looking economic analysis, but its influence on long-term anticipatory practices is limited by political cycles and competing priorities (Feldstein 1997).

India, another large and diverse economy, has attempted to implement anticipatory practices through its Planning Commission (now NITI Aayog). However, the effectiveness of these efforts has been constrained by the country's federal structure and diverse regional interests (Ahluwalia 2019).

Challenges and opportunities

The contextual differences in anticipatory macroeconomic practices present both challenges and opportunities for policymakers and researchers. On the challenge side, institutional inertia poses a significant hurdle, as existing structures and practices in well-established economic governance systems may resist the adoption of new anticipatory approaches. Cultural barriers also play a role, with factors such as short-term orientation or low uncertainty avoidance potentially hindering the

acceptance and implementation of anticipatory practices. Political constraints further complicate matters, as short-term political cycles and the demand for immediate results can undermine long-term anticipatory planning efforts. Additionally, the inherent complexity of modern economies and the high degree of global interconnectedness make accurate long-term anticipation increasingly challenging.

However, these contextual differences also offer several opportunities. The variety of anticipatory practices across different contexts provides a rich source of learning and potential for cross-pollination of ideas. This diversity allows for the development of tailored solutions, as recognition of contextual differences enables the creation of anticipatory practices better suited to specific institutional, cultural, and national contexts. By understanding and addressing these contextual factors, economies can develop more robust and adaptable anticipatory practices, potentially enhancing their resilience to future shocks. Furthermore, the need to adapt anticipatory practices to different contexts can drive innovation in economic governance, leading to new tools and approaches for managing complex economic systems. This innovation potential represents a significant opportunity for improving the effectiveness and relevance of anticipatory macroeconomic practices across diverse global contexts.

The effectiveness of anticipatory practices in macroeconomic governance is deeply influenced by institutional, cultural, and national contexts. Recognizing and understanding these contextual differences is crucial for developing and implementing successful anticipatory strategies. As the global economic landscape continues to evolve, the ability to adapt and tailor anticipatory practices to specific contexts will become increasingly important for ensuring economic resilience and sustainability.

Limitations and level of support

The examples and cases presented in this section allow us to draw several well-supported conclusions about institutional variations in anticipatory practices, particularly regarding central bank behavior and formal governance structures. The documented experiences of the Federal Reserve, ECB, and Bank of Japan provide strong evidence for the influence of institutional mandates on anticipatory practice development. However, our conclusions about cultural influences, while theoretically grounded in Hofstede's framework, remain more suggestive than definitive. The proposed relationships between cultural dimensions and anticipatory practices require systematic empirical validation.

The analysis of national context differences presents an intermediate level of evidential support. While specific cases like Singapore's Committee on the Future Economy and Norway's Government Pension Fund Global demonstrate clear examples of context-specific anticipatory practices, broader generalizations about how national contexts shape these practices remain speculative. Future research would benefit from more systematic cross-national comparisons to validate these preliminary observations.

Interconnections in macroeconomic spheres

The implementation of anticipatory practices in macroeconomic governance does not occur in isolation. Instead, it involves complex interactions between various economic spheres at different levels. This section examines the role of anticipatory practices in facilitating or constraining the links between macroeconomic policies, innovation strategies, and societal expectations. It also identifies factors that can enhance the interconnectedness, fostering a more holistic approach to macroeconomic governance.

Micro-level interconnections and performativity

At the micro level, anticipatory practices influence individual economic actors, including households and firms, while simultaneously being shaped by these actors' responses. This recursive relationship exemplifies what scholars in the social studies of finance term the "performative" nature of economic practices – where anticipatory practices don't simply predict futures but actively participate in creating them.

Central bank communication provides a clear example of this dynamic interplay. When central banks engage in forward guidance about future interest rates and inflation, they not only attempt to predict future conditions but actively shape household expectations and behaviors. As Holmes (2014) demonstrates through extensive ethnographic research, central banks must carefully manage these communications, recognizing that their anticipatory statements will influence the very economic conditions they are attempting to forecast. For instance, when the Federal Reserve signals future interest rate changes, this shapes household consumption and savings decisions, creating feedback loops that affect overall economic performance.

The performative aspects of anticipatory practices are particularly evident in financial markets. MacKenzie's (2006) seminal work shows how financial models and forecasting tools don't simply describe market behavior but actively influence it. Similarly, Beunza and Stark's (2012) research reveals how shared anticipatory frameworks among market participants can create systemic risks by promoting homogeneous behavior. In macroeconomic contexts, this suggests that widely adopted

anticipatory practices might inadvertently increase system-wide vulnerabilities by encouraging uniform responses to perceived future risks.

At the firm level, anticipatory practices play a crucial role in shaping investment and innovation decisions. However, these decisions are not made in isolation but are influenced by what Beckert (2016) terms "fictional expectations" – collectively shared images of future states of the world. For example, anticipatory climate policies, such as carbon pricing schemes or renewable energy targets, shape firm-level investment decisions by creating shared expectations about future market conditions. This demonstrates what Callon (2007) describes as the "economization" process, where anticipatory practices help constitute what counts as economic behavior.

The effectiveness of such anticipatory practices depends heavily on their credibility and clarity. Blinder et al. (2008) show that central bank communication must be carefully calibrated to avoid confusion or unintended consequences. This calibration requires understanding both the technical aspects of economic forecasting and the social dynamics of expectation formation. As Esposito (2013) argues, anticipatory practices in economics must navigate the paradox of "transcendent simultaneity" – where the future being predicted is itself dependent on current predictions.

Several specific examples illustrate these micro-level dynamics:

> Inflation Expectations Management: When the European Central Bank communicates its inflation targets, this shapes price-setting behaviors and wage negotiations throughout the economy. The success of inflation targeting depends not just on the technical accuracy of forecasts but on the central bank's ability to coordinate expectations across diverse economic actors.
>
> Stress Testing Practices: Banking sector stress tests influence bank behavior not only through their formal regulatory requirements but by shaping how banks anticipate and prepare for potential futures. The Bank of England's stress testing framework has led banks to preemptively adjust their capital structures and risk management practices, demonstrating how anticipatory practices can prompt preventive actions that alter the likelihood of different future scenarios.
>
> Investment Decision-Making: Firm-level investment decisions are shaped by multiple layers of anticipatory practices, from internal forecasting models to external policy signals. These practices create what MacKenzie terms "Barnesian performativity" – where the use of predictive models makes their predictions more likely to become true through the behavioral changes they induce.

Understanding these micro-level dynamics and their performative aspects has important implications for macroeconomic governance. It suggests that policymakers need to consider not just the predictive accuracy of their anticipatory practices but also:

1. The potential feedback loops created by their communications and actions.
2. The diversity (or lack thereof) in anticipatory frameworks across the economic system.
3. The institutional and cultural contexts that modify how anticipatory practices are interpreted and acted upon.
4. The ethical implications of using practices that actively shape economic futures.

This understanding of micro-level interconnections and performativity provides a foundation for examining how anticipatory practices operate at broader meso and macro levels, while recognizing that these higher-level dynamics are ultimately grounded in the behaviors and expectations of individual economic actors.

Meso-level interconnections

At the meso level, anticipatory practices influence interactions between different economic sectors, industries, and regional economies. These practices can shape the evolution of economic structures and the distribution of economic activity across sectors and regions.

Anticipatory practices in macroeconomic governance can play a crucial role in facilitating or hindering sectoral transformations. For instance, anticipatory industrial policies that identify and support emerging sectors can accelerate structural change in the economy (Rodrik 2014). The success of such policies often depends on their ability to anticipate future technological trends and market demands.

South Korea's anticipatory approach to industrial policy in the 1960s and 1970s, which identified and supported key industries like electronics and shipbuilding, exemplifies how forward-looking governance can shape sectoral development (Chang 2006). However, the risks of misallocation and government failure in picking winners highlight the challenges of implementing such anticipatory practices effectively.

Anticipatory practices also influence the spatial distribution of economic activity. Regional development policies that anticipate future economic trends can help address regional disparities and promote balanced growth. For example, the European Union's Smart

Specialisation Strategy encourages regions to identify and develop their unique strengths based on anticipated future opportunities (Foray 2015).

However, the effectiveness of such anticipatory approaches depends on the accuracy of long-term projections and the flexibility to adapt to changing circumstances. The decline of many industrial regions in developed countries, despite various anticipatory policies, underscores the challenges of managing long-term structural changes at the regional level.

Macro-level interconnections

At the macro level, anticipatory practices shape the overall direction of the economy, influencing interactions between different macroeconomic variables and policy domains.

Anticipatory practices play a crucial role in coordinating monetary and fiscal policies. Forward-looking approaches that anticipate the interactions between these policy domains can enhance overall macroeconomic stability. For instance, the use of dynamic stochastic general equilibrium (DSGE) models by central banks and finance ministries represents an attempt to anticipate the complex interactions between different macroeconomic variables and policy interventions (Christiano et al. 2018).

However, the 2008 financial crisis revealed the limitations of many existing anticipatory models in capturing systemic risks and complex economic dynamics. This has led to calls for more diverse and adaptive approaches to macroeconomic modeling and policymaking (Stiglitz 2018).

In an increasingly interconnected global economy, anticipatory practices also play a vital role in international economic coordination. Institutions like the G20 and the Financial Stability Board engage in anticipatory practices to identify and address potential global economic risks (Helleiner 2014).

The development of macroprudential policies in the wake of the global financial crisis represents an anticipatory approach to managing systemic risks in the global financial system (Agénor & Pereira da Silva, 2019). However, the effectiveness of these practices depends on the willingness of nations to cooperate and the ability to anticipate complex global economic dynamics.

Factors enhancing interconnectedness

Several factors can enhance the interconnectedness of anticipatory practices across different economic spheres, fostering a more holistic approach to macroeconomic governance:

> Improved information sharing and transparency can enhance the effectiveness of anticipatory practices across different economic spheres. For instance, the Bank for International Settlements' efforts to improve global financial statistics have enhanced the ability of policymakers to anticipate and respond to potential financial instabilities (Borio 2013).
>
> Better coordination between different economic institutions can improve the coherence and effectiveness of anticipatory practices. The creation of financial stability councils in many countries after the global financial crisis represents an attempt to enhance coordination between different regulatory bodies and improve the anticipation of systemic risks (Lombardi and Moschella 2017).
>
> Engaging a wider range of stakeholders in anticipatory practices can help capture diverse perspectives and improve the accuracy of future projections. For example, the European Commission's foresight network brings together policymakers, academics, and industry representatives to anticipate future challenges and opportunities (European Commission 2020).
>
> Developing more adaptive governance frameworks can enhance the ability to respond to emerging trends and unexpected shocks. Concepts like adaptive governance (Chaffin et al. 2014) and anticipatory governance (Guston 2014) offer potential pathways for creating more flexible and responsive economic institutions.

Analytical assessment of anticipatory practice implementation

The implementation of anticipatory practices in macroeconomic governance varies significantly in both approach and effectiveness across different institutions and contexts. This section provides a detailed analysis of how key economic actors utilize anticipatory practices, examining both successes and limitations.

The Bank of Japan's (BOJ) implementation of yield curve control (YCC) in 2016 represents a sophisticated application of anticipatory practices in monetary policy. The BOJ's approach combined traditional forecasting with scenario analysis to anticipate the potential effects of controlling long-term interest rates. Analysis of market data shows that the policy successfully stabilized long-term yields while reducing bond market volatility (Kuroda 2019). However, the BOJ's experience also reveals several significant challenges in anticipatory practice implementation. The bank faced initial market skepticism that required the development of strong communication strategies to overcome. As global financial conditions evolved, the policy needed continuous adjustments, highlighting the difficulty of maintaining flexible

anticipatory frameworks. Furthermore, the BOJ struggled to fully anticipate spillover effects on market functioning, demonstrating the challenges of implementing novel policy approaches in complex financial markets.

Norway's Government Pension Fund Global (GPFG) demonstrates how anticipatory practices can inform long-term investment strategies. The fund employs a comprehensive approach that combines long-term scenario planning for climate change impacts with regular horizon scanning for emerging risks and opportunities. This is further enhanced by the systematic integration of environmental, social, and governance factors in investment decisions. Analysis of the GPFG's performance shows that its anticipatory practices have contributed to above-average returns while managing long-term risks effectively (Chambers et al. 2021). The fund's success can be attributed to several key factors. First, it maintains a clear separation between short-term and long-term decision-making processes, allowing for focused attention on different time horizons. Second, it systematically integrates diverse data sources to build a comprehensive view of potential futures. Third, the fund regularly reviews and adjusts its anticipatory frameworks to ensure continued relevance and effectiveness.

The European Central Bank's forward guidance provides valuable insights into both the potential and limitations of communication-based anticipatory practices. Analysis of market reactions to ECB guidance between 2013-2023 reveals varying effectiveness across different market conditions. The impact has been notably stronger when guidance is tied to specific economic conditions, but maintaining policy credibility during periods of high uncertainty has proved challenging. Research indicates that the ECB's forward guidance has been most effective when communication is clear and specific, policy commitments are credible, and economic conditions align with guidance parameters. These findings underscore the importance of carefully calibrating anticipatory communications to market conditions and policy objectives.

The COVID-19 crisis provided a natural experiment in how different central banks employ anticipatory practices under extreme uncertainty. The Federal Reserve demonstrated remarkable agility in rapidly deploying scenario-based planning while regularly updating economic projections and integrating high-frequency data in decision-making. The European Central Bank responded by developing pandemic-specific scenarios and enhancing its risk monitoring frameworks, while also adapting existing anticipatory tools to the unique circumstances of the crisis. The Bank of England showed particular innovation in its response, developing new approaches to data collection and analysis, implementing novel stress testing methodologies, and integrating public health scenarios into its economic planning framework. These varied responses highlight both the flexibility and limitations of existing anticipatory frameworks when confronted with unprecedented challenges.

Challenges and opportunities

The interconnections between different economic spheres present both challenges and opportunities for anticipatory macroeconomic governance. On the challenge front, the complexity arising from the complex web of connections between different economic spheres makes it difficult to anticipate the full consequences of policy interventions. This complexity is further compounded by the presence of conflicting objectives across different economic spheres, which can hinder the implementation of coherent anticipatory practices. Additionally, the varying time horizons on which different economic spheres operate complicate efforts to align long-term anticipatory practices with short-term economic needs.

Despite these challenges, the interconnections also offer significant opportunities. Recognizing these interconnections can lead to more holistic and effective anticipatory policymaking, enabling a more comprehensive approach to economic governance. Furthermore, anticipatory practices in one sphere can stimulate innovation and adaptation in others, potentially leading to positive feedback loops that enhance overall economic resilience and adaptability. Perhaps most importantly, a better understanding of these interconnections can help build more resilient economic systems capable of adapting to future shocks. By leveraging these opportunities, policymakers and researchers can develop more robust and effective anticipatory practices that account for the complex, interconnected nature of modern economies.

The interconnections between different economic spheres play a crucial role in shaping the effectiveness of anticipatory practices in macroeconomic governance. By recognizing and leveraging these interconnections, policymakers can develop more holistic, adaptive, and resilient approaches to managing complex economic systems in an uncertain future.

Our analysis of micro-level interconnections draws strong empirical support from documented cases of central bank communication and market responses, particularly regarding the performative aspects of anticipatory practices. The work of Holmes (2014) and MacKenzie (2006) provides robust evidence for these dynamics. However, our understanding of meso-level interconnections remains more tentative. While cases like South Korea's industrial policy provide suggestive evidence, the precise mechanisms through which anticipatory

practices influence sectoral development require further investigation.

At the macro level, while we can confidently describe the formal structures of policy coordination, our conclusions about the effectiveness of these arrangements in enhancing anticipatory capabilities remain preliminary. The interaction effects between different levels of economic governance represent an area where current evidence allows only speculative conclusions.

Institutionalization and temporal dynamics

The effectiveness of anticipatory practices in macroeconomic governance largely depends on their degree of institutionalization and how they evolve over time. This section examines the processes by which anticipatory practices become embedded in regulatory and governance frameworks, and explores the temporal dynamics that shape their impact on economic decision-making and policy formulation.

Institutionalization of anticipatory practices

The institutionalization of anticipatory practices involves their formal integration into the structures, processes, and norms of economic governance institutions. This process is crucial for ensuring the sustained and systematic application of future-oriented approaches in macroeconomic decision-making.

The incorporation of anticipatory practices into regulatory frameworks represents a key aspect of institutionalization. For instance, the Basel III accord, developed in response to the 2008 financial crisis, includes forward-looking elements such as countercyclical capital buffers and stress testing requirements (Basel Committee on Banking Supervision 2017). These measures institutionalize anticipatory thinking in financial regulation, aiming to enhance the resilience of the banking sector to future shocks.

Similarly, the introduction of climate-related financial disclosures, as recommended by the Task Force on Climate-related Financial Disclosures (TCFD), represents an emerging form of institutionalized anticipatory practice in corporate governance and financial reporting (TCFD, 2017). By requiring companies to consider and disclose potential future climate-related risks, these frameworks embed long-term thinking into corporate decision-making processes.

The creation of dedicated governance structures for anticipatory practices is another crucial aspect of institutionalization. For example, the establishment of the UK's National Infrastructure Commission in 2015 represents an attempt to institutionalize long-term planning for critical infrastructure (National Infrastructure Commission 2021). By providing independent, expert advice on long-term infrastructure needs, this body aims to inject anticipatory thinking into policy decisions that have significant long-term economic implications.

In the realm of monetary policy, the adoption of inflation targeting frameworks by many central banks since the 1990s has institutionalized a forward-looking approach to price stability (Bernanke and Mishkin 1997). These frameworks typically involve regular forecasting exercises and the communication of future policy intentions, embedding anticipatory practices into the core of monetary policy decision-making.

Beyond formal structures and regulations, the institutionalization of anticipatory practices also involves their integration into organizational cultures. This can be challenging, as it often requires shifting deeply ingrained mindsets and routines. Successful institutionalization often depends on leadership commitment, staff training, and the development of appropriate incentive structures.

For instance, the Bank of England's "One Bank Research" initiative, which aims to integrate insights from diverse disciplines into policy-making, represents an attempt to foster a more forward-looking and holistic organizational culture (Bank of England 2015). Such initiatives can help embed anticipatory thinking into the day-to-day operations of economic governance institutions.

Temporal dynamics of anticipatory practices

The impact and effectiveness of anticipatory practices in macroeconomic governance are not static but evolve through distinct temporal phases, influenced by gradual advancements and sudden transformations. Figure 2 illustrates the hypothesized temporal dynamics of these practices, highlighting the interplay between technological evolution, policy frameworks, and crisis response capabilities. The evolution of anticipatory practices is marked by identifiable developmental phases in methods and tools. In the late 20th and early 21st centuries, dynamic stochastic general equilibrium (DSGE) models emerged as a major step forward in modeling and anticipating complex economic dynamics (Christiano et al. 2018). These advancements were later complemented by the integration of machine learning techniques and big data analytics, representing a significant frontier in the accuracy and granularity of economic forecasting (Mullainathan and Spiess 2017). However, these technological advances also introduced challenges, such as interpretability and potential biases, requiring ongoing adaptation by institutions.

Figure 2 highlights that crisis periods often introduce discontinuities in the temporal trajectory of anticipatory practices. For instance, while the 2008 global financial crisis spurred the rapid development of new anticipatory tools—including macroprudential stress tests and

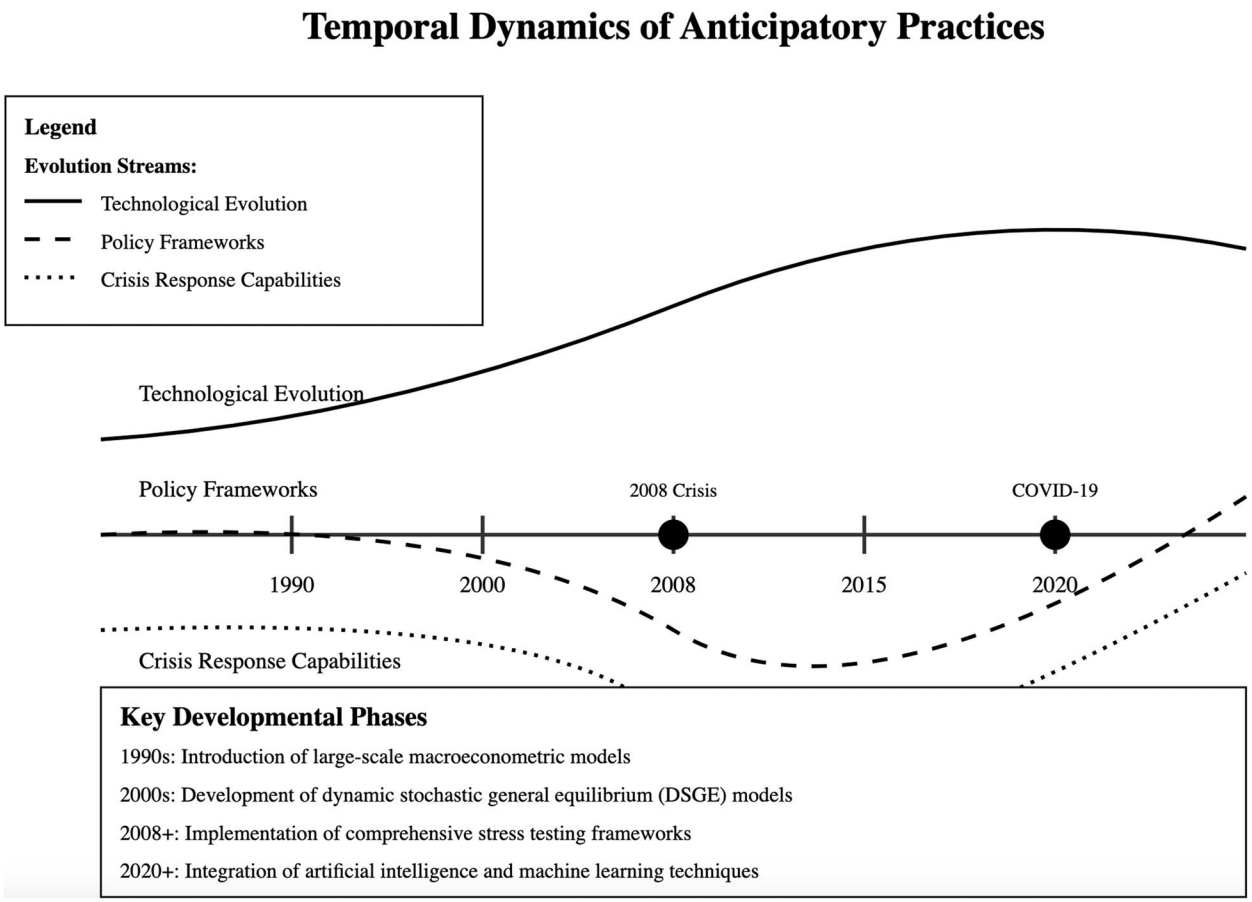

Fig. 2 Temporal dynamics of anticipatory practices

early warning systems for systemic risks (Aikman et al. 2019)—the figure reflects a temporary lag in the operationalization and institutional embedding of these tools. This dip in "Policy Frameworks" and "Crisis Response Capabilities" represents the initial difficulty in adapting to the crisis's scale and complexity. Similarly, the COVID-19 pandemic accelerated the development of scenario planning and resilience stress testing for non-financial shocks (Shiller 2020), but these frameworks required time to become fully institutionalized. Such delays are indicative of the learning processes that characterize anticipatory practice evolution during and after crises.

The temporal evolution of these practices is also deeply shaped by shifts in economic policy paradigms. For example, the transition from Keynesian to monetarist approaches in the 1970s and 1980s fundamentally altered how inflation and macroeconomic stability were anticipated and managed (Hall 1993). More recently, the limitations of inflation targeting exposed by the 2008 crisis led to a renewed focus on financial stability concerns within monetary policy frameworks (Borio 2014). This represents another distinct phase in the evolution of anticipatory practices, as policy priorities shifted to address systemic risks more comprehensively. Technological and social transformations have further influenced the temporal trajectory of anticipatory practices. The digital transformation of the global economy, for example, has introduced both challenges and opportunities for economic governance. Cryptocurrencies and decentralized finance have prompted central banks to adopt forward-looking strategies, such as central bank digital currency initiatives (Auer et al. 2020). Meanwhile, the growing urgency of climate change has led to the integration of climate scenarios into stress tests, marking a new phase in anticipatory practices (NGFS, 2020).

The post-2008 period is particularly notable for the emergence of unconventional policies and enhanced anticipatory frameworks. Forward guidance has become a key tool for shaping expectations, with central banks refining their communication strategies to manage market responses and economic outlooks (Bernanke 2020). Macroprudential policies have also advanced to better anticipate systemic risks, while balance sheet policies have evolved to address multiple market segments

simultaneously. These developments underscore the role of institutional learning in driving progress. Each implementation cycle of stress tests, for example, has led to refined methodologies and more sophisticated capabilities.

In summary, while Fig. 2 depicts temporary dips in policy frameworks and crisis response capabilities during major crises, these dips reflect transitional phases where rapid technological and policy innovations face initial delays in institutional adoption. Over time, these innovations result in more robust and integrated anticipatory practices, driven by ongoing technological advances and adaptive policy learning.

The institutionalization patterns we identify are well-documented in specific cases, particularly regarding regulatory frameworks like Basel III and climate-related financial disclosures. However, our understanding of how institutional learning processes shape the evolution of anticipatory practices remains largely theoretical. While Fig. 2 presents a conceptual model of temporal dynamics, the specific mechanisms driving transitions between different phases require empirical validation.

The paper's conclusions about crisis-driven institutional change are supported by historical evidence, but our ability to predict how future crises might reshape anticipatory practices remains limited. This represents an area where our framework suggests possibilities rather than definitive conclusions.

Cultures of anticipation in macroeconomics

The effectiveness of anticipatory practices in macroeconomic governance is not solely determined by institutional structures or methodological approaches. It is also profoundly influenced by the underlying cultures of anticipation that shape how economic actors perceive, interpret, and respond to future possibilities. This section explores the diverse cultures of anticipation within macroeconomics, analyzing how these cultures influence decision-making processes and whose voices are (in)visible in anticipatory practices.

Defining cultures of anticipation

Cultures of anticipation in macroeconomics refer to the shared beliefs, values, and practices that shape how economic actors engage with the future. These cultures encompass not only formal analytical approaches but also informal norms, narratives, and cognitive frameworks that guide future-oriented thinking and action.

One dominant culture of anticipation in macroeconomics is the technocratic approach, which emphasizes quantitative modeling, data-driven forecasting, and expert analysis. This culture is particularly prevalent in central banks and international financial institutions. It values precision, objectivity, and scientific rigor in anticipatory practices.

For example, the Federal Reserve's use of complex econometric models to guide monetary policy decisions exemplifies this technocratic culture (Bernanke 2015). While this approach has strengths in terms of analytical rigor, it can sometimes lead to overconfidence in quantitative predictions and a neglect of qualitative or contextual factors.

In contrast to the technocratic culture, the political-economic culture of anticipation emphasizes the role of power dynamics, interests, and ideologies in shaping economic futures. This culture is often more prevalent in legislative bodies, think tanks, and advocacy organizations.

The political-economic culture recognizes that anticipatory practices are not value-neutral but are inherently shaped by political considerations and societal power structures. For instance, debates over long-term fiscal projections often reflect competing political visions of the future role of government in the economy (Streeck and Mertens 2013).

An emerging culture of anticipation in macroeconomics is the adaptive approach, which emphasizes flexibility, learning, and resilience in the face of uncertainty. This culture acknowledges the limitations of precise forecasting and instead focuses on building adaptive capacity to respond to a range of possible futures.

The Bank of England's adoption of "robust decision making" techniques, which involve testing policy decisions against a wide range of scenarios, reflects elements of this adaptive culture (Haldane and Turrell 2018). This approach recognizes the inherent unpredictability of complex economic systems and seeks to develop strategies that perform well across multiple possible futures.

Influence on decision-making processes

The prevailing cultures of anticipation significantly influence how economic decision-makers perceive and respond to future possibilities.

Different cultures of anticipation frame future economic challenges in distinct ways. The technocratic culture tends to frame challenges in terms of quantifiable risks that can be modeled and managed. In contrast, the political-economic culture may frame future challenges in terms of structural inequalities or power imbalances that require political solutions.

For example, approaches to addressing future climate-related economic risks differ significantly depending on the dominant culture of anticipation. A technocratic approach might focus on quantifying the economic costs of climate change and developing optimal carbon pricing mechanisms. A political-economic approach, on the other hand, might emphasize the need for a "just

transition" that addresses both environmental and social equity concerns (Newell and Mulvaney 2013).

Cultures of anticipation also influence the time horizons considered in economic decision-making. The technocratic culture often focuses on medium-term forecasts (typically 1-5 years), reflecting the limitations of quantitative modeling over longer time horizons. The political-economic culture may alternate between short-term considerations (driven by electoral cycles) and very long-term visions.

The adaptive culture, recognizing the limitations of precise long-term forecasting, often emphasizes building resilience and adaptability over multiple time scales. This approach is reflected in the growing interest in "dynamic adaptive policy pathways" in areas like climate change adaptation (Haasnoot et al. 2013).

Different cultures of anticipation also vary in their approaches to uncertainty. The technocratic culture often seeks to quantify uncertainty through probabilistic forecasts and confidence intervals. The political-economic culture may use uncertainty strategically, emphasizing certain future scenarios to support particular policy positions.

The adaptive culture, in contrast, embraces uncertainty as a fundamental feature of complex systems. This approach focuses on developing robust strategies that can perform well under a wide range of future conditions, rather than trying to predict a single most likely future (Lempert et al., 2003).

(In)visible voices in anticipatory practices

The cultures of anticipation in macroeconomics also shape whose voices and perspectives are included or excluded in anticipatory practices.

The technocratic culture of anticipation often privileges the voices of economic experts, particularly those with advanced quantitative skills. While this ensures a high level of technical expertise, it can lead to a narrow range of perspectives and potential blind spots.

For example, the dominance of neoclassical economic thinking in many policy institutions has been criticized for excluding alternative economic perspectives that might offer valuable insights into future challenges (Earle et al. 2016).

The political-economic and adaptive cultures of anticipation often emphasize the importance of including a wider range of stakeholder voices in anticipatory practices. This can involve participatory foresight exercises, citizen panels, or multi-stakeholder scenario planning processes.

For instance, the European Commission's foresight network aims to incorporate diverse perspectives from across society in anticipating future challenges and opportunities (European Commission 2020). However, ensuring genuine inclusion and influence of marginalized voices remains a significant challenge.

Many anticipatory practices in global macroeconomic governance have been criticized for marginalizing perspectives from the Global South. This can lead to blind spots in anticipating future global economic dynamics and perpetuate existing power imbalances.

Efforts to address this issue include initiatives like the T20 (Think20), which aims to bring diverse global perspectives into G20 policy discussions. However, meaningful inclusion of Global South voices in shaping anticipatory practices remains an ongoing challenge (Luckhurst 2019).

Towards more inclusive and reflexive anticipatory cultures

Recognizing the limitations and biases inherent in existing cultures of anticipation, there is growing interest in developing more inclusive and reflexive approaches to anticipatory practices in macroeconomics.

One promising direction is the development of transdisciplinary approaches that bring together insights from economics, complexity science, sociology, and other fields. This can help broaden the range of perspectives and methodologies used in anticipatory practices (Bai et al. 2016).

Another important trend is the move towards more reflexive forms of governance that explicitly acknowledge the role of anticipatory practices in shaping, not just predicting, economic futures. This involves greater attention to the performative effects of economic forecasts and the need for ongoing learning and adaptation (Voß and Kemp 2006).

Finally, there are growing efforts to democratize anticipatory practices in macroeconomics, making them more accessible and inclusive. This includes initiatives to enhance economic and financial literacy, as well as experiments with participatory budgeting and citizen assemblies on economic issues (Pateman 2012).

In conclusion, understanding and shaping the cultures of anticipation in macroeconomics is crucial for developing more effective, equitable, and resilient approaches to economic governance. By fostering more inclusive, reflexive, and adaptive anticipatory cultures, we can enhance our collective capacity to navigate the complex and uncertain economic futures that lie ahead. Our characterization of different cultures of anticipation (technocratic, political-economic, and adaptive) is supported by documented institutional practices and policy approaches. However, the causal relationships between these cultural orientations and the effectiveness of anticipatory practices remain largely speculative. While we can confidently describe how different cultures frame future

challenges, our understanding of how these framings influence actual outcomes requires systematic empirical investigation.

The analysis of invisible voices in anticipatory practices is well-grounded in documented patterns of exclusion, but our proposals for more inclusive approaches remain tentative and require practical validation.

Conclusion

This conceptual exploration of anticipatory macroeconomic governance has revealed several key theoretical dimensions and research opportunities that warrant further investigation. Our analysis suggests that anticipatory practices in economic governance are shaped by complex interactions between institutional structures, cultural factors, and temporal dynamics, each offering distinct pathways for future research.

The conceptual framework developed in this paper makes several important contributions to our understanding of anticipatory practices in macroeconomic governance. First, it highlights the crucial role of institutional context in shaping how anticipatory practices are implemented and evolved. The cases of central banks, sovereign wealth funds, and other economic institutions demonstrate that anticipatory practices cannot be understood in isolation from their institutional settings. This suggests a rich agenda for future research examining how specific institutional features enable or constrain different types of anticipatory practices.

Our analysis also reveals the performative nature of anticipatory practices in economic governance. These practices don't simply predict the future but actively participate in shaping it through complex feedback loops between expectations and outcomes. Future research could productively explore these performative effects in greater detail, particularly examining how different institutional and cultural contexts modify their operation. The framework further emphasizes the temporal dynamics of anticipatory practices, showing how they evolve through both gradual learning processes and sudden transformations in response to crises. This temporal dimension raises important questions about how institutions learn from experience in implementing anticipatory practices, what factors determine their effectiveness across time, and how crisis events reshape anticipatory frameworks and capabilities.

Our conceptual framework suggests the need for diverse methodological approaches in studying anticipatory practices. Future research would benefit from combining qualitative case studies that can capture the ways in which institutional and cultural contexts shape anticipatory practices, quantitative analyses of the effectiveness of different anticipatory approaches across various contexts, comparative studies examining how similar anticipatory practices operate in different institutional settings, and longitudinal studies tracking the evolution of anticipatory practices over time.

The framework developed here has significant implications for policy design and implementation. It suggests that effective anticipatory governance requires careful attention to institutional design, cultural factors, and power dynamics. Future research should examine how to design institutions that can effectively develop and maintain anticipatory capabilities while remaining adaptable to changing circumstances. More investigation is needed into how different cultural contexts influence the effectiveness of anticipatory practices and how these practices can be adapted to diverse cultural settings. Additionally, future work should address questions of inclusion and exclusion in anticipatory practices, examining how to ensure diverse voices are meaningfully incorporated into economic governance.

Several emerging areas warrant particular attention in future research. The challenge of climate change and sustainability raises questions about how anticipatory practices can be adapted to address long-term environmental challenges while maintaining economic stability. Digital transformation creates new possibilities for anticipatory capabilities through advances in data analytics and artificial intelligence, while raising questions about their effective integration into existing governance frameworks. Increasing global economic integration requires evolution in anticipatory practices to address increasingly complex global economic interconnections.

As the global economy continues to face unprecedented challenges, from climate change to technological disruption, the importance of effective anticipatory practices in macroeconomic governance will only grow. The conceptual framework developed in this paper provides a foundation for understanding these practices, but much work remains to be done in testing and refining these ideas through empirical research. The future research agenda suggested here is necessarily ambitious, reflecting the complexity and importance of anticipatory practices in economic governance. Success in this endeavor will require collaboration across disciplines and between researchers and practitioners, as well as sustained attention to questions of power, inclusion, and responsibility in economic governance.

The evolution of anticipatory practices in macroeconomic governance represents not just a technical challenge but a fundamental aspect of how societies prepare for and shape their economic futures. As such, continued research in this field has implications not only for economic policy but for broader questions of democratic governance and social justice in an increasingly uncertain

world. The path forward requires both theoretical sophistication and practical wisdom, combining rigorous analysis with attention to the diverse needs and perspectives of different stakeholders in the global economic system.

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