



RESEARCH

Economic Resilience, Resource Diversification, and Sustainable Development: An Integrative Review and Conceptual Framework



Rio Razab Isdendi

*Correspondence:

Rio Razab Isdendi, Institut Citra
Buana Indonesia, Email:
riorazabisdendi@gmail.com

Received: 13-08-2026

Accepted: 08-09-2026

Abstract

Recurrent shocks, including financial crises, pandemics, energy price spikes, supply chain disruptions, and intensifying climate hazards, have made the capacity of national economies to absorb, adapt to, and transform after disruptions a central condition for sustainable development. Yet the macroeconomic, climate-economics, structural-diversification, and institutional literatures on resilience have evolved largely in isolation, leaving the joint mechanisms through which resilience shapes long-run development insufficiently theorized. This article integrates these streams into a coherent explanatory framework. Methodologically, it combines an integrative literature review with a theory-synthesis approach to conceptual development, drawing on peer-reviewed cross-country, national, and regional evidence and on major institutional reports, with emphasis on studies published between 2019 and 2026. The synthesis indicates that absorptive capacity, grounded in policy space, external buffers, and sound financial conditions, limits immediate output losses, whereas adaptive and transformative capacities determine whether shocks leave persistent scars; that climate vulnerability raises sovereign and corporate financing costs and narrows fiscal space; that export and productive diversification dampens many, but not all, types of shocks; and that institutional quality conditions all of these relationships. The article advances a framework linking shocks, transmission channels, three resilience capacities, and sustainable development outcomes, moderated by resource diversification and institutional quality, and derives six testable propositions together with a methodological agenda for heterogeneous and cross-sectionally dependent panels. It concludes with macroeconomic policy implications for emerging economies such as Indonesia.

Keywords: Climate resilience; Economic resilience; Institutional quality; Resource diversification; Sustainable development

INTRODUCTION

The global economy has entered an era of compound and recurrent shocks. The global financial crisis, the COVID-19 pandemic, the energy price surge that followed the war in Ukraine, repeated disruptions to global supply chains, and increasingly frequent climate-related disasters have revealed large and persistent cross-country differences in how economies withstand and recover from adverse events (Baldwin & Freeman, 2022; Eichengreen et al., 2024; G7 Panel on Economic Resilience, 2021). These differences matter for sustainable development because the output losses that follow severe shocks are often permanent rather than transitory: recessions and crises can leave lasting scars on capital accumulation, productivity, and employment (Cerra et al., 2023; Cerra & Saxena, 2008). Development strategies that pursue aggregate growth while neglecting the capacity to absorb and recover from shocks therefore risk eroding the very gains they seek to sustain (Hallegatte, 2014; World Trade Organization [WTO], 2021).

Economic resilience has accordingly moved to the center of policy debate, yet its conceptual and empirical foundations remain fragmented. Building on its ecological origins (Holling, 1973; Walker et al., 2004), economists have defined resilience as the ability to limit losses when a shock occurs, the speed of recovery, or the capacity to reorganize toward new growth paths (Hallegatte, 2014; Martin & Sunley, 2015; Rose, 2004). Measurement approaches range from composite indices that separate inherent vulnerability from policy-induced resilience (Briguglio, 2016; Briguglio et al., 2009) to multidimensional resilience indices (Hafele et al., 2023; Tsiotas & Katsaiti, 2025), quantile-based analyses of income dynamics (Chavas, 2024), and formal tests of whether economies return to their pre-crisis growth paths (Hara & Yamamoto, 2026). A recent systematic review concludes that the concept is still used heterogeneously across economic theory and policy (Capoani et al., 2025), and a similar absence of a coherent paradigm has been documented in development studies (Park, 2024).

Four largely separate literatures have produced relevant but partial insights. Macroeconomic research identifies fiscal and monetary policy space, external buffers, and exchange-rate flexibility as determinants of the depth of downturns and the strength of recoveries (Bergant & Forbes, 2023; Eichengreen et al., 2024; Romer & Romer, 2018). Climate economics documents that rising temperatures and climate vulnerability depress growth and raise financing costs, especially in poorer economies (Burke et al., 2015; Dell et al., 2012; Kahn et al., 2021; Kling et al., 2021). Trade and development economics shows that export diversification and economic complexity shape both macroeconomic volatility and long-run development (Haddad et al., 2013; Hidalgo & Hausmann, 2009; Koren & Tenreyro, 2007), while the resource-curse literature stresses that dependence on natural resources becomes a liability where institutions are weak (Mehlum et al., 2006; van der Ploeg, 2011). Institutional economics, finally, argues that the quality of institutions governs how societies manage external shocks and the distributional conflicts they trigger (Acemoglu et al., 2003; North, 1990; Rodrik, 1999).

Recent cross-country research has begun to link resilience directly to sustainable development. Using panel-corrected standard errors, feasible generalized least squares, panel quantile regression, and local projections for 31 countries over 2007–2021, Hasan et al. (2025) report that economic and climate resilience both have significant and persistent effects on sustainable development and that these effects hold across stages of development. Such studies provide an important baseline, but they typically treat resilience indices as aggregate regressors and leave unexamined the structural

conditions, notably the diversification of the productive and export base and the quality of institutions, that determine whether resilience translates into durable development gains. Sectoral evidence points in the same direction: vector autoregression simulations for Austria indicate that high-carbon-intensity industries suffer markedly larger losses in real gross value added and employment than low-carbon-intensity industries after fossil energy price shocks (Lichtenberger & Stehrer, 2024), suggesting that the composition of production is itself a determinant of resilience.

Three gaps follow from this assessment. First, the literature lacks an integrative framework that specifies how distinct resilience capacities (absorptive, adaptive, and transformative) map onto sustainable development outcomes, rather than treating resilience as a single latent quantity (Béné et al., 2014; Sutton & Arku, 2022). Second, the conditioning roles of resource diversification and institutional quality are usually examined separately, although emerging evidence suggests that they interact: economic complexity appears to reduce resource dependence only where institutions are sufficiently strong (Olaniyi & Odhiambo, 2025), and the growth and human development effects of complexity vary non-linearly with institutional quality and resource dependence (Hamdi et al., 2025). Third, climate risk is increasingly recognized as both a source of shocks and a structural stressor that operates through fiscal and financial channels (Campiglio et al., 2018; Seghini, 2026), yet it is rarely integrated with structural diversification in a single analytical framework. These gaps translate into three guiding questions: (1) how macroeconomic and climate resilience transmit to sustainable development outcomes; (2) under what conditions resource diversification and institutional quality act as structural buffers against energy price shocks and supply chain disruptions; and (3) which policy instruments and analytical designs can strengthen adaptive capacity while protecting household welfare under constrained fiscal space.

The purpose of this article is therefore twofold. On the theoretical side, it integrates the macroeconomic, climate-economics, structural-diversification, and institutional literatures into a framework that reconceptualizes economic resilience as a set of capacities whose development payoffs are conditioned by economic structure and institutions, and it derives testable propositions from this framework. On the applied side, it translates the synthesis into a methodological agenda suited to heterogeneous and cross-sectionally dependent country panels and into macroeconomic policy implications for emerging economies, with particular reference to Indonesia, where resource-based industrialization and high climate exposure make these trade-offs especially salient (Asyono et al., 2026; Beirne et al., 2021a; Hidayati et al., 2025).

RESEARCH METHODS

This study is a conceptual article based on an integrative literature review. No primary data were collected and no new econometric estimates are reported; all empirical statements refer to the published studies cited. The review design, the identification and selection of the literature, and the procedures for analysis and synthesis are described below and summarized in Table 1, so that the process can be scrutinized and replicated.

Review Design

An integrative review was selected because the topic is characterized by a large but fragmented body of work spread across disciplines, methods, and levels of analysis. Integrative reviews synthesize such literatures critically in order to generate new perspectives and frameworks, rather than to aggregate

effect sizes (Cronin & George, 2023; Snyder, 2019; Torraco, 2005). The review was combined with a theory-synthesis approach to conceptual development, which integrates concepts from several theoretical perspectives into a higher-order framework that explains a focal phenomenon (Jaakkola, 2020). Economic resilience served as the focal concept, while macroeconomic resilience theory, climate economics, structural-diversification and economic-complexity theory, and institutional economics served as the domain theories. In contrast to a systematic review or a meta-analysis, the design does not claim exhaustive coverage of every study; it prioritizes conceptual breadth, critical comparison of convergent and divergent findings, and the identification of boundary conditions.

Literature Identification and Selection

The literature was identified in October 2026 through keyword and semantic searches in scholarly search engines that index the Semantic Scholar and OpenAlex corpora, Crossref metadata queries, and general academic web searches. Search strings combined resilience terms (e.g., "economic resilience," "macroeconomic resilience," "climate resilience," "recovery," and "hysteresis") with structural terms ("export diversification," "economic complexity," "resource dependence," "institutional quality," and "governance") and outcome terms ("sustainable development," "human development," and "Sustainable Development Goals"). Forward citation tracking was performed from anchor contributions (Briguglio et al., 2009; Hallegatte, 2014; Martin & Sunley, 2015), and the most closely related cross-country study (Hasan et al., 2025) served as the benchmark for evidence on the resilience–development link. Reports of multilateral and official institutions were retrieved in a targeted manner to capture policy-relevant evidence (Bank Indonesia, 2024; G7 Panel on Economic Resilience, 2021; New Zealand Productivity Commission, 2024; WTO, 2021).

Sources were retained if they (a) were peer-reviewed journal articles, scholarly books, or major reports of multilateral, official, or research institutions; (b) were written in English; (c) made a conceptual, methodological, or empirical contribution to at least one link in the nexus under study, namely shocks and their transmission, resilience capacities, sustainable development outcomes, or the conditioning roles of diversification, institutional quality, and climate risk; and (d) provided cross-country or national evidence, or regional and sectoral evidence that illuminates mechanisms relevant at the national level. Studies on organizational, psychological, or purely engineering resilience were excluded. To capture the evidence generated after the COVID-19 pandemic and the 2022 energy price shock, publications from 2019 to 2026 were emphasized, while seminal contributions were retained irrespective of their date. The bibliographic metadata of all retained sources that carry a digital object identifier were verified against DOI registration records. The final corpus comprises 122 sources: 111 peer-reviewed journal articles and 11 books, reports, or working papers of multilateral, official, and research institutions; 69 of these sources were published between 2021 and 2026.

Analysis and Synthesis

The retained sources were analyzed with a concept-centric matrix (Webster & Watson, 2002). Each source was coded along six dimensions: (i) the resilience dimension addressed (absorptive, adaptive, or transformative capacity; instantaneous or dynamic resilience); (ii) the type of shock (financial, health, energy and terms-of-trade, supply chain, or climate-related); (iii) the transmission channel (fiscal, financial, trade, production network, or labor market and human capital); (iv) the conditioning structure (diversification and complexity, institutional quality, or carbon intensity); (v) the outcome (output level and volatility, welfare and human development, composite sustainable development

indicators, or financing costs); and (vi) the research design. Synthesis proceeded abductively in three steps. Convergent findings were first consolidated into mechanisms; divergent findings were then examined to identify boundary conditions, such as the type of shock, the stage of development, and the strength of institutions; finally, the mechanisms and boundary conditions were integrated into a framework from which propositions were derived (Cronin & George, 2023; Jaakkola, 2020). Because the cited studies differ in their identification strategies, findings from correlational designs were treated as indicative rather than causal, and the strength of the evidence is signaled in the text.

Table 1. Design of the integrative review

Element	Description
Review type	Integrative literature review combined with a theory-synthesis approach to conceptual development (Cronin & George, 2023; Jaakkola, 2020; Torraco, 2005)
Focal concept and domain theories	Economic resilience; macroeconomic resilience theory, climate economics, diversification and economic-complexity theory, and institutional economics
Sources searched	Scholarly search engines indexing the Semantic Scholar and OpenAlex corpora; Crossref metadata; general academic web searches; repositories of multilateral, official, and research institutions
Search strategy	Resilience terms combined with structural and outcome terms; forward citation tracking from anchor contributions; targeted retrieval of institutional reports
Inclusion criteria	Peer-reviewed articles, scholarly books, and major institutional reports in English that address at least one link of the nexus, with priority to cross-country and national evidence
Exclusion criteria	Organizational, psychological, or purely engineering resilience; non-peer-reviewed commentary
Time emphasis	2019–2026, with seminal contributions retained irrespective of date
Quality assurance	Verification of bibliographic metadata against DOI registration records where available; signaling of the strength of evidence by research design
Coding dimensions	Resilience capacity; shock type; transmission channel; conditioning structure; outcome; research design
Synthesis logic	Abductive: consolidation of convergent findings, analysis of divergent findings and boundary conditions, and integration into a framework and propositions
Outputs	Integrative framework (Figure 1), six propositions, methodological agenda (Table 4), and policy matrix (Table 5)

Source: Author's elaboration.

RESULTS AND DISCUSSION

The synthesis is organized in ten parts. The first clarifies the conceptual foundations of economic resilience; the next five review the evidence on macroeconomic buffers, climate risk, resource diversification, institutional quality, and the transmission of energy price and supply chain shocks; the final parts present the integrative framework and propositions, the methodological agenda, the policy implications, and the limitations of the review. Table 3 summarizes a selection of the cross-country and national evidence on which the synthesis draws.

Conceptual Foundations: From Bouncing Back to Bouncing Forward

The resilience concept entered economics from ecology. Holling (1973) contrasted the stability of a system, its tendency to return to equilibrium after a disturbance, with its resilience, understood as its ability to absorb change and disturbance while persisting. Walker et al. (2004) extended this view by adding adaptability, the capacity of actors to manage resilience, and transformability, the capacity to create a fundamentally new system when existing conditions become untenable; they also emphasized thresholds beyond which systems reorganize. In economics, Rose (2004) distinguished

static resilience, the ability to maintain function when shocked, from dynamic resilience, the speed with which an economy recovers. Hallegatte (2014) formalized a related distinction between instantaneous resilience, which limits the immediate production loss for a given loss of assets, and dynamic resilience, which reflects the ability to reconstruct and recover, and he argued that the welfare impact of a shock also depends on microeconomic resilience, that is, on the distribution of losses, household vulnerability, and social protection. Briguglio et al. (2009) separated inherent vulnerability, determined by exposure to external shocks, from resilience as a policy-induced capacity to withstand and recover, an approach later updated with global indicators showing that highly exposed small states can still achieve high resilience through sound economic, social, and environmental governance (Briguglio, 2016).

Economic geography contributed a more evolutionary understanding. Martin (2012) decomposed regional resilience into resistance, recovery, re-orientation, and renewal, and connected resilience to hysteresis, whereby shocks permanently alter growth paths. Martin and Sunley (2015) argued that resilience is best understood as a process rather than a fixed attribute, while Boschma (2015) defined it as the long-term capacity to develop new growth paths, shaped by industrial relatedness, networks, and institutions. Sutton and Arku (2022) proposed that engineering, ecological, evolutionary, and transformative interpretations should be treated as complementary rather than competing, because economies may exhibit different types of resilience depending on how their structure and function change during and after a shock. Development scholarship has similarly distinguished absorptive, adaptive, and transformative capacities, while cautioning that resilience is not an inherently pro-poor concept and cannot substitute for poverty reduction (Béné et al., 2014).

The relationship between resilience and sustainable development is neither automatic nor uncontested. Reviewing a decade of practice, Reyers et al. (2022) identify six shifts through which resilience thinking is reshaping sustainable development (from capitals to capacities, from objects to relations, from outcomes to processes, from closed to open systems, from generic interventions to context sensitivity, and from linear to complex causality) but note that dominant applications often diverge from the underlying science. Chaigneau et al. (2022) show that resilience and well-being, although often assumed to be synergistic, may in practice work against each other. Scown et al. (2023) find that the Sustainable Development Goals address several resilience factors, including economic diversity and transparent governance, but neglect key ecological factors, and Assarkhaniki et al. (2023) similarly report that SDG indicators cover resilience extensively but overlook some of its dimensions. Moreover, not all resilience is desirable: the persistence of carbon-intensive structures can represent an undesirable form of resilience that obstructs sustainability transitions (Scordato & Gulbrandsen, 2024). These insights imply that resilience should be treated not as an end in itself but as a set of capacities whose value depends on whether they protect and expand inclusive and environmentally sustainable development. Accordingly, this article distinguishes absorptive capacity (limiting immediate losses), adaptive capacity (recovering and reallocating resources without permanent damage), and transformative capacity (reorganizing the economic structure toward more sustainable paths), as summarized in Table 2.

Table 2. Conceptual lenses on economic resilience and their macroeconomic interpretation

Lens	Core idea	Macroeconomic interpretation	Illustrative indicators	Key sources
Engineering (“bouncing back”)	Speed of return to a pre-shock equilibrium	Instantaneous and dynamic resilience; depth and duration of output losses	Peak-to-trough output loss; time to regain the pre-crisis peak	Holling (1973); Rose (2004); Hallegatte (2014); Eichengreen et al. (2024)
Ecological (absorbing)	Disturbance absorbed without a regime shift; thresholds	Absorptive capacity; avoidance of crisis regimes	Fiscal and monetary policy space; reserves; financial soundness	Walker et al. (2004); Romer & Romer (2018); Kose et al. (2022)
Evolutionary (adaptive)	Continuous adjustment of structures and functions	Adaptive capacity; reallocation that avoids hysteresis	Recovery of employment and productivity; speed of reallocation	Martin (2012); Martin & Sunley (2015); Cerra et al. (2023)
Transformative (“bouncing forward”)	Reorganization onto new, more desirable paths	Transformative capacity; structural change toward complex, low-carbon activities	Changes in economic complexity, export structure, and emission intensity	Boschma (2015); Sutton & Arku (2022); Mealy & Teytelboym (2022)
Vulnerability–resilience	Inherent exposure versus policy-induced coping capacity	Separates exposure from the role of policy and institutions	Vulnerability and resilience indices; climate vulnerability and readiness	Briguglio et al. (2009); Briguglio (2016); Béné et al. (2014)

Source: Author's synthesis.

Economic Resilience and Sustainable Development: Policy Space, Buffers, and Hysteresis

A first strand of evidence concerns the persistence of shock-induced losses. Using panel data for a large set of high-income, emerging, developing, and transition economies, Cerra and Saxena (2008) find that the large output losses associated with financial crises and some types of political crises are highly persistent. Reviewing the subsequent literature, Cerra et al. (2023) argue that the dependence of output levels on their history of shocks, known as hysteresis or scarring, calls for unifying the analysis of growth and business cycles and implies that macroeconomic policy should act forcefully in recessions to avoid permanent damage. If losses are persistent, resilience is not merely a cyclical concern but a determinant of long-run development trajectories.

A second strand identifies the determinants of absorptive capacity. For a large sample of advanced and emerging economies, Eichengreen et al. (2024) find that deeper recessions are followed by stronger recoveries, whereas longer recessions are associated with weaker recoveries, consistent with hysteresis; trade openness, exchange-rate flexibility, a strong current account, and ample foreign reserves are positively associated with resilience, while financial openness and rapid private credit growth during the preceding expansion are negatively associated with it. For advanced economies, Romer and Romer (2018) show that the decline in output after financial distress is small when countries possess both monetary and fiscal policy space but large when they possess neither. During the COVID-19 shock, pre-existing policy space was usually more important than other country characteristics in shaping policy packages, although fiscal stimulus in advanced economies was not significantly constrained by it, and countries did not appear to coordinate their policy tools within an integrated framework (Bergant & Forbes, 2023). Fiscal space is itself multidimensional, encompassing debt sustainability, balance-sheet vulnerabilities, and market perceptions (Kose et al., 2022), and its effect on the policy response to financial distress operates partly through sovereign market-access constraints that are non-linear in debt and deficits (Salamaliki & Venetis, 2024).

A third strand links resilience to sustainable development and to the nature of shocks. Hasan et al. (2025) provide cross-country evidence that economic and climate resilience have persistent positive effects on sustainable development across stages of development. Measurement studies, however,

caution against treating resilience as a stable national attribute. Comparing realized output paths with counterfactual no-crisis trajectories, Hara and Yamamoto (2026) find that most advanced OECD economies were not resilient to the global financial crisis but recovered strongly from COVID-19, and they conclude that resilience depends on the nature of the crisis. Across the SARS and COVID-19 pandemics, national resistance and recoverability were negatively related, and the dominant typology of resilience shifted between the two episodes (Li et al., 2024). Chavas (2024) shows that low-income countries tend to adjust better to adverse shocks in the short run, but high-income countries do better in the long run, and an analysis of 200 countries using a three-dimensional resilience index finds that resilience is positively associated with education, tax revenue, sectoral diversification, and gross value added, negatively associated with primary-sector specialization and, in contrast to the findings of Eichengreen et al. (2024), with trade activity, and has declined for the global economy over time (Tsiotas & Katsaiti, 2025).

The direction of causality between resilience and sustainable development is also unsettled. Sustainable development may itself strengthen resilience by building human capital, institutions, and environmental buffers, yet Ashraf et al. (2024) find no evidence that countries' pre-pandemic progress on the Sustainable Development Goals stabilized their stock markets during the COVID-19 shock, whereas cultural, openness, and economic factors did. Together with the evidence of trade-offs between resilience and well-being (Chaigneau et al., 2022), this finding suggests that the resilience–development relationship is bidirectional, context-dependent, and potentially non-linear. It also implies that the choice of outcome measure matters. Aggregate output captures only part of sustainable development; welfare-oriented and environmentally adjusted indicators, such as the Human Development Index or the Sustainable Development Index, which relates human development to ecological overshoot (Hickel, 2020), are better suited to assessing whether resilience protects the integrated social, economic, and environmental transformations that the Sustainable Development Goals require (Sachs et al., 2019).

Table 3. Selected cross-country and national evidence on the resilience–diversification–development nexus

Study	Context and data	Design	Main finding	Link to the framework
Hasan et al. (2025)	31 countries, 2007–2021	PCSE, FGLS, panel quantile regression, local projections	Economic and climate resilience have significant and persistent effects on sustainable development across stages of development	Resilience → sustainable development
Eichengreen et al. (2024)	Advanced and emerging economies	Cross-country analysis of recession and recovery episodes	Longer recessions are followed by weaker recoveries; openness, exchange-rate flexibility, current account strength, and reserves support resilience, whereas rapid credit growth and financial openness undermine it	Absorptive and adaptive capacity
Romer & Romer (2018)	24 advanced economies, postwar period	Narrative measure of financial distress	Output declines after financial distress are much smaller when both fiscal and monetary policy space are available	Absorptive capacity
Hara & Yamamoto (2026)	18 advanced OECD economies	Tests against counterfactual no-crisis paths	Most economies were not resilient to the global financial crisis but recovered strongly from COVID-19	Shock-specific resilience
Kahn et al. (2021)	174 countries, 1960–2014	Panel growth model with climate deviations	Persistent temperature deviations from historical norms reduce per capita output growth	Climate risk → sustainable development

Study	Context and data	Design	Main finding	Link to the framework
Kling et al. (2021)	15,265 firms in 71 countries, 1999–2017	Panel IV regressions and structural equation models	Climate vulnerability raises the cost of debt directly and by restricting access to finance	Climate risk → absorptive capacity
Beirne et al. (2021a)	Six Southeast Asian economies, 2002–2018	Country-specific OLS and fixed-effects panel	Climate vulnerability raises sovereign bond yields; resilience to climate change partly offsets the effect	Climate risk → absorptive capacity
Haddad et al. (2013)	Cross-country panel	Panel regressions with openness–concentration interactions	Openness reduces growth volatility in countries with relatively diversified export baskets	Diversification as a buffer
Güneri & Yalta (2021)	Developing countries	Panel vector autoregression	Economic complexity reduces output volatility	Diversification as a buffer
Ardelean et al. (2024)	34 countries, 19 industries, 84 destinations, 1980–2011	Risk decomposition and counterfactuals	Destination-market diversification reduces aggregate volatility, whereas lower industrial specialization raises it	Boundary condition
Olaniyi & Odhiambo (2025)	20 resource-rich African countries, 1995–2021	FMOLS, Driscoll–Kraay estimator, MMQR	Complexity reduces resource dependence only through strong institutions	Diversification × institutions
Saadani & Dhahri (2026)	30 resource-rich countries, 1995–2022	Tobit, fixed effects with Driscoll–Kraay errors, system GMM	Oil rents harm all SDG dimensions; gas, mineral, and forest rents support them under good governance	Resource dependence → sustainable development
Chen et al. (2024)	66 countries, financial crises 1985–2010	Recovery-duration and output-loss regressions with endogeneity checks	Better institutions shorten recoveries and reduce the depth of output losses	Institutional conditioning
Kuokštis & Kuokštytė (2023)	EU member states, 2020–2021	Quarterly panel regressions	Governance quality and economic freedom reduced pandemic downturns, more so for larger shocks	Institutional conditioning
Kee & Xie (2025)	Indonesia, nickel export ban	Three-sector model and firm-level evidence	Domestic value added in exports rose, but the entry of smaller firms caused downstream efficiency losses	Downstreaming versus diversification

Note. FGLS = feasible generalized least squares; FMOLS = fully modified ordinary least squares; GMM = generalized method of moments; IV = instrumental variables; MMQR = method-of-moments quantile regression; OLS = ordinary least squares; PCSE = panel-corrected standard errors; SDG = Sustainable Development Goal. Source: Author's compilation from the cited studies.

Climate Risk as a Shock and a Structural Stressor

Climate change affects resilience in two ways: as a source of acute shocks and as a structural stressor that erodes the capacities needed to respond to all shocks. The macroeconomic evidence on physical risk is substantial. Higher temperatures substantially reduce economic growth in poor countries, with wide-ranging effects on agricultural output, industrial output, and political stability (Dell et al., 2012), and the global relationship between temperature and economic production is non-linear (Burke et al., 2015). Using a panel of 174 countries over more than five decades, Kahn et al. (2021) find that persistent deviations of temperature from historical norms reduce per capita output growth and that limiting warming in line with the Paris Agreement would substantially reduce long-term income losses. Natural disasters impose larger macroeconomic costs on developing and smaller economies, whereas countries with higher literacy, better institutions, higher income, greater trade openness, and higher government spending are better able to withstand the initial shock (Noy, 2009); a meta-analysis confirms that the average growth effect of natural disasters is negative, particularly in developing countries (Klomp & Valckx, 2014).

The financial channel is critical for absorptive capacity. Climate vulnerability raises firms' cost of debt both directly and by restricting their access to finance (Kling et al., 2021). At the sovereign level, greater climate vulnerability is associated with higher government borrowing costs, while resilience

to climate change partly offsets this effect; the impact is larger in developing countries and has been documented specifically for Southeast Asia (Beirne et al., 2021a, 2021b; Cevik & Jalles, 2022b). Climate vulnerability also raises the probability of sovereign debt default, especially among low-income countries (Cevik & Jalles, 2022a). Simulations of climate-adjusted sovereign credit ratings suggest that, under high-emission scenarios, many sovereigns would face climate-induced downgrades as early as 2030, an outcome that stringent mitigation could almost eliminate (Klusak et al., 2023). A recent survey shows that physical and transition risks affect public debt sustainability through output growth, primary balances, and real interest rates (Seghini, 2026). Climate vulnerability therefore narrows fiscal space precisely where adaptation needs are largest, creating a potential vicious circle between exposure, financing costs, and under-investment in resilience.

Transition risk adds a structural dimension. Climate policies and technological change can strand fossil-fuel assets, generating major losses for investors (Semieniuk et al., 2022) and exposing financial systems to risks that central banks and regulators are only beginning to integrate into their frameworks (Campiglio et al., 2018). At the country level, transition risk depends on the structure of exports: countries whose exports are concentrated in a few low-complexity "brown" products have fewer nearby diversification opportunities than countries with diversified and sophisticated export baskets (Andres et al., 2023). For resource-dependent economies with limited diversification and binding external constraints, decarbonization may confront policymakers with a dilemma between growth and emission reduction unless structural limitations are overcome (Valdecantos, 2025), and simulations for Colombia indicate that the more the global transition is delayed, the greater the macroeconomic vulnerability of a fossil-fuel-exporting economy (Moreno et al., 2024). Sectoral simulations for Austria point in the same direction, showing that fossil energy price shocks destabilize high-carbon-intensity industries far more than low-carbon-intensity ones in the short run (Lichtenberger & Stehrer, 2024). Carbon intensity is therefore not only an environmental attribute but also a resilience characteristic of the production structure.

Adaptive capacity in the face of climate risk depends heavily on infrastructure and public investment. Unreliable power, water, and transport systems impose large costs on households and firms, particularly when natural hazards strike, and building more resilient infrastructure is economically justified in low- and middle-income countries (Hallegatte et al., 2019). Policy reviews have accordingly begun to treat resilience as a systemic objective that cuts across fiscal, infrastructure, supply chain, and climate policies (G7 Panel on Economic Resilience, 2021; New Zealand Productivity Commission, 2024).

Resource Diversification as a Structural Buffer

The case for diversification as a resilience strategy rests on a portfolio logic: an economy whose output and exports are spread across activities exposed to imperfectly correlated shocks should experience lower aggregate volatility. Koren and Tenreyro (2007) show that, as countries develop, their productive structure moves from more volatile to less volatile sectors and the volatility of country-specific shocks falls, and they find some evidence that sectoral concentration declines at early stages of development and rises again at later stages. Export diversification follows a similar hump-shaped pattern, with reconcentration at high income levels (Cadot et al., 2011). Beyond the number of products, the type of products matters: countries that export goods associated with higher productivity levels grow faster (Hausmann et al., 2007), and the structure of the product space conditions the opportunities to diversify, because capabilities are more easily redeployed to related

products (Hidalgo et al., 2007). Economic complexity, which captures the diversity and sophistication of the capabilities embedded in exports, has therefore become a central measure of productive structure (Hidalgo & Hausmann, 2009).

Empirical evidence broadly supports the buffering role of diversification. The effect of trade openness on growth volatility is negative for a significant proportion of countries with relatively diversified export baskets (Haddad et al., 2013). Economic complexity reduces output volatility in developing countries (Güneri & Yalta, 2021), and at the regional level, industrial diversity, human capital, and openness improved the resilience of Chinese regions to the 2008 crisis (Wang & Wei, 2021). Related variety strongly supported the post-crisis industrial resilience of US counties, particularly in intermediate and rural areas (Grabner & Modica, 2022). Outside macroeconomics, greater diversity of food supply chains increases the resistance of cities to food shocks (Gomez et al., 2021), illustrating the generality of the portfolio mechanism.

The evidence nonetheless reveals important boundary conditions. Decomposing output risk across 34 countries, 19 industries, and 84 destination markets, Ardelean et al. (2024) find that diversifying across destination markets substantially reduces aggregate volatility for high-volatility countries, whereas reducing industrial specialization increases volatility. A quantitative trade model calibrated to European economies suggests that export diversification dampens the welfare effects of shocks to trade costs and foreign productivity but amplifies those of balance-of-payments and domestic productivity shocks (Zélity, 2025). In Chinese cities, a high degree of related variety made regions more, rather than less, vulnerable to external demand shocks, because shocks spread across related industries (He et al., 2021), a result that contrasts with the US evidence cited above. Diversification is therefore not a universal buffer: its stabilizing value depends on the type of shock and on the correlation structure of the activities into which an economy diversifies.

Natural resource dependence represents the most consequential form of concentration. Resource-abundant economies have historically grown more slowly (Sachs & Warner, 2001), but whether resources become a curse depends on institutions: where institutions favor producers over rent-seekers, resource wealth need not impede growth (Mehlum et al., 2006). Commodity price volatility and institutional quality are central to this outcome (van der Ploeg, 2011). Distinguishing abundance from dependence, Lashitew and Werker (2020) find that resource abundance generally has a direct positive effect on development outcomes, whereas resource dependence exerts a stronger negative indirect effect through the weakening of institutions, especially on human capital. Recent work using composite indicators of the Sustainable Development Goals finds that oil rents harm all dimensions of sustainable development, while rents from natural gas, minerals, and forests can support them under good governance (Saadani & Dhahri, 2026), and that policies and institutions for environmental sustainability mitigate the adverse welfare effects of resource dependence in Africa (Mpuure & Mengba, 2024).

The interaction between diversification and institutions is a recurring theme. In resource-rich African countries, economic complexity has no direct effect on resource dependence, but institutional quality enables complexity to reduce dependence and mitigate the resource curse (Olaniyi & Odhiambo, 2025). Using a buffered panel threshold model for 92 countries, Hamdi et al. (2025) show that the effects of complexity on growth and human development are heterogeneous and contingent on institutional quality and resource dependence. The quality of diversification also matters for

sustainability. Countries that rank higher in green complexity tend to have higher environmental patenting rates, lower CO₂ emissions, and more stringent environmental policies, and the accumulation of green capabilities is strongly path-dependent (Mealy & Teytelboym, 2022). Economic complexity is associated with lower greenhouse gas emission intensity (Romero & Gramkow, 2021) and lower income inequality (Hartmann et al., 2017), and complexity measures that combine trade, patent, and research data help to explain inclusive green growth (Stojkoski et al., 2023). Diversification into complex, related, and low-carbon activities thus promises a double dividend for resilience and sustainability.

Indonesia illustrates these issues. Mixed-methods evidence from Indonesian regions suggests that the degree of economic diversification is the dominant factor associated with regional resilience to economic crises (Hidayati et al., 2025). At the national level, the export ban on nickel ore and the associated downstreaming policy raised the domestic value-added ratio of exports but also induced the entry of smaller and less efficient firms into downstream steel-using industries, with aggregate efficiency losses and continued reliance on imported steel (Kee & Xie, 2025). Input–output analysis further indicates that nickel downstreaming has worked through structural concentration in higher-value, capital-intensive activities rather than through broad-based diversification, accompanied by a marked decline in employment intensity (Asyono et al., 2026). Downstreaming, in other words, is not synonymous with diversification; its resilience dividend depends on whether it broadens capabilities and linkages across the economy.

Institutional Quality as the Conditioning Mechanism

Institutional economics provides the theoretical rationale for why similar shocks produce different outcomes. Institutions shape incentives and transaction costs and thereby the capacity of economies to adapt (North, 1990). Rodrik (1999) shows that the growth effects of external shocks are larger where latent social conflicts are deeper and institutions of conflict management are weaker, which helps to explain why many countries experienced growth collapses after the mid-1970s. Acemoglu et al. (2003) argue that weak institutions are the deep cause of macroeconomic volatility and crises, with distortionary macroeconomic policies being symptoms rather than causes.

Recent evidence supports a conditioning role for institutions across different types of shocks. For 66 countries that experienced financial crises between 1985 and 2010, better government institutions are associated with shorter recoveries and with shallower and less severe output losses, effects that are more pronounced in emerging economies and in banking and sovereign debt crises (Chen et al., 2024). A deterioration of institutional quality during banking crises is associated with additional and long-lasting output losses (Sever, 2022). Within the European Union, countries with higher quality of governance and greater economic freedom suffered markedly smaller downturns during the COVID-19 pandemic, and institutions mattered more when the shock was larger (Kuokštis & Kuokštytė, 2023). In Sub-Saharan Africa, institutional quality and human capital development strengthen economic resilience, with institutional quality having a larger effect in fragile countries (Afolabi & Raifu, 2025). Regional studies reach similar conclusions: higher quality of government is associated with greater resilience of European regions to the Great Recession, partly through spatial spillovers, and it is among the most robust predictors of regional resilience (Ezcurra & Rios, 2019; Rios & Gianmoena, 2020).

The evidence is nevertheless not uniform. In a cross-country analysis of the COVID-19 pandemic, pre-pandemic institutional quality was consistently associated with better health outcomes and higher

vaccination coverage, whereas its association with economic growth was phase-specific: it was not robust in 2020 and was weaker in 2021 once economic support policies were taken into account (Díaz et al., 2026). Institutions may therefore matter less for the depth of an initial, synchronized collapse than for the effectiveness of the policy response and the speed of recovery.

Institutions also shape the economic structure on which resilience depends. Institutional quality fosters economic complexity by strengthening incentives for innovative entrepreneurship and human capital accumulation (Vu, 2022), and pandemics reduce economic complexity mainly in emerging and low-income economies and in countries with weak institutions, operating through the deterioration of human capital (Nguyen et al., 2024). Measuring institutions is itself challenging, because widely used composite governance indicators aggregate perception-based sources and carry non-trivial margins of error, which makes robustness to alternative measures essential (Kaufmann et al., 2011). Taken together, the evidence suggests that institutions operate at three levels: they enhance the credibility of buffers and market access, which supports absorptive capacity; they improve the effectiveness of reallocation and policy implementation, which supports adaptive capacity; and they enable the coordination of structural change and the management of distributional conflict, which supports transformative capacity.

Transmission Channels: Energy Price Shocks and Supply Chain Disruptions

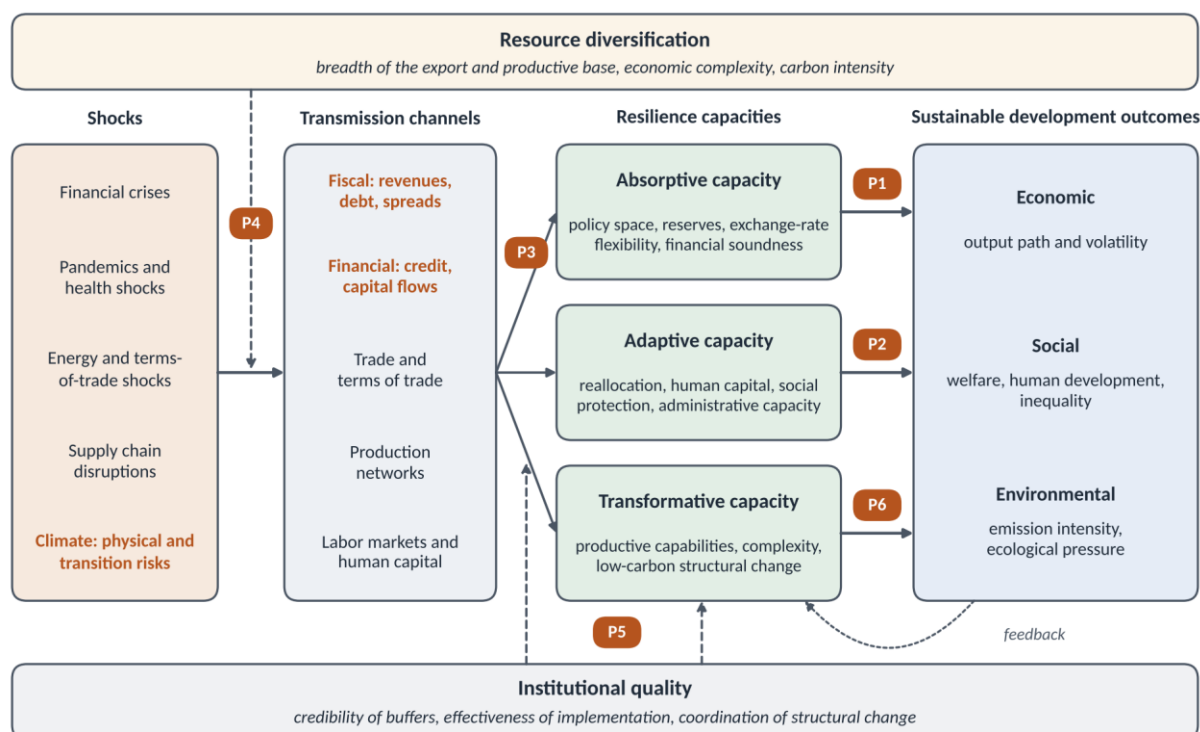
The framework must also account for how shocks propagate. Oil price shocks have different macroeconomic consequences depending on whether they originate in supply disruptions or in demand surges (Kilian, 2009), which implies that resilience strategies cannot be calibrated to a single type of energy shock. In production networks, idiosyncratic shocks to individual sectors can propagate through input–output linkages and generate aggregate fluctuations (Acemoglu et al., 2012). Evidence from the Great East Japan Earthquake shows that the disruption propagated upstream and downstream along supply chains to the direct and indirect suppliers and customers of the affected firms (Carvalho et al., 2021), and during the COVID-19 pandemic a substantial part of the decline in output was transmitted through global supply chains (Bonadio et al., 2021). Input–output evidence for 61 economies suggests that countries that cushion downturns through their domestic service sectors, rather than through goods sectors or foreign demand, are more resilient to negative shocks (Hashiguchi et al., 2022).

Whether greater self-reliance strengthens resilience is contested. In a quantitative model of the pandemic, renationalizing global supply chains does not in general make countries more resilient (Bonadio et al., 2021). Theoretical analysis of optimal policy suggests that, under standard assumptions, subsidizing the diversification of input sources achieves the constrained social optimum, although private investment in resilience may be socially excessive when demand elasticity rises with price (Grossman et al., 2023). A review of the evidence questions whether shorter, more domestic, or more diversified chains would necessarily have reduced recent shortages and proposes a portfolio-theory framework that weighs risks against rewards in evaluating anti-risk policies (Baldwin & Freeman, 2022). For the framework developed here, these findings imply that the diversification of sourcing and export markets is a key channel through which structural characteristics shape absorptive and adaptive capacities.

An Integrative Framework and Research Propositions

Figure 1 integrates the preceding strands into a single framework. Shocks (financial, health, energy and terms-of-trade, supply chain, and climate-related, the latter comprising both physical and transition risks) are transmitted through fiscal, financial, trade, production-network, and labor-market channels. Their impact on sustainable development depends on three resilience capacities. Absorptive capacity, grounded in policy space, external buffers, and financial soundness, limits the immediate loss. Adaptive capacity, grounded in labor-market flexibility, human capital, social protection, and effective public administration, determines whether resources are reallocated quickly enough to avoid hysteresis. Transformative capacity, grounded in productive capabilities and coordinated industrial and climate policies, determines whether the post-shock economy moves toward more complex, diversified, and low-carbon activities. Sustainable development outcomes are captured in economic (output path and volatility), social (welfare, human development, and inequality), and environmental (emission intensity and ecological pressure) dimensions. Two structural conditions moderate the links between shocks, capacities, and outcomes: resource diversification, including its breadth, complexity, and carbon intensity, and institutional quality. Feedback loops connect outcomes back to capacities, since development strengthens fiscal space and human capital, while climate change and resource depletion feed back into the shock environment.

Figure 1. Integrative framework linking shocks, resilience capacities, and sustainable development



Note. P1–P6 denote the research propositions; solid arrows indicate transmission and effects, dashed arrows indicate moderating influences and feedback; highlighted items mark the climate–fiscal–financial pathway of Proposition 3. Source: Author's synthesis.

Six propositions follow from the framework. They are formulated to be falsifiable with country-level panel data and are summarized, together with indicative measures and estimation strategies, in Table 4.

Proposition 1 (absorptive capacity). Greater ex ante macroeconomic policy space, comprising fiscal space, monetary policy space, external buffers, and exchange-rate flexibility, reduces the depth of output and welfare losses after adverse shocks and thereby protects sustainable development outcomes; this protective effect is larger for severe and prolonged shocks (Bergant & Forbes, 2023; Eichengreen et al., 2024; Romer & Romer, 2018).

Proposition 2 (adaptive capacity and persistence). The development payoff of resilience is predominantly dynamic: economies that shorten recessions and reallocate resources faster avoid persistent losses in human capital and productivity, so that resilience has persistent rather than transitory effects on sustainable development (Cerra et al., 2023; Eichengreen et al., 2024; Hasan et al., 2025).

Proposition 3 (climate vulnerability). Climate vulnerability erodes absorptive capacity by raising sovereign and corporate financing costs and narrowing fiscal space, whereas adaptation readiness mitigates this effect; the erosion is stronger in lower-income and more exposed economies (Beirne et al., 2021b; Cevik & Jalles, 2022b; Kling et al., 2021).

Proposition 4 (diversification as a shock-specific buffer). Export and productive diversification attenuates the transmission of terms-of-trade, commodity price, and country-specific demand shocks to output volatility and welfare, but its buffering effect is shock-specific and depends on the correlation structure of the activities concerned; diversification into complex and low-carbon activities yields larger resilience and sustainability gains than diversification per se (Ardelean et al., 2024; Haddad et al., 2013; Mealy & Teytelboym, 2022; Zélity, 2025).

Proposition 5 (institutional conditioning). Institutional quality conditions the relationships described in Propositions 1–4: the payoffs of policy space, diversification, and adaptation investment are larger, and the costs of resource dependence smaller, where institutions are stronger, possibly with threshold effects (Chen et al., 2024; Hamdi et al., 2025; Mehlum et al., 2006; Olaniyi & Odhiambo, 2025).

Proposition 6 (transformative resilience). Post-shock structural change toward greater economic complexity and lower carbon intensity generates larger long-run sustainable development gains than recovery to the pre-shock path, provided that its distributional effects are managed through social protection and labor-market policies (Andres et al., 2023; Boschma, 2015; Stojkoski et al., 2023).

The propositions are interdependent. Proposition 5 implies that the effects posited in Propositions 1–4 should be estimated as conditional rather than average effects, and Proposition 6 implies that resilience should be evaluated over horizons long enough to capture structural change.

Methodological Agenda for Testing the Propositions

Testing the propositions requires careful measurement. Sustainable development can be captured with the Human Development Index, composite indicators of progress toward the Sustainable Development Goals (Saadani & Dhahri, 2026), or the Sustainable Development Index, which penalizes ecological overshoot (Hickel, 2020); using several measures guards against conclusions that hold only for income-based outcomes. Economic resilience can be measured ex ante with vulnerability and resilience indices (Briguglio, 2016) or ex post with episode-based measures of the depth, duration, and completeness of recovery (Eichengreen et al., 2024; Hara & Yamamoto, 2026; Martin, 2012). Climate vulnerability and adaptation readiness are commonly proxied with the Notre Dame Global

Adaptation Initiative (ND-GAIN) indices (Beirne et al., 2021a; Kling et al., 2021). Diversification can be captured with export concentration indices (Cadot et al., 2011), economic complexity (Hidalgo & Hausmann, 2009), and green complexity (Mealy & Teytelboym, 2022); institutional quality with the Worldwide Governance Indicators and alternative measures (Kaufmann et al., 2011); and fiscal space with multidimensional indicators (Kose et al., 2022).

Estimation must confront four features of cross-country panels. First, countries are exposed to common shocks and spillovers, producing cross-sectional dependence that should be tested (Pesaran, 2021) and accommodated through second-generation unit root tests (Pesaran, 2007) and common correlated effects estimators, including their dynamic extensions (Chudik & Pesaran, 2015; Pesaran, 2006); Driscoll–Kraay standard errors offer a simpler alternative (Driscoll & Kraay, 1998). Panel-corrected standard errors (Beck & Katz, 1995) adjust inference for contemporaneous correlation and panel heteroskedasticity, but they neither remove the bias caused by unobserved common factors nor address endogeneity, and they are best suited to panels whose time dimension is long relative to the number of countries. Second, effects are likely to be heterogeneous across the distribution of outcomes, which can be examined with method-of-moments quantile regression (Machado & Santos Silva, 2019). Third, Propositions 4 and 5 imply non-linear and threshold effects, which can be estimated with panel threshold models (Hansen, 1999), including dynamic specifications that allow for endogeneity (Seo & Shin, 2016). Fourth, reverse causality between development and resilience calls for internal instruments in dynamic panels (Blundell & Bond, 1998) or for credible external instruments.

A baseline specification for Propositions 1, 3, 4, and 5 can be written as a conditional-effects model:

$$SD_{it} = \alpha_i + \lambda_t + \beta_1 RES_{i,t-1} + \beta_2 (RES_{i,t-1} \times DIV_{i,t-1}) + \beta_3 (RES_{i,t-1} \times INST_{i,t-1}) + \beta_4 CV_{i,t-1} + \gamma' X_{i,t-1} + \varepsilon_{it} \quad (1)$$

where SD is a sustainable development indicator, RES a measure of economic resilience or policy space, DIV a measure of diversification or complexity, $INST$ institutional quality, CV climate vulnerability, X a vector of controls, α_i and λ_t country and period effects, and ε_{it} an error term that may contain unobserved common factors. Proposition 5 implies $\beta_3 > 0$. The dynamic Propositions 2 and 6, and the shock-specific buffering effects in Proposition 4, can be examined with local projections (Jordà, 2005):

$$y_{i,t+h} - y_{i,t-1} = \alpha_i^h + \vartheta^h S_{it} + \varphi^h (S_{it} \times M_{i,t-1}) + \Gamma^h Z_{it} + u_{i,t+h}, \quad h = 0, 1, \dots, H \quad (2)$$

where y is an outcome, S a shock measure, M a moderator such as diversification or institutional quality, and Z a set of controls including lags. The sequences of ϑ^h and φ^h trace the response path and its dependence on structural conditions; a buffering moderator implies that φ^h has the opposite sign to ϑ^h . Local projections and vector autoregressions estimate the same impulse responses in population, so the choice between them involves a bias–variance trade-off rather than a difference in the estimand (Plagborg-Møller & Wolf, 2021).

Table 4. Propositions, mechanisms, indicative measures, and suitable research designs

Proposition	Core mechanism	Indicative measures	Suitable designs
P1. Absorptive capacity	Policy space and external buffers limit immediate losses	Fiscal space indicators (Kose et al., 2022); distance of policy rates from the lower bound; reserves; exchange-rate regime; output loss per episode	Episode-based panel regressions; local projections with interaction terms; CCE estimators
P2. Adaptive capacity and persistence	Faster recovery avoids hysteresis in human capital and productivity	Recession duration; completeness of recovery; employment and productivity paths	Long-horizon local projections; tests of return to pre-crisis paths (Hara & Yamamoto, 2026)
P3. Climate vulnerability	Vulnerability raises financing costs and narrows fiscal space; readiness mitigates the effect	ND-GAIN vulnerability and readiness; sovereign spreads and ratings; corporate cost of debt	Panel models with CCE or Driscoll–Kraay errors; quantile regression on spreads
P4. Shock-specific buffering by diversification	Diversification insures against imperfectly correlated shocks	Export concentration (Theil or Herfindahl–Hirschman indices); economic complexity; green complexity; shock-specific exposure	Local projections by shock type with diversification interactions; MMQR
P5. Institutional conditioning	Institutions raise the payoffs of buffers, diversification, and adaptation	Worldwide Governance Indicators and alternative measures; resource rents	Interaction and panel threshold models (Hansen, 1999; Seo & Shin, 2016); system GMM
P6. Transformative resilience	Structural change toward complex, low-carbon activities yields long-run gains	Post-shock changes in complexity, export structure, and emission intensity; SDG and SDI indices	Long-horizon local projections; dynamic CCE estimators (Chudik & Pesaran, 2015)

Note. CCE = common correlated effects; GMM = generalized method of moments; MMQR = method-of-moments quantile regression; ND-GAIN = Notre Dame Global Adaptation Initiative; SDG = Sustainable Development Goal; SDI = Sustainable Development Index. Source: Author's elaboration.

Macroeconomic Policy Implications

The framework yields policy implications for each of the three capacities (Table 5). For absorptive capacity, the evidence favors rebuilding fiscal and monetary policy space during expansions, maintaining adequate foreign reserves and exchange-rate flexibility, and containing rapid private credit growth through macroprudential policy (Eichengreen et al., 2024; Romer & Romer, 2018). Because countries do not appear to coordinate their policy tools optimally, especially when space is limited (Bergant & Forbes, 2023), integrated policy frameworks that sequence fiscal, monetary, macroprudential, and exchange-rate instruments deserve priority. Fiscal rules that combine credible medium-term anchors with well-defined escape clauses allow buffers to be used when shocks occur without undermining market confidence.

For adaptive capacity, policies that preserve human capital and facilitate reallocation, such as active labor-market programs, skills development, and adaptive social protection, are central, because human capital is both a determinant of resilience (Afolabi & Raifu, 2025) and a channel through which shocks erode productive capabilities (Nguyen et al., 2024). Since resilience is not inherently pro-poor (Béné et al., 2014), targeted transfers that protect vulnerable households during shocks are needed to ensure that recovery is inclusive.

For transformative capacity, diversification policy should target the accumulation of capabilities in related, more complex, and low-carbon activities rather than the number of products alone (Hidalgo & Hausmann, 2009; Mealy & Teytelboym, 2022). Countries whose exports are concentrated in a few low-complexity brown products face the highest transition risks and require path-breaking diversification strategies (Andres et al., 2023). Climate risk should be integrated into debt sustainability analysis and fiscal planning (Seghini, 2026); investment in adaptation and resilient infrastructure can lower sovereign financing costs and reduce disruption losses (Beirne et al., 2021a; Hallegatte et al., 2019), and financial supervisors should incorporate climate-related risks into

prudential frameworks (Campiglio et al., 2018). In supply chains, policies that encourage the diversification of sourcing and export markets are more likely to strengthen resilience than reshoring (Bonadio et al., 2021; Grossman et al., 2023). Across all three capacities, institutional quality, understood as effective, transparent, and accountable public institutions capable of managing distributional conflict, is a precondition for the credibility and effectiveness of these instruments (Chen et al., 2024; Rodrik, 1999).

For Indonesia, the analysis suggests four priorities. First, the emphasis of the monetary authority on policy synergy to strengthen national economic resilience (Bank Indonesia, 2024) should be complemented by an explicit assessment of fiscal and external buffers against climate and commodity shocks. Second, downstreaming policy should be evaluated against diversification objectives, including the breadth of linkages, employment intensity, and capability spillovers, rather than against value added in a single commodity chain, given the evidence of efficiency losses and declining employment intensity in the nickel ecosystem (Asyono et al., 2026; Kee & Xie, 2025). Third, the high exposure of Southeast Asian sovereigns to climate risk, which is priced in their bond yields (Beirne et al., 2021a), makes adaptation investment and climate-informed debt management integral to macroeconomic stability. Fourth, strengthening regional diversification and local institutional capacity can reinforce national resilience from the bottom up (Hidayati et al., 2025).

Table 5. Policy matrix by resilience capacity

Policy domain	Absorptive capacity	Adaptive capacity	Transformative capacity
Fiscal and monetary	Rebuild fiscal space during expansions; adequate reserves; exchange-rate flexibility	Timely, targeted support to households and viable firms	Climate-informed debt sustainability analysis; green public investment
Financial	Macroprudential limits on credit booms; liquidity backstops	Continuity of credit to viable firms	Climate risk in prudential supervision; transition finance
Structural and trade	Diversified export markets and input sources	Labor-market reallocation and skills development	Capability building in related, complex, and low-carbon activities
Climate and infrastructure	Disaster risk finance and emergency response	Rapid restoration of resilient infrastructure services	Low-carbon energy systems and adaptation investment
Institutional	Credible and transparent policy frameworks	Administrative capacity for rapid implementation	Coordination of structural change; institutions for managing distributional conflict

Source: Author's synthesis based on the reviewed literature.

Limitations and Future Research

The review has limitations that qualify its conclusions. As an integrative rather than systematic review, it does not claim exhaustive coverage, and the selection of sources, although guided by explicit criteria, involves judgment; the restriction to English-language publications may underrepresent evidence from non-Anglophone contexts. Most of the cited evidence is observational, and identification strategies vary across studies, so several relationships in the framework remain correlational. Regional and sectoral findings were used to illuminate mechanisms but may not generalize to national economies, and the published evidence may be affected by publication bias. Future research should test the propositions with panel data that address cross-sectional dependence, heterogeneity, non-linearity, and endogeneity; extend the analysis to the micro level by examining the resilience of households and small and medium-sized enterprises; evaluate the effectiveness of green and climate finance, as well as Islamic social finance instruments, in strengthening adaptive capacity; and develop harmonized measures of transformative resilience that capture structural change after shocks.

CONCLUSION

This article set out to integrate fragmented literatures on economic resilience, resource diversification, climate risk, institutional quality, and sustainable development. The synthesis shows that resilience is best understood not as a single attribute but as a set of absorptive, adaptive, and transformative capacities whose contribution to sustainable development depends on the structure of the economy and the quality of its institutions. Policy space and external buffers limit the immediate damage of shocks, faster recovery prevents persistent scarring, climate vulnerability erodes these capacities through fiscal and financial channels, and diversification provides insurance whose value depends on the type of shock and on whether it deepens complex and low-carbon capabilities. The article contributes to science by offering an integrative framework that connects these mechanisms, by deriving propositions that turn the framework into a testable research program, and by specifying estimation strategies suited to heterogeneous and interdependent country panels. For policymakers, the central message is that strengthening resilience and pursuing sustainable development are complementary only when buffers, capabilities, and institutions are built together, a lesson of particular relevance for resource-rich emerging economies such as Indonesia.

ACKNOWLEDGMENT

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

DECLARATION OF COMPETING INTEREST

The author declares that there are no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

USE OF ARTIFICIAL INTELLIGENCE (AI)-ASSISTED TECHNOLOGY

The authors declare that no artificial intelligence (AI) tools were used in the preparation, analysis, or writing of this manuscript. All aspects of the research, including data collection, interpretation, and manuscript preparation, were carried out entirely by the authors without the assistance of AI-based technologies.

REFERENCES

- Acemoglu, D., Carvalho, V. M., Ozdaglar, A., & Tahbaz-Salehi, A. (2012). The network origins of aggregate fluctuations. *Econometrica*, 80(5), 1977–2016. <https://doi.org/10.3982/ECTA9623>
- Acemoglu, D., Johnson, S., Robinson, J., & Thaicharoen, Y. (2003). Institutional causes, macroeconomic symptoms: Volatility, crises and growth. *Journal of Monetary Economics*, 50(1), 49–123. [https://doi.org/10.1016/S0304-3932\(02\)00208-8](https://doi.org/10.1016/S0304-3932(02)00208-8)
- Afolabi, J. A., & Raifu, I. A. (2025). Toward economic resilience in Sub-Saharan Africa: The role of institutional quality and human capital development. *Sustainable Development*, 33(2), 2566–2578. <https://doi.org/10.1002/sd.3251>
- Andres, P., Mealy, P., Handler, N., & Fankhauser, S. (2023). Stranded nations? Transition risks and opportunities towards a clean economy. *Environmental Research Letters*, 18(4), Article 045004. <https://doi.org/10.1088/1748-9326/acc347>

- Ardelean, A., León-Ledesma, M., & Puzzello, L. (2024). Growth volatility and trade: Market diversification vs. production specialization. *Journal of Economic Behavior & Organization*, 225, 252–271. <https://doi.org/10.1016/j.jebo.2024.07.001>
- Ashraf, B. N., Goodell, J. W., & Butt, S. (2024). SDGs and economic resilience: Evidence from the COVID-19 shock. *Journal of Sustainable Finance and Accounting*, 4, Article 100015. <https://doi.org/10.1016/j.josfa.2024.100015>
- Assarkhaniki, Z., Sabri, S., Rajabifard, A., & Kahalimoghadam, M. (2023). Advancing sustainable development goals: Embedding resilience assessment. *Sustainability Science*, 18(5), 2405–2421. <https://doi.org/10.1007/s11625-023-01372-7>
- Asyono, A. H., Samputra, P. L., & Djatmiko, H. (2026). Domestic structural transformation in a critical mineral economy: A multisectoral assessment of Indonesia's nickel downstream strategy. *Economies*, 14(4), Article 133. <https://doi.org/10.3390/economies14040133>
- Baldwin, R., & Freeman, R. (2022). Risks and global supply chains: What we know and what we need to know. *Annual Review of Economics*, 14, 153–180. <https://doi.org/10.1146/annurev-economics-051420-113737>
- Bank Indonesia. (2024). *Economic report on Indonesia 2023: Synergy strengthening national economic resilience and revival*. Bank Indonesia.
- Beck, N., & Katz, J. N. (1995). What to do (and not to do) with time-series cross-section data. *American Political Science Review*, 89(3), 634–647. <https://doi.org/10.2307/2082979>
- Beirne, J., Renzhi, N., & Volz, U. (2021a). Bracing for the typhoon: Climate change and sovereign risk in Southeast Asia. *Sustainable Development*, 29(3), 537–551. <https://doi.org/10.1002/sd.2199>
- Beirne, J., Renzhi, N., & Volz, U. (2021b). Feeling the heat: Climate risks and the cost of sovereign borrowing. *International Review of Economics & Finance*, 76, 920–936. <https://doi.org/10.1016/j.iref.2021.06.019>
- Béné, C., Newsham, A., Davies, M., Ulrichs, M., & Godfrey-Wood, R. (2014). Resilience, poverty and development. *Journal of International Development*, 26(5), 598–623. <https://doi.org/10.1002/jid.2992>
- Bergant, K., & Forbes, K. (2023). Policy packages and policy space: Lessons from COVID-19. *European Economic Review*, 158, Article 104499. <https://doi.org/10.1016/j.euroecorev.2023.104499>
- Blundell, R., & Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. *Journal of Econometrics*, 87(1), 115–143. [https://doi.org/10.1016/S0304-4076\(98\)00009-8](https://doi.org/10.1016/S0304-4076(98)00009-8)
- Bonadio, B., Huo, Z., Levchenko, A. A., & Pandalai-Nayar, N. (2021). Global supply chains in the pandemic. *Journal of International Economics*, 133, Article 103534. <https://doi.org/10.1016/j.jinteco.2021.103534>
- Boschma, R. (2015). Towards an evolutionary perspective on regional resilience. *Regional Studies*, 49(5), 733–751. <https://doi.org/10.1080/00343404.2014.959481>
- Briguglio, L. P. (2016). Exposure to external shocks and economic resilience of countries: Evidence from global indicators. *Journal of Economic Studies*, 43(6), 1057–1078. <https://doi.org/10.1108/JES-12-2014-0203>
- Briguglio, L., Cordina, G., Farrugia, N., & Vella, S. (2009). Economic vulnerability and resilience: Concepts and measurements. *Oxford Development Studies*, 37(3), 229–247. <https://doi.org/10.1080/13600810903089893>

- Burke, M., Hsiang, S. M., & Miguel, E. (2015). Global non-linear effect of temperature on economic production. *Nature*, 527(7577), 235–239. <https://doi.org/10.1038/nature15725>
- Cadot, O., Carrère, C., & Strauss-Kahn, V. (2011). Export diversification: What's behind the hump? *Review of Economics and Statistics*, 93(2), 590–605. https://doi.org/10.1162/REST_a_00078
- Campiglio, E., Dafermos, Y., Monnin, P., Ryan-Collins, J., Schotten, G., & Tanaka, M. (2018). Climate change challenges for central banks and financial regulators. *Nature Climate Change*, 8(6), 462–468. <https://doi.org/10.1038/s41558-018-0175-0>
- Capoani, L., Fantinelli, M., & Giordano, L. (2025). The concept of resilience in economics: A comprehensive analysis and systematic review of economic literature. *Continuity & Resilience Review*, 7(2), 121–145. <https://doi.org/10.1108/CRR-11-2024-0045>
- Carvalho, V. M., Nirei, M., Saito, Y. U., & Tahbaz-Salehi, A. (2021). Supply chain disruptions: Evidence from the Great East Japan Earthquake. *The Quarterly Journal of Economics*, 136(2), 1255–1321. <https://doi.org/10.1093/qje/qjaa044>
- Cerra, V., Fatás, A., & Saxena, S. C. (2023). Hysteresis and business cycles. *Journal of Economic Literature*, 61(1), 181–225. <https://doi.org/10.1257/jel.20211584>
- Cerra, V., & Saxena, S. C. (2008). Growth dynamics: The myth of economic recovery. *American Economic Review*, 98(1), 439–457. <https://doi.org/10.1257/aer.98.1.439>
- Cevik, S., & Jalles, J. T. (2022a). An apocalypse foretold: Climate shocks and sovereign defaults. *Open Economies Review*, 33(1), 89–108. <https://doi.org/10.1007/s11079-021-09624-8>
- Cevik, S., & Jalles, J. T. (2022b). This changes everything: Climate shocks and sovereign bonds. *Energy Economics*, 107, Article 105856. <https://doi.org/10.1016/j.eneco.2022.105856>
- Chaigneau, T., Coulthard, S., Daw, T. M., Szaboova, L., Camfield, L., Chapin, F. S., Gasper, D., Gurney, G. G., Hicks, C. C., Ibrahim, M., James, T., Jones, L., Matthews, N., McQuistan, C., Reyers, B., & Brown, K. (2022). Reconciling well-being and resilience for sustainable development. *Nature Sustainability*, 5(4), 287–293. <https://doi.org/10.1038/s41893-021-00790-8>
- Chavas, J.-P. (2024). Economic resilience: Measurement and assessment across time and space. *Research in Economics*, 78(2), Article 100953. <https://doi.org/10.1016/j.rie.2024.100953>
- Chen, H.-Y., Chen, S.-S., & Chang, C.-C. (2024). How do institutions affect output recovery after financial crises? *Journal of International Money and Finance*, 146, Article 103120. <https://doi.org/10.1016/j.jimonfin.2024.103120>
- Chudik, A., & Pesaran, M. H. (2015). Common correlated effects estimation of heterogeneous dynamic panel data models with weakly exogenous regressors. *Journal of Econometrics*, 188(2), 393–420. <https://doi.org/10.1016/j.jeconom.2015.03.007>
- Cronin, M. A., & George, E. (2023). The why and how of the integrative review. *Organizational Research Methods*, 26(1), 168–192. <https://doi.org/10.1177/1094428120935507>
- Dell, M., Jones, B. F., & Olken, B. A. (2012). Temperature shocks and economic growth: Evidence from the last half century. *American Economic Journal: Macroeconomics*, 4(3), 66–95. <https://doi.org/10.1257/mac.4.3.66>
- Díaz, D. A., Larroulet, C., & Marticorena, A. (2026). Institutional quality and pandemic resilience: Cross-country evidence on health and economic outcomes during COVID-19. *Globalization and Health*. Advance online publication. <https://doi.org/10.1186/s12992-026-01230-y>

- Driscoll, J. C., & Kraay, A. C. (1998). Consistent covariance matrix estimation with spatially dependent panel data. *Review of Economics and Statistics*, 80(4), 549–560. <https://doi.org/10.1162/003465398557825>
- Eichengreen, B., Park, D., & Shin, K. (2024). Economic resilience: Why some countries recover more robustly than others from shocks. *Economic Modelling*, 136, Article 106748. <https://doi.org/10.1016/j.econmod.2024.106748>
- Ezcurra, R., & Rios, V. (2019). Quality of government and regional resilience in the European Union. Evidence from the Great Recession. *Papers in Regional Science*, 98(3), 1267–1291. <https://doi.org/10.1111/pirs.12417>
- G7 Panel on Economic Resilience. (2021). *Global economic resilience: Building forward better*. United Kingdom Presidency of the G7.
- Gomez, M., Mejia, A., Ruddell, B. L., & Rushforth, R. R. (2021). Supply chain diversity buffers cities against food shocks. *Nature*, 595(7866), 250–254. <https://doi.org/10.1038/s41586-021-03621-0>
- Grabner, S., & Modica, M. (2022). Industrial resilience, regional diversification and related variety during times of crisis in the US urban–rural context. *Regional Studies*, 56(10), 1605–1617. <https://doi.org/10.1080/00343404.2021.2002837>
- Grossman, G. M., Helpman, E., & Lhuillier, H. (2023). Supply chain resilience: Should policy promote international diversification or reshoring? *Journal of Political Economy*, 131(12), 3462–3496. <https://doi.org/10.1086/725173>
- Güneri, B., & Yalta, A. Y. (2021). Does economic complexity reduce output volatility in developing countries? *Bulletin of Economic Research*, 73(3), 411–431. <https://doi.org/10.1111/boer.12257>
- Haddad, M., Lim, J. J., Pancaro, C., & Saborowski, C. (2013). Trade openness reduces growth volatility when countries are well diversified. *Canadian Journal of Economics*, 46(2), 765–790. <https://doi.org/10.1111/caje.12031>
- Hafele, J., Bertram, L., Demitry, N., Le Lannou, L.-A., Korinek, L., & Barth, J. (2023). *The economic resilience index: Assessing the ability of EU economies to thrive in times of change*. ZOE Institute for Future-fit Economies.
- Hallegatte, S. (2014). *Economic resilience: Definition and measurement* (Policy Research Working Paper No. 6852). World Bank. <https://doi.org/10.1596/1813-9450-6852>
- Hallegatte, S., Rentschler, J., & Rozenberg, J. (2019). *Lifelines: The resilient infrastructure opportunity*. World Bank. <https://doi.org/10.1596/978-1-4648-1430-3>
- Hamdi, F., Souam, S., & Zouikri, M. (2025). The heterogeneous effect of economic complexity on growth and human development: New empirical evidence using buffered panel threshold regression. *The World Economy*, 48(12), 2561–2592. <https://doi.org/10.1111/twec.70023>
- Hansen, B. E. (1999). Threshold effects in non-dynamic panels: Estimation, testing, and inference. *Journal of Econometrics*, 93(2), 345–368. [https://doi.org/10.1016/S0304-4076\(99\)00025-1](https://doi.org/10.1016/S0304-4076(99)00025-1)
- Hara, N., & Yamamoto, Y. (2026). Testing and quantifying economic resilience. *Journal of Regional Science*. Advance online publication. <https://doi.org/10.1111/jors.70098>
- Hartmann, D., Guevara, M. R., Jara-Figueroa, C., Aristarán, M., & Hidalgo, C. A. (2017). Linking economic complexity, institutions, and income inequality. *World Development*, 93, 75–93. <https://doi.org/10.1016/j.worlddev.2016.12.020>

- Hasan, M. B., Uddin, G. S., Ali, M. S., Park, D., & Beirne, J. (2025). *Impact of economic and climate resilience on sustainable development: A cross-country analysis* (ADB Economics Working Paper Series No. 795). Asian Development Bank. <https://doi.org/10.22617/WPS250309-2>
- Hashiguchi, Y., Yamano, N., & Webb, C. (2022). How thick is your armour? Measuring economic resilience to shocks in global production networks. *Economic Systems Research*, 34(4), 410–439. <https://doi.org/10.1080/09535314.2021.1958764>
- Hausmann, R., Hwang, J., & Rodrik, D. (2007). What you export matters. *Journal of Economic Growth*, 12(1), 1–25. <https://doi.org/10.1007/s10887-006-9009-4>
- He, C., Chen, T., & Zhu, S. (2021). Do not put eggs in one basket: Related variety and export resilience in the post-crisis era. *Industrial and Corporate Change*, 30(6), 1655–1676. <https://doi.org/10.1093/icc/dtab044>
- Hickel, J. (2020). The sustainable development index: Measuring the ecological efficiency of human development in the anthropocene. *Ecological Economics*, 167, Article 106331. <https://doi.org/10.1016/j.ecolecon.2019.05.011>
- Hidalgo, C. A., & Hausmann, R. (2009). The building blocks of economic complexity. *Proceedings of the National Academy of Sciences*, 106(26), 10570–10575. <https://doi.org/10.1073/pnas.0900943106>
- Hidalgo, C. A., Klinger, B., Barabási, A.-L., & Hausmann, R. (2007). The product space conditions the development of nations. *Science*, 317(5837), 482–487. <https://doi.org/10.1126/science.1144581>
- Hidayati, F., Puspitawati, D., & Aliriad, H. (2025). Indonesia's economic resilience through resource diversification: An overview from a national resilience perspective. *European Public & Social Innovation Review*, 11, 1–18. <https://doi.org/10.31637/epsir-2026-2147>
- Holling, C. S. (1973). Resilience and stability of ecological systems. *Annual Review of Ecology and Systematics*, 4, 1–23. <https://doi.org/10.1146/annurev.es.04.110173.000245>
- Jaakkola, E. (2020). Designing conceptual articles: Four approaches. *AMS Review*, 10(1–2), 18–26. <https://doi.org/10.1007/s13162-020-00161-0>
- Jordà, Ò. (2005). Estimation and inference of impulse responses by local projections. *American Economic Review*, 95(1), 161–182. <https://doi.org/10.1257/0002828053828518>
- Kahn, M. E., Mohaddes, K., Ng, R. N. C., Pesaran, M. H., Raissi, M., & Yang, J.-C. (2021). Long-term macroeconomic effects of climate change: A cross-country analysis. *Energy Economics*, 104, Article 105624. <https://doi.org/10.1016/j.eneco.2021.105624>
- Kaufmann, D., Kraay, A., & Mastruzzi, M. (2011). The Worldwide Governance Indicators: Methodology and analytical issues. *Hague Journal on the Rule of Law*, 3(2), 220–246. <https://doi.org/10.1017/S1876404511200046>
- Kee, H. L., & Xie, E. (2025). *Nickel, steel and cars: Export ban and domestic value-added in Indonesia* (Policy Research Working Paper No. 11249). World Bank. <https://doi.org/10.1596/1813-9450-11249>
- Kilian, L. (2009). Not all oil price shocks are alike: Disentangling demand and supply shocks in the crude oil market. *American Economic Review*, 99(3), 1053–1069. <https://doi.org/10.1257/aer.99.3.1053>

- Kling, G., Volz, U., Murinde, V., & Ayas, S. (2021). The impact of climate vulnerability on firms' cost of capital and access to finance. *World Development*, 137, Article 105131. <https://doi.org/10.1016/j.worlddev.2020.105131>
- Klomp, J., & Valckx, K. (2014). Natural disasters and economic growth: A meta-analysis. *Global Environmental Change*, 26, 183–195. <https://doi.org/10.1016/j.gloenvcha.2014.02.006>
- Klusak, P., Agarwala, M., Burke, M., Kraemer, M., & Mohaddes, K. (2023). Rising temperatures, falling ratings: The effect of climate change on sovereign creditworthiness. *Management Science*, 69(12), 7468–7491. <https://doi.org/10.1287/mnsc.2023.4869>
- Koren, M., & Tenreyro, S. (2007). Volatility and development. *The Quarterly Journal of Economics*, 122(1), 243–287. <https://doi.org/10.1162/qjec.122.1.243>
- Kose, M. A., Kurlat, S., Ohnsorge, F., & Sugawara, N. (2022). A cross-country database of fiscal space. *Journal of International Money and Finance*, 128, Article 102682. <https://doi.org/10.1016/j.jimonfin.2022.102682>
- Kuokštis, V., & Kuokštytė, R. (2023). How institutions moderated the pandemic's economic impact in EU member states. *JCMS: Journal of Common Market Studies*, 61(2), 503–525. <https://doi.org/10.1111/jcms.13385>
- Lashitew, A. A., & Werker, E. (2020). Do natural resources help or hinder development? Resource abundance, dependence, and the role of institutions. *Resource and Energy Economics*, 61, Article 101183. <https://doi.org/10.1016/j.reseneeco.2020.101183>
- Li, Y., Cheng, W., & Xiao, W. (2024). Measuring national economic resilience to the SARS and COVID-19 pandemics. *Applied Economics*, 56(51), 6467–6482. <https://doi.org/10.1080/00036846.2023.2274304>
- Lichtenberger, A., & Stehrer, R. (2024). *Exploring the economic resilience of low vs. high carbon intensity sectors* (wiiw Policy Notes and Reports No. 83). The Vienna Institute for International Economic Studies. <https://wiiw.ac.at/p-6970.html>
- Machado, J. A. F., & Santos Silva, J. M. C. (2019). Quantiles via moments. *Journal of Econometrics*, 213(1), 145–173. <https://doi.org/10.1016/j.jeconom.2019.04.009>
- Martin, R. (2012). Regional economic resilience, hysteresis and recessionary shocks. *Journal of Economic Geography*, 12(1), 1–32. <https://doi.org/10.1093/jeg/lbr019>
- Martin, R., & Sunley, P. (2015). On the notion of regional economic resilience: Conceptualization and explanation. *Journal of Economic Geography*, 15(1), 1–42. <https://doi.org/10.1093/jeg/lbu015>
- Mealy, P., & Teytelboym, A. (2022). Economic complexity and the green economy. *Research Policy*, 51(8), Article 103948. <https://doi.org/10.1016/j.respol.2020.103948>
- Mehlum, H., Moene, K., & Torvik, R. (2006). Institutions and the resource curse. *The Economic Journal*, 116(508), 1–20. <https://doi.org/10.1111/j.1468-0297.2006.01045.x>
- Moreno, A., Guevara, D., Andrade, J., Pierros, C., Godin, A., Yilmaz, S. D., & Valdecantos, S. (2024). Low-carbon transition and macroeconomic vulnerabilities: A multidimensional approach in tracing vulnerabilities and its application in the case of Colombia. *International Journal of Political Economy*, 53(1), 43–66. <https://doi.org/10.1080/08911916.2024.2318995>
- Mpuure, D. M.-N., & Mengba, J. D. (2024). Natural resource dependence, policy and institutions for environmental sustainability and African welfare. *Sustainable Development*, 32(3), 2176–2193. <https://doi.org/10.1002/sd.2752>

- New Zealand Productivity Commission. (2024). *Improving economic resilience: Report on a Productivity Commission inquiry*. Te Kōmihana Whai Hua o Aotearoa.
- Nguyen, D. T., Duong, K. T., Phung, H. T. T., & Ha, M. Q. (2024). Pandemics and economic complexity: A cross-country analysis. *International Economic Journal*, 38(1), 103–129. <https://doi.org/10.1080/10168737.2023.2300309>
- North, D. C. (1990). *Institutions, institutional change and economic performance*. Cambridge University Press.
- Noy, I. (2009). The macroeconomic consequences of disasters. *Journal of Development Economics*, 88(2), 221–231. <https://doi.org/10.1016/j.jdeveco.2008.02.005>
- Olaniyi, C. O., & Odhiambo, N. M. (2025). Does economic complexity provide antidotal pathways to evade the resource curse syndrome? A novel role for institutions. *Sustainable Development*, 33(2), 3118–3142. <https://doi.org/10.1002/sd.3266>
- Park, A. S. (2024). Understanding resilience in sustainable development: Rallying call or siren song? *Sustainable Development*, 32(1), 260–274. <https://doi.org/10.1002/sd.2645>
- Pesaran, M. H. (2006). Estimation and inference in large heterogeneous panels with a multifactor error structure. *Econometrica*, 74(4), 967–1012. <https://doi.org/10.1111/j.1468-0262.2006.00692.x>
- Pesaran, M. H. (2007). A simple panel unit root test in the presence of cross-section dependence. *Journal of Applied Econometrics*, 22(2), 265–312. <https://doi.org/10.1002/jae.951>
- Pesaran, M. H. (2021). General diagnostic tests for cross-sectional dependence in panels. *Empirical Economics*, 60(1), 13–50. <https://doi.org/10.1007/s00181-020-01875-7>
- Plagborg-Møller, M., & Wolf, C. K. (2021). Local projections and VARs estimate the same impulse responses. *Econometrica*, 89(2), 955–980. <https://doi.org/10.3982/ECTA17813>
- Reyers, B., Moore, M.-L., Haider, L. J., & Schlüter, M. (2022). The contributions of resilience to reshaping sustainable development. *Nature Sustainability*, 5(8), 657–664. <https://doi.org/10.1038/s41893-022-00889-6>
- Rios, V., & Gianmoena, L. (2020). The link between quality of government and regional resilience in Europe. *Journal of Policy Modeling*, 42(5), 1064–1084. <https://doi.org/10.1016/j.jpolmod.2020.02.005>
- Rodrik, D. (1999). Where did all the growth go? External shocks, social conflict, and growth collapses. *Journal of Economic Growth*, 4(4), 385–412. <https://doi.org/10.1023/A:1009863208706>
- Romer, C. D., & Romer, D. H. (2018). Phillips lecture – Why some times are different: Macroeconomic policy and the aftermath of financial crises. *Economica*, 85(337), 1–40. <https://doi.org/10.1111/ecca.12258>
- Romero, J. P., & Gramkow, C. (2021). Economic complexity and greenhouse gas emissions. *World Development*, 139, Article 105317. <https://doi.org/10.1016/j.worlddev.2020.105317>
- Rose, A. (2004). Defining and measuring economic resilience to disasters. *Disaster Prevention and Management*, 13(4), 307–314. <https://doi.org/10.1108/09653560410556528>
- Saadani, N., & Dhahri, S. (2026). The impact of natural resource rents on sustainable development dimensions in resource-rich countries. *Sustainable Development*. Advance online publication. <https://doi.org/10.1002/sd.71012>

- Sachs, J. D., Schmidt-Traub, G., Mazzucato, M., Messner, D., Nakicenovic, N., & Rockström, J. (2019). Six transformations to achieve the Sustainable Development Goals. *Nature Sustainability*, 2(9), 805–814. <https://doi.org/10.1038/s41893-019-0352-9>
- Sachs, J. D., & Warner, A. M. (2001). The curse of natural resources. *European Economic Review*, 45(4–6), 827–838. [https://doi.org/10.1016/S0014-2921\(01\)00125-8](https://doi.org/10.1016/S0014-2921(01)00125-8)
- Salamaliki, P. K., & Venetis, I. A. (2024). Fiscal space and policy response to financial crises: Market access and deficit concerns. *Open Economies Review*, 35(2), 323–361. <https://doi.org/10.1007/s11079-023-09724-7>
- Scordato, L., & Gulbrandsen, M. (2024). Resilience perspectives in sustainability transitions research: A systematic literature review. *Environmental Innovation and Societal Transitions*, 52, Article 100887. <https://doi.org/10.1016/j.eist.2024.100887>
- Scown, M. W., Craig, R. K., Allen, C. R., Gunderson, L., Angeler, D. G., Garcia, J. H., & Garmestani, A. (2023). Towards a global sustainable development agenda built on social–ecological resilience. *Global Sustainability*, 6, Article e8. <https://doi.org/10.1017/sus.2023.8>
- Seghini, C. (2026). The macroeconomics of climate change and public debt sustainability: Mapping transition and physical risks through output growth, primary balances, and real rates. *Journal of Economic Surveys*, 40(3), 1281–1305. <https://doi.org/10.1111/joes.70060>
- Semieniuk, G., Holden, P. B., Mercure, J.-F., Salas, P., Pollitt, H., Jobson, K., Vercoulen, P., Chewpreecha, U., Edwards, N. R., & Viñuales, J. E. (2022). Stranded fossil-fuel assets translate to major losses for investors in advanced economies. *Nature Climate Change*, 12(6), 532–538. <https://doi.org/10.1038/s41558-022-01356-y>
- Seo, M. H., & Shin, Y. (2016). Dynamic panels with threshold effect and endogeneity. *Journal of Econometrics*, 195(2), 169–186. <https://doi.org/10.1016/j.jeconom.2016.03.005>
- Sever, C. (2022). Financial crises and institutional quality. *International Journal of Finance & Economics*, 27(1), 1510–1525. <https://doi.org/10.1002/ijfe.2228>
- Snyder, H. (2019). Literature review as a research methodology: An overview and guidelines. *Journal of Business Research*, 104, 333–339. <https://doi.org/10.1016/j.jbusres.2019.07.039>
- Stojkoski, V., Koch, P., & Hidalgo, C. A. (2023). Multidimensional economic complexity and inclusive green growth. *Communications Earth & Environment*, 4, Article 130. <https://doi.org/10.1038/s43247-023-00770-0>
- Sutton, J., & Arku, G. (2022). Regional economic resilience: Towards a system approach. *Regional Studies, Regional Science*, 9(1), 497–512. <https://doi.org/10.1080/21681376.2022.2092418>
- Torraco, R. J. (2005). Writing integrative literature reviews: Guidelines and examples. *Human Resource Development Review*, 4(3), 356–367. <https://doi.org/10.1177/1534484305278283>
- Tsiotas, D., & Katsaiti, M.-S. (2025). A 3D index for measuring economic resilience with application to modern financial crises. *Journal of International Development*, 37(2), 371–404. <https://doi.org/10.1002/jid.3957>
- Valdecantos, S. (2025). The green transition dilemma: The impossible (?) quest for prosperity of South American economies. *Ecological Economics*, 230, Article 108508. <https://doi.org/10.1016/j.ecolecon.2024.108508>
- van der Ploeg, F. (2011). Natural resources: Curse or blessing? *Journal of Economic Literature*, 49(2), 366–420. <https://doi.org/10.1257/jel.49.2.366>

Volume 1(1), September 2026

- Vu, T. V. (2022). Does institutional quality foster economic complexity? The fundamental drivers of productive capabilities. *Empirical Economics*, 63(3), 1571–1604. <https://doi.org/10.1007/s00181-021-02175-4>
- Walker, B., Holling, C. S., Carpenter, S. R., & Kinzig, A. (2004). Resilience, adaptability and transformability in social–ecological systems. *Ecology and Society*, 9(2), Article 5. <https://doi.org/10.5751/ES-00650-090205>
- Wang, Z., & Wei, W. (2021). Regional economic resilience in China: Measurement and determinants. *Regional Studies*, 55(7), 1228–1239. <https://doi.org/10.1080/00343404.2021.1872779>
- Webster, J., & Watson, R. T. (2002). Analyzing the past to prepare for the future: Writing a literature review. *MIS Quarterly*, 26(2), xiii–xxiii. <https://doi.org/10.2307/4132319>
- World Trade Organization. (2021). *World trade report 2021: Economic resilience and trade*. World Trade Organization.
- Zélity, B. (2025). Export diversification and macroeconomic shocks. *The World Economy*, 48(4), 742–778. <https://doi.org/10.1111/twec.13653>

Author's Bio*

Rio Razab Isdendi, Institut Citra Buana Indonesia, Email: riorazabisdendi@gmail.com, and
Orcid: <https://orcid.org/0000-0002-8926-4656>