

Economic Convergence Under Compound Shocks: Resilience Strategies for Developing Nations

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Research Article

Keywords: economic convergence, compound shocks, polycrisis, hysteresis, output scarring, growth spells, resilience, developing economies, emerging markets, sovereign debt, fiscal space, fiscal rules, stabilisation funds, procyclicality, bank–sovereign nexus, currency mismatch, disaster risk finance, pre-arranged finance, catastrophe bonds, climate-resilient debt clauses, adaptive social protection, human capital, Common Framework, Global South

Posted Date: September 21st, 2026

DOI: <https://doi.org/10.21203/rs.3.rs-11067201/v1>

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Additional Declarations: The authors declare no competing interests.

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Navigating a Changing World

Economic Convergence Under Compound Shocks

Resilience Strategies for Developing Nations

Why catch-up is won or lost in the recoveries — the frequency, depth, persistence and coupling of shocks, and how to reduce each

H Heuristics · Hunter Hughes

Research Report · September 2026

Abstract

Developing economies rarely fall behind because their good years are too slow. They fall behind because their bad years are too frequent, too deep and too long, and in the 2020s the bad years have begun to overlap. This report examines how compound shocks — financial, commodity, climate, health, conflict and global-financial disturbances that arrive in succession, coincide, or transmit from one system to another — affect the capacity of developing nations to converge with advanced economies, and which resilience strategies protect that convergence most efficiently.

The starting point is a historical regularity and a current fact. Broadberry and Wallis show, with annual data reaching back to the thirteenth century, that long-run economic improvement has come mainly from shrinking less often and less severely, not from growing faster in good years. The World Bank's June 2026 *Global Economic Prospects* shows what the opposite looks like: growth in emerging and developing economies falling to a post-pandemic low of 3.6 per cent as an energy shock lands before earlier recoveries were complete, and developing economies excluding China and India making essentially no progress in closing the income gap with advanced economies for close to a decade by 2028.

The report organises the problem around a shock-loss identity: the convergence an economy loses to shocks is approximately the product of their frequency, their depth, their persistence and their coupling. Persistence is decisive. Output lost in financial and most political crises is, on average, never regained, and a 90th-percentile tropical cyclone leaves national income 7.4 per cent below trend two decades later. The report introduces the recovery-interval ratio — recovery time divided by the typical interval between shocks — as a practical diagnostic: below one, losses form a sawtooth around a rising trend; near or above one, they form a ratchet. An illustrative simulation shows how strongly non-linear the stakes are: moving from a shock every eight years to one every four, with 30 per cent of each loss permanent, raises the convergence lost over three decades from about six years to about sixteen.

Coupling is the neglected term. Five recurring doom loops — bank–sovereign, currency–debt, import bill–reserves, disaster–debt and budget–human capital — turn modest shocks into crises, and each rests on an exposure acquired in calm times because it was cheap. Buffers are thin: developing-country net interest payments reached US\$921 billion in 2024, 61 countries spend at least a tenth of revenue on interest, and most disaster losses in emerging markets are uninsured. Timing matters as much as size, yet only about 2.7 per cent of international crisis finance in 2021 was pre-arranged.

Because the terms multiply, a balanced portfolio of strategies — prevent, buffer, repair and decouple — outperforms any single flagship. In the report's illustrative model, a portfolio applying each lever at half strength lifts the median end-point more than any one lever at full strength. Evidence from Bangladesh, Indonesia, Chile, Jamaica, Grenada, Sri Lanka and Zambia shows that the countries that protected their convergence did not avoid shocks; they changed how much each shock cost. The report closes with a three-phase sequence, eight principles, four reforms to the international architecture, and an explicit statement of the trade-offs and of the evidence that would falsify its argument.

Keywords: economic convergence; compound shocks; polycrisis; hysteresis; output scarring; growth spells; resilience; developing economies; emerging markets; sovereign debt; fiscal space; fiscal rules; stabilisation funds; procyclicality; bank–sovereign nexus; currency mismatch; disaster risk finance; pre-arranged finance; catastrophe bonds; climate-resilient debt clauses; adaptive social protection; human capital; Common Framework; Global South

JEL classification: O47, O11, E32, F34, H63, Q54, G01; convergence and aggregate growth; macroeconomic analyses of development; business fluctuations and cycles; international lending and debt problems; public debt management; climate and natural disasters; financial crises

Data and method: This report synthesises institutional and peer-reviewed research, including the World Bank's *Global Economic Prospects* (June 2026); Broadberry and Wallis on growing and shrinking; Kremer, Willis and You on convergence; Hausmann, Pritchett and Rodrik and Berg, Ostry and Zettelmeyer on growth episodes; Cerra and Saxena and Cerra, Fatás and Saxena on hysteresis; Laeven and Valencia on banking crises; Hsiang and Jina on cyclones and long-run growth; IMF and World Bank work on pandemic scarring and learning poverty; UNCTAD's *A World of Debt 2025*; the Swiss Re Institute's *sigma* 1/2026; the Centre for Disaster Protection on pre-arranged finance and debt-pause clauses; and primary and official sources on Bangladesh, Indonesia, Chile, Jamaica, Grenada, Dominica, Sri Lanka and Zambia. Every quantitative claim about the world is attributed inline. Figures 1, 7 and 13 are conceptual schematics; Figure 4 is stylised but anchored to cited magnitudes; Figure 12's placements are qualitative judgements; Figures 5, 6 and 10 are generated by an illustrative simulation of shocks and recoveries whose structure and parameters are stated in section 6 and which is not an estimate for any country; Figures 2, 3, 8 and 11 report values from the cited sources, and Figure 9 shows indicative timelines. The report is analytical rather than predictive.

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1. Introduction: Convergence Is Lost in the Recoveries

Developing economies rarely fall behind because their good years are too slow. They fall behind because their bad years are too frequent, too deep and too long, and because in the 2020s the bad years have begun to overlap. This report is about the shrinking side of the growth ledger, and what developing nations can do to control it.

1.1 The question this report asks

The central promise of development economics is that poorer countries can grow faster than richer ones and close the gap. Adopting a technology is cheaper than inventing it; capital earns more where it is scarce; an economy far from its potential can move toward it quickly. For most of the past half-century, the policy debate about how to realise that promise has concentrated on the upswing: how to start a growth acceleration, how to raise investment, how to move labour into more productive sectors, how to plug into global value chains.

This report asks a different question, one that the events of the 2020s have made unavoidable. **When shocks arrive more often, and increasingly arrive together, what determines whether a developing economy keeps converging, and which strategies protect that convergence?** The question is not whether shocks are costly, which is obvious, nor whether developing countries should prepare for them, which nobody disputes. It concerns mechanism: which features of a shock, and of the economy it hits, turn a temporary setback into a permanent loss of ground, and which policies act on those features most efficiently.

The answer developed here is that convergence under compound shocks is governed less by the rate of growth in good years than by four properties of the bad ones: how often shocks become crises, how far output falls when they do, how much of the loss is never recovered, and how strongly one shock amplifies the next. Those four properties multiply one another. Each responds to a different family of policies. And a developing nation that treats them as a single portfolio, rather than as four separate problems owned by four separate ministries, can recover a large part of the convergence that compound shocks would otherwise take away.

1.2 Why the question is urgent now

The 2020s have delivered a sequence of global shocks with little precedent in the post-war era: a pandemic, a surge in food and energy prices after Russia's invasion of Ukraine, the fastest tightening of global monetary conditions in four decades, a wave of sovereign defaults, a sharp increase in trade restrictions, record climate losses and, in 2026, a conflict in the Middle East that has pushed oil prices sharply higher. Each would have been a significant event on its own. The defining feature of the decade is that they have arrived before economies recovered from the one before.

The consequences for convergence are now visible in the data. The World Bank's [Global Economic Prospects of June 2026](#) projects global growth slowing from 2.9 per cent in 2025 to 2.5 per cent in 2026, the weakest rate since the pandemic, with growth in emerging market and developing economies (EMDEs) falling from 4.4 per cent to 3.6 per cent, a post-pandemic low. The [accompanying press release](#) reports Brent crude at around US\$94 a barrel, 36 per cent above its 2025 average, and global inflation rising to 4.0 per cent. Most tellingly for this report, developing economies excluding China and India are expected to

have made essentially no progress in narrowing the per capita income gap with advanced economies for close to a decade by 2028.

A lost decade of convergence is not the product of any single shock. It is the product of a sequence, each arriving while the damage from the previous one was still being repaired. That is the phenomenon this report calls compound shocks, and it is why the old habit of treating crises as discrete interruptions to an otherwise steady path no longer describes the experience of most developing nations.

1.3 The argument in brief

The argument rests on one historical finding and one identity. The finding, from Broadberry and Wallis, who assembled annual output data from the thirteenth century to the present, is that improvements in long-run economic performance have come mainly from a decline in the rate and frequency of shrinking, not from faster growth in expanding years. Indeed, as economies became richer, their short-run growth rate during expansions typically *fell*. What changed was that they stopped going backwards so often. Economies that converged learned, above all, not to lose ground.

The identity follows from that finding. Over any long period, the convergence an economy loses to shocks is approximately the product of four terms: the frequency with which shocks become crises, the depth of the output loss on impact, the persistence of that loss, and the coupling that makes each shock amplify the next. Figure 1 sets out the identity and the family of strategies that acts on each term.

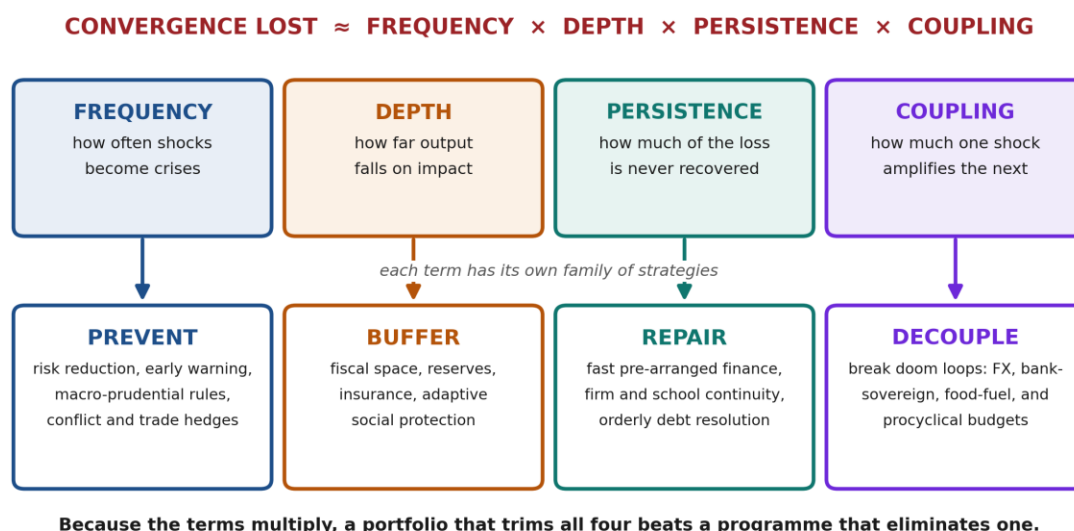


Figure 1. *The shock-loss identity: four multiplicative terms, four families of resilience strategy.*

H Heuristics. Conceptual schematic. The identity is an organising approximation developed in section 4; the strategy families are developed in sections 9 and 10.

Four propositions follow, and the report defends each in turn.

- **Persistence is the term that decides convergence.** Output lost to financial and most political crises is, on average, never regained; the economy resumes growth from a permanently lower path. A developing economy that recovers its growth rate but not its level has still fallen behind, and the evidence says that this is the normal outcome, not the exception.

- **Compound shocks are defined by timing, not by size.** When the typical interval between shocks is shorter than the typical time needed to recover, losses stop being a sawtooth around a rising trend and become a ratchet. The ratio of recovery time to shock interval is the single most useful diagnostic this report offers.
- **Coupling is the neglected term, and the cheapest to reduce.** Most of the damage in compound crises is done by channels that connect one balance sheet to another: banks to the sovereign, the exchange rate to foreign-currency debt, the food and fuel import bill to reserves, the budget to schools and clinics. These channels are policy choices, and they can be loosened before the next shock arrives.
- **Because the terms multiply, a balanced portfolio beats a single flagship.** Halving one term is worth less than trimming all four, and the most cost-effective instruments (pre-arranged finance, fiscal rules with escape clauses, adaptive social protection, lower foreign-currency exposure) are neither large nor glamorous.

1.4 Scope, method and what this report does not claim

The scope is the developing world as a whole, with particular attention to economies that are exposed to several kinds of shock at once: commodity exporters and importers, small island states, frontier markets with foreign-currency debt, and countries where climate hazards are rising fastest. The horizon is the next three decades, the period over which today's institutional choices will determine how much of each future shock becomes permanent.

The method is synthesis combined with a simple illustrative model. Every quantitative claim about the world is attributed inline to a primary or authoritative source. Several figures are conceptual schematics, and three (Figures 5, 6 and 10) are generated by a stylised simulation of shocks and recoveries whose parameters are stated in full in section 6. Those figures illustrate the logic of the argument; they are not estimates for any particular country, and the report says so wherever they appear.

Three things the report does not claim. It does not claim that resilience substitutes for the conventional drivers of growth: investment, skills, institutions and openness still set how fast an economy can grow when it is not being hit. It does not claim that all shocks can be prevented; many cannot, which is precisely why depth, persistence and coupling matter. And it does not claim that resilience is free. Buffers have an opportunity cost, insurance has a premium, and section 14 treats those trade-offs as genuine constraints.

2. The Convergence Record in an Age of Overlapping Shocks

2.1 What the theory promises

The convergence hypothesis comes in two strengths. Unconditional convergence holds that poor countries grow faster than rich ones simply because they are poor. Conditional convergence, the weaker and more defensible claim, holds that each economy moves toward its own long-run position, set by its savings rate, human capital, institutions and the efficiency with which it allocates capital. For decades the data supported only the conditional version. Poor countries as a group did not catch up; many fell further behind.

That began to change around the turn of the century. Kremer, Willis and You document that the cross-country relationship between initial income and subsequent growth moved from clearly divergent in the 1960s to convergent by the 2000s, and attribute the shift largely to improvements in the policies, institutions and human capital of poorer countries. Convergence, in other words, was earned, and what was earned can be lost. The question of the 2020s is whether the improvements that made convergence possible are robust to a much harsher shock environment.

2.2 Growth spells and why they end

A second body of work looks not at average growth but at its episodes. Hausmann, Pritchett and Rodrik identified more than 80 growth accelerations since the 1950s, episodes in which growth rose sharply and stayed high for at least eight years. They found that accelerations are common, hard to predict, and frequently fizzle out: those triggered by external shocks tend to fade, while those accompanied by economic reform are more likely to be sustained.

Berg, Ostry and Zettelmeyer, studying growth spells in 140 countries, reached a complementary conclusion that is central to this report. What distinguishes successful developing economies is less their ability to start growing than their ability to keep growing. Growth spells tend to be shorter in Africa and Latin America than in fast-converging East Asia, and the duration of a spell is associated with a more equal income distribution, stronger institutions, export orientation, avoidance of overvalued exchange rates and macroeconomic stability. Several of those characteristics are, in effect, shock absorbers.

Put the two literatures together with Broadberry and Wallis and a consistent picture emerges. Developing economies do not lack good years. They lack protection against bad ones. The typical story of a country that failed to converge is not a story of permanently slow growth but of repeated reversals: a decade of catch-up erased by a banking crisis, a commodity collapse, a conflict or a disaster, followed by a long climb back to where the country had already been.

2.3 The stalled decade

The 2020s have made that pattern visible across the developing world at once. Figure 2 shows the World Bank's current outlook. EMDE growth had recovered to 4.4 per cent in 2025 before the 2026 energy shock cut it to a projected 3.6 per cent; the rebound projected for 2027 depends on that shock fading. The regional picture is highly uneven. South Asia continues to grow above 6 per cent, and East Asia and the Pacific above 4 per cent, while Latin America and the Caribbean and Europe and Central Asia hover near 2 per cent and the Middle East and North Africa, closest to the conflict, slows to 1.6 per cent.

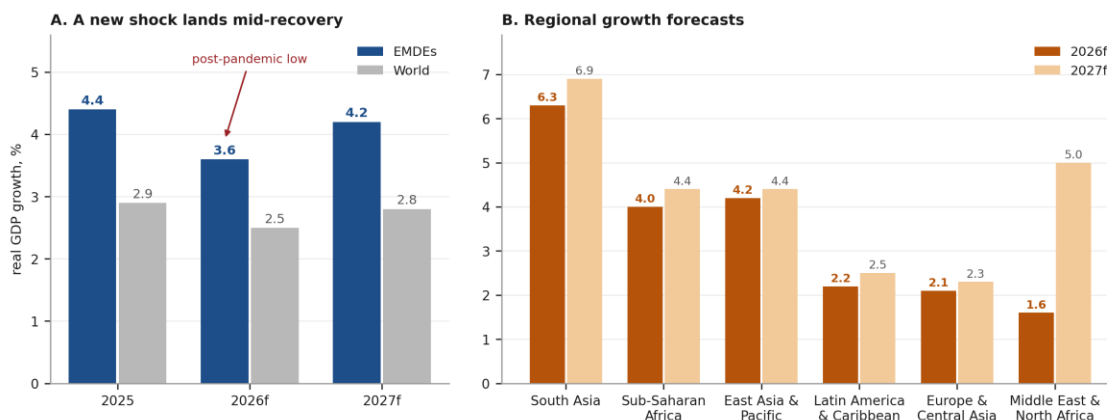


Figure 2. *A new shock lands before the last recovery is complete: growth outlook, June 2026.*

Data: World Bank, *Global Economic Prospects*, June 2026, and accompanying press release. 2026 and 2027 are forecasts. EMDEs = emerging market and developing economies.

Two features of this picture matter for the argument. First, the 2026 shock did not hit economies at full strength. It hit economies whose public debt had risen sharply during the pandemic, whose central banks had only recently brought inflation down, and whose borrowing costs remained well above pre-2020 levels. That is the definition of a compound shock: its damage depends on what the previous shocks left behind.

Second, the losses are concentrated among the economies least able to absorb them. The regions growing fastest are those with the deepest domestic markets, the largest reserves and the most diversified economies. The regions stalling are, disproportionately, commodity-dependent, fuel-importing, highly indebted or conflict-affected. Convergence has not stopped everywhere; it has become selective, and the selection criterion is increasingly the capacity to absorb shocks.

3. What Makes a Shock Compound

A compound shock is not simply a large shock or several shocks in the same year. It is a shock whose effect depends on the state in which earlier shocks left the economy, or which transmits through channels that turn one kind of damage into another.

3.1 A working typology

Developing economies face six broad classes of shock. Table 1 summarises each, together with its typical depth, its typical persistence and the main channel through which it couples with the others. The magnitudes are drawn from the sources discussed in this and the following sections and should be read as orders of magnitude rather than precise estimates.

Table 1. Six classes of shock: depth, persistence and coupling

Shock class	Typical depth on impact	Typical persistence	Main coupling channel	Representative evidence
Financial (banking, currency, sovereign debt)	Large: several per cent of GDP, larger in twin or triple crises	High: on average no rebound to the pre-crisis trend	Bank-sovereign loop; foreign-currency debt revalued by depreciation	Cerra and Saxena ; Laeven and Valencia , 151 systemic banking crises, 1970–2017
Terms of trade (commodity prices)	Moderate to large for concentrated exporters and importers	Moderate; high where fiscal policy is procyclical	Budget revenues and the import bill; reserves	Procyclical fiscal policy makes commodity shocks more than one-fifth worse in the average exporting EMDE (World Bank)
Climate and disaster	Very large for small states (up to twice GDP); smaller but frequent for large ones	High for major cyclones: incomes still below trend after 20 years	Reconstruction spending, lost revenue, harvest failure	Hsiang and Jina : 90th-percentile cyclone cuts income per head 7.4% two decades later
Health (pandemics, epidemics)	Large and synchronised across countries	Moderate to high via schooling and labour-market scarring	Budgets, school closures, informal incomes	Learning poverty in low- and middle-income countries rose from 57% to 70% (World Bank)
Conflict and political	Large; deepest in civil war	Partial rebound after civil wars; little after other political crises	Capital flight, trade disruption, displaced people	Cerra and Saxena : partial rebound only for civil wars
Global financial conditions and trade	Moderate, but hits many countries at once	Moderate; high where market access is lost	Capital outflows, refinancing risk, export demand	Developing regions borrow at 2–4× US rates and 6–12× German rates (UNCTAD)

Depth and persistence are qualitative summaries of the cited literature. Individual episodes vary widely around them.

3.2 Three ways shocks compound

Shocks compound in three distinct ways, and the distinction matters for policy.

Coincidence. Two or more shocks arrive in the same period. The 2022 combination of food and fuel price spikes with rising global interest rates is the archetype: importers faced a larger bill just as the cost of financing it rose. Coincidence is partly a matter of bad luck, but correlation between shocks is rising,

because many of them now share common drivers in climate change, geopolitical fragmentation and globally synchronised monetary policy.

Succession. A shock arrives before recovery from the last is complete. It finds depleted reserves, a weaker banking system, higher public debt and households that have already sold assets or withdrawn children from school. The same physical or financial event does more damage the second time. This is the mechanism formalised in section 6.

Transmission. A shock in one system becomes a shock in another. A drought becomes a food-price shock, then a balance-of-payments shock, then a fiscal shock, then a social-spending cut that becomes a human-capital shock. The original event may be modest; the chain is what makes it expensive. This is the mechanism set out in section 7.

3.3 The magnitudes involved

Figure 3 (panel A) collects documented output losses from single and compound episodes. Indonesia's real GDP fell by about 13 per cent in 1998, when a currency and banking crisis combined with a political transition; the [Asian Development Bank](#) records the official poverty rate rising from 17.7 per cent in 1996 to 24.2 per cent in 1998. Sri Lanka's economy contracted by 7.3 per cent in 2022, according to the [revised national accounts](#), after a tourism collapse, a disastrous fertiliser policy, depleted reserves and a sovereign default reinforced one another. The pandemic, on the IMF's [April 2021 projections](#), was expected to cost low-income countries an average of 5.7 per cent of per capita GDP each year over 2020–24 relative to pre-pandemic forecasts, and emerging markets 4.7 per cent, against 2.3 per cent in advanced economies.

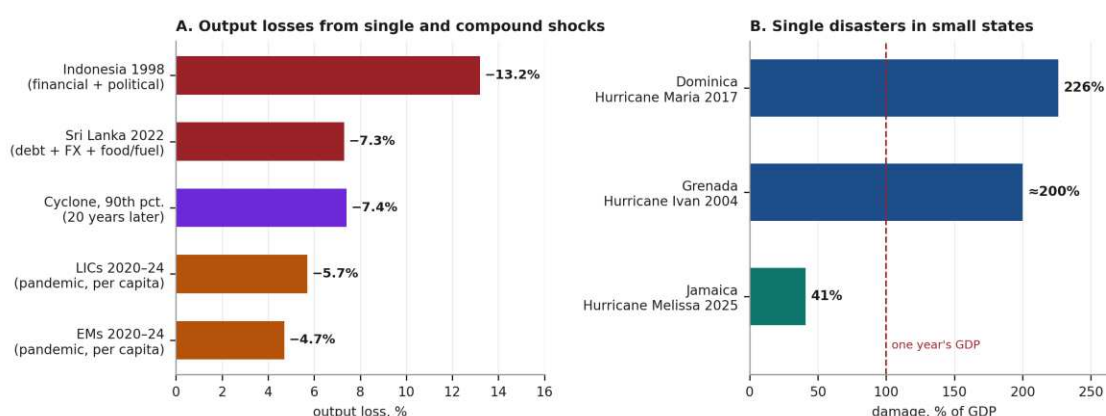


Figure 3. Output losses from single and compound shocks, and the scale of disasters in small states.

Data: panel A: ADB (Indonesia, real GDP 1998); Central Bank of Sri Lanka, revised national accounts; Hsiang and Jina (2014); IMF, April 2021 WEO briefing (projected average annual per capita losses vs. pre-pandemic forecasts). Panel B: Government of Dominica PDNA (damage and losses, % of 2016 GDP); World Bank and OECS/ECLAC (Grenada, damage exceeding 200% of GDP); World Bank (Jamaica, preliminary physical damage, % of 2024 GDP).

Panel B shows why small states experience disasters as macroeconomic events. Hurricane Maria's damage and losses in Dominica in 2017 reached 226 per cent of the previous year's GDP, with around 90 per cent of the housing stock damaged. Hurricane Ivan's damage in Grenada in 2004 exceeded 200 per cent of GDP. Hurricane Melissa's preliminary physical damage in Jamaica in October 2025 was estimated at US\$8.8 billion, about 41 per cent of 2024 GDP. For these economies, a single event can erase a generation of accumulated capital, and whether it also erases a generation of convergence depends on the arrangements in place before it struck.

4. The Shock-Loss Identity

4.1 Four terms

The organising idea of this report is an approximation. Over a long horizon, the convergence an economy loses to shocks can be written as the product of four terms:

- **Frequency:** how often a hazard or disturbance becomes a macroeconomic crisis; not every drought or capital outflow does.
- **Depth:** how far output and incomes fall on impact when a crisis occurs.
- **Persistence:** the share of that loss that is never recovered, together with the time needed to recover the rest.
- **Coupling:** the degree to which one shock amplifies the damage of the next, either by arriving while buffers are depleted or by transmitting through connected balance sheets.

The identity is not an econometric model, and its terms are not independent in every setting. Its value is that it separates questions that policy discussion routinely merges. A seawall reduces the frequency with which a storm becomes a crisis. A fiscal reserve reduces the depth of the fall. A pre-arranged insurance payout reduces persistence by speeding reconstruction. A shift from foreign-currency to local-currency borrowing reduces coupling by stopping a depreciation from becoming a debt crisis. These are four different mechanisms, typically owned by four different parts of government, and they rarely appear in the same budget discussion.

4.2 Why multiplication matters

The multiplicative form has a practical consequence that is easy to state and routinely ignored. When losses are a product of terms, the payoff from reducing any one term depends on the size of the others. Halving persistence in an economy that is rarely hit achieves little; halving it in an economy hit every three years achieves a great deal. And trimming each of the four terms by a modest amount can reduce the total loss by more than eliminating any single one would, because the reductions compound.

This is the analytical basis for the portfolio approach set out in section 10. It also explains a pattern in development practice: countries that invest heavily in one form of resilience, such as a large reserve buffer, while leaving others untouched, such as foreign-currency debt or a fragile banking system, often find that the neglected term determines the outcome. Sri Lanka in 2022 is the clearest recent example, discussed in section 11.

The terms are also managed separately because they sit in different institutions. Frequency is shaped by line ministries, disaster agencies, central-bank prudential departments and foreign ministries. Depth is shaped by the finance ministry's fiscal space, the central bank's reserves and the social-protection agency's reach. Persistence is shaped by how quickly money and repair capacity reach damaged firms, schools and infrastructure, and by the speed of debt resolution when the sovereign itself is damaged. Coupling is shaped by the debt-management office, bank regulators, trade and energy ministries, and the rules that govern the budget in a downturn.

Few governments make any body responsible for the product of these terms, which is why section 13 begins with a single risk register housed where the budget is made.

5. Persistence: Why Output Does Not Come Back

The single most consequential fact about shocks in developing economies is that the losses they cause are usually permanent. Growth resumes; the lost level does not return.

5.1 The evidence on hysteresis

For much of the twentieth century, macroeconomics treated recessions as temporary deviations from a trend set by technology and population. Output would return to that trend, and the loss was confined to the years below it. The evidence has steadily undermined that view. Cerra and Saxena, using panel data for high-income, emerging, developing and transition economies, found that the large output losses associated with financial crises and most kinds of political crisis are highly persistent: on average, the trend output lost is never regained. Civil wars were the partial exception, followed by some rebound.

The subsequent literature, reviewed by Cerra, Fatás and Saxena in the *Journal of Economic Literature*, has made this finding harder to dismiss. Their review argues that the dependence of output levels on the history of shocks, known as hysteresis, should unify the analysis of growth and business cycles, and that recessions therefore call for more active policy to avoid permanent scars. For developing economies the implication is stark. A crisis is not a pause in convergence. It is a subtraction from it.

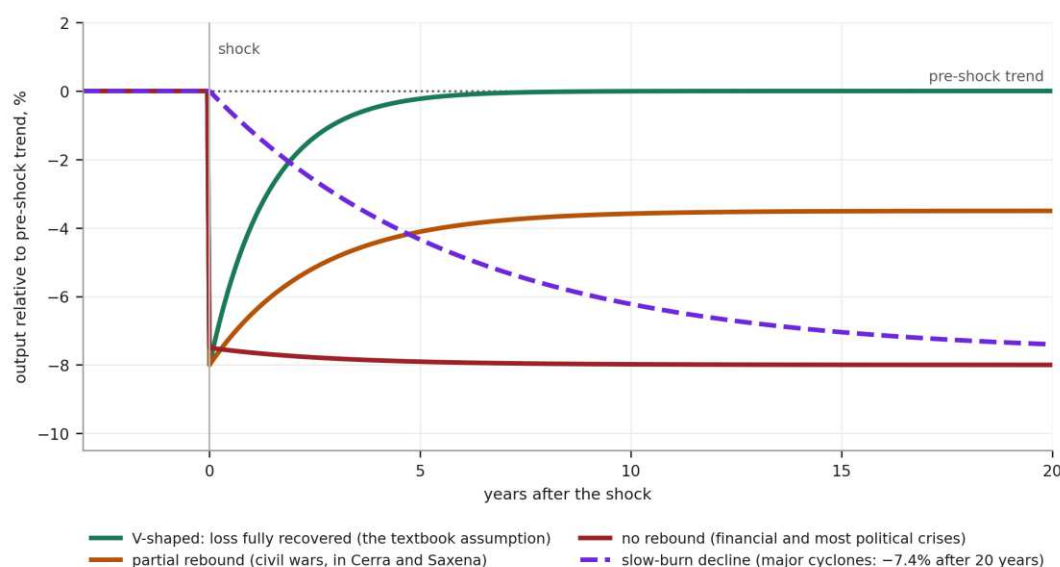


Figure 4. Four shapes of recovery. Only the first, the textbook assumption, returns output to its pre-shock trend.

H Heuristics. Stylised paths, anchored to reported findings: the 'no rebound' and 'partial rebound' shapes follow Cerra and Saxena (2008); the slow-burn decline reaches the -7.4% reported by Hsiang and Jina (2014) for a 90th-percentile cyclone after 20 years. Depths are illustrative.

5.2 Disasters that keep costing

Climate-related disasters show an even less comfortable pattern. Hsiang and Jina reconstructed every country's exposure to tropical cyclones between 1950 and 2008, some 6,700 storms, and found that national incomes decline relative to their pre-disaster trend and do not recover within twenty years. A 90th-percentile event reduces income per head by 7.4 per cent two decades later, which the authors equate to undoing 3.7 years of average development. Losses were larger in countries with less historical experience of cyclones,

which suggests that adaptation and preparedness matter, and that economies facing hazards new to them are the most vulnerable.

The shape in Figure 4 is not a sudden fall and partial recovery but a slow divergence: the damage continues to accumulate as destroyed capital is not fully replaced, investment is diverted into reconstruction, and firms and households respond to the demonstrated risk. This is persistence of a particularly damaging kind, because its costs arrive long after attention has moved elsewhere.

5.3 The channels of scarring

Why do losses persist? The literature identifies several channels, each of which is particularly strong in developing economies.

- **Human capital.** School closures and the withdrawal of children from school during income shocks reduce the skills of an entire cohort. The World Bank and partners estimated that the share of ten-year-olds in low- and middle-income countries unable to read a simple text rose from 57 per cent before the pandemic to about 70 per cent, and that the associated lifetime earnings losses could reach roughly US\$21 trillion. Those losses will appear in growth statistics for forty years.
- **Firm destruction.** Viable firms that fail during a crisis take with them relationships, know-how and organisational capital that take years to rebuild. In economies with thin credit markets and weak insolvency systems, the failure rate of viable firms is higher and the rebuilding slower.
- **Asset depletion by households.** Poor households cope by selling livestock, tools and land, or by cutting nutrition and health spending. The World Bank's *Unbreakable* study estimated that natural disasters cause well-being losses equivalent to US\$520 billion a year in consumption and push some 26 million people into poverty annually, losses that exceed asset damage in every one of the 117 countries studied because the poor have so little capacity to cope.
- **Investment and risk perception.** After a crisis, both domestic and foreign investors demand higher returns to compensate for demonstrated risk. The resulting rise in the cost of capital lowers investment for years, and it is precisely the capital-intensive, long-lived investments that convergence requires that are deterred most.
- **Public investment crowd-out.** Reconstruction absorbs budgets and implementation capacity that would otherwise have financed new capital. An economy may spend heavily for years merely to return to where it was.

5.4 The pandemic as a natural experiment

The pandemic offers a revealing comparison because it hit almost every economy at once. Advanced economies, with deep fiscal space, central banks able to finance large programmes, and extensive social insurance, suffered sharp contractions but largely returned towards their pre-pandemic paths. Developing economies, especially low-income ones, experienced smaller and slower support packages, less access to vaccines, longer school closures and weaker labour-market recoveries. The IMF's early projections of per capita losses, cited in section 3, were more than twice as large for low-income countries as for advanced ones.

The same shock produced different persistence because the economies it hit had different capacities to repair. That, rather than the size of the initial blow, is what separated the advanced economies that returned to trend from the developing economies whose convergence stalled.

6. The Recovery-Interval Ratio

Whether shocks leave a sawtooth or a ratchet depends on one comparison: the time an economy needs to recover against the time it typically has before the next shock arrives.

6.1 Sawtooth and ratchet

Consider two economies with the same underlying capacity to grow. In the first, a significant shock arrives roughly once a decade, most of the loss is recovered within a couple of years, and only a small share is permanent. The economy's path is a sawtooth: dips below trend, followed by recovery, with a modest cumulative loss. In the second, shocks arrive every few years, recovery is slow, a larger share of each loss is permanent, and each new shock lands while the previous gap is still open, finding buffers depleted and therefore doing more damage. The second economy's path is a ratchet: each shock pushes it lower, and it never climbs back.

Figure 5 illustrates the two cases. The parameters are stylised but not extreme. In the sawtooth case, after thirty years the economy stands at 96 per cent of its no-shock path. In the ratchet case it stands at about 45 per cent. The shocks themselves are of identical size on first impact. The difference lies entirely in their timing relative to recovery, in how much of each loss persists, and in whether one shock amplifies the next.

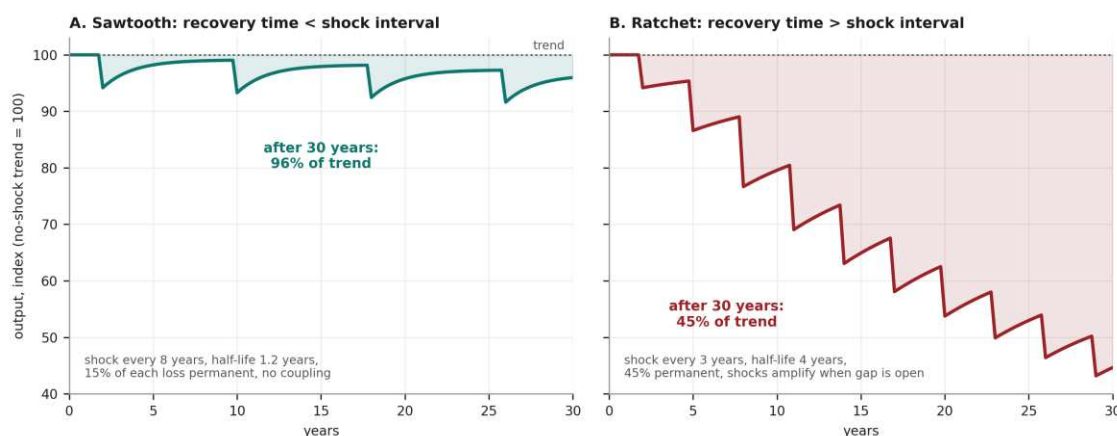


Figure 5. The same shocks, two outcomes: when recovery outpaces the interval between shocks, and when it does not.

H Heuristics. Illustrative simulation (section 6.2). Each shock initially reduces output by 6%; in panel B, shocks arriving while a gap is still open are amplified by up to 2.6×. Not an estimate for any country.

The diagnostic that follows is simple enough to compute for any economy: the **recovery-interval ratio**, the typical time needed to recover from a significant shock divided by the typical interval between such shocks. A ratio well below one means the economy lives on a sawtooth; resilience investments improve welfare but convergence is broadly intact. A ratio near or above one means the economy is on, or close to, a ratchet; resilience investments are not a supplement to the growth strategy but a precondition for it.

6.2 A simple model

To explore the logic more systematically, the report uses a deliberately simple simulation, whose structure is stated here in full so that readers can judge its assumptions. An economy starts at 20 per cent of the advanced-economy income level and, absent shocks, converges at 2 per cent a year, reaching about 36 per cent after thirty years. In each year a shock arrives with a fixed probability. Each shock reduces output by

a base amount of 6 per cent, amplified in proportion to any output gap still open from earlier shocks (the coupling term). A fixed share of each loss is permanent; the rest decays with a given half-life. Each configuration is simulated 1,500 to 4,000 times and the median path reported.

The model omits a great deal: positive shocks, policy responses that vary with the size of the shock, differences between types of shock, and the possibility that reconstruction upgrades the capital stock. Its purpose is not prediction. It is to show how the four terms of the identity interact, and roughly how large the stakes are under parameter values consistent with the evidence in sections 3 and 5.

6.3 How much convergence is at stake

Figure 6 reports the years of convergence lost over three decades across combinations of shock frequency and persistence, with a recovery half-life of three years and moderate coupling. The pattern is strongly non-linear. An economy hit every eight years, with 30 per cent of each loss permanent, loses about six years of convergence over three decades. Halve the interval to every four years and the loss rises to about sixteen years. At a shock every three years with half of each loss permanent, the economy loses more than the entire thirty years: it ends the period further from the frontier than it began.

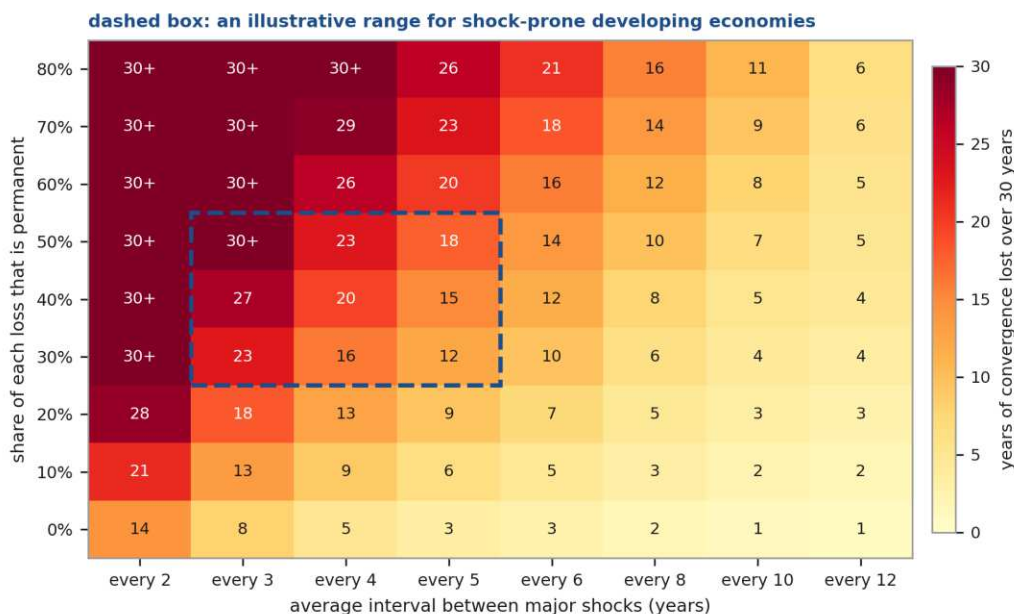


Figure 6. Years of convergence lost over thirty years, by shock frequency and persistence.

H Heuristics. Illustrative simulation (section 6.2), median of 1,500 paths per cell; base shock 6%, recovery half-life 3 years, coupling coefficient 0.5; convergence rate 2% a year. The dashed box is an analytical judgement, not a measurement.

The dashed box marks a range, interval of three to five years and persistence of 30 to 50 per cent, that is consistent with the recent experience of many shock-prone developing economies. It is a judgement rather than an estimate. But it indicates why the 2020s have felt so different: an economy that moves from the lower-right of the chart to the box loses somewhere between a third and all of its expected convergence, without any change in its underlying capacity to grow.

Two lessons follow. When shocks are frequent, persistence matters most, because every point of permanent loss is repeated many times. And because the effect is non-linear, modest resilience gains pay most for economies near the ratchet threshold.

7. Coupling: The Channels That Turn Shocks into Crises

Most of the damage in compound crises is not done by the initial shock but by the connections that carry it from one balance sheet to the next. Those connections are largely the product of policy, and they can be loosened.

7.1 The coupling web

Figure 7 maps the main channels. At the centre sits the sovereign balance sheet, because in developing economies almost every shock reaches the budget within a year: through lost revenue, reconstruction costs, support for banks or firms, or the revaluation of foreign-currency debt. Around it sit the banking system, the exchange rate and reserves, the food and fuel import bill, physical assets exposed to climate hazards, and households whose incomes and human capital are the economy's most important long-run asset.

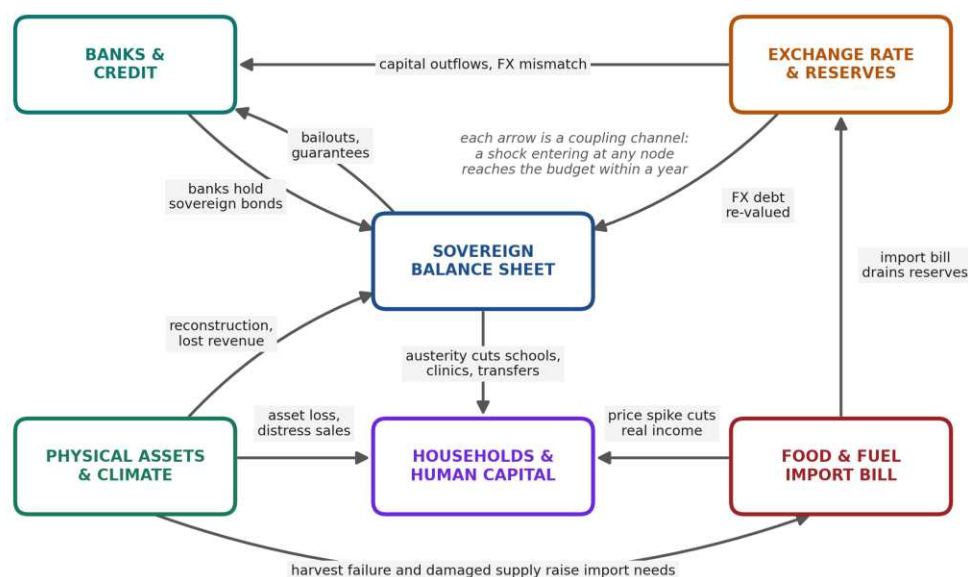


Figure 7. *The coupling web: how a shock entering one system reaches the others.*

H Heuristics. Conceptual schematic drawing on the literature on bank-sovereign linkages, original sin and currency mismatch, commodity-driven fiscal procyclicality, and disaster-debt dynamics cited in sections 7 and 8.

7.2 Five doom loops

Five loops recur so often in developing-country crises that they deserve names. Table 2 sets them out with the circuit breakers that can interrupt each.

Table 2. Five doom loops and their circuit breakers

Loop	How it works	Where it has bitten	Circuit breakers
Bank–sovereign	Banks hold government bonds; sovereign stress cuts their value, banks need support, the sovereign's debt rises	Emerging-market banking crises; Sri Lanka and Ghana's domestic debt operations	Limits on bank concentration in sovereign debt; credible bank-resolution regimes; deposit insurance funded ex ante

Loop	How it works	Where it has bitten	Circuit breakers
Currency–debt	Debt is in foreign currency; a shock weakens the currency, the debt burden jumps, confidence falls further	Indonesia 1997–98; many frontier issuers after 2022	Lengthen maturities; shift to local-currency borrowing; reserves sized to short-term external debt; hedging
Import bill–reserves	Food and fuel prices rise, the import bill drains reserves, the currency weakens, imports cost more still	Fuel and food importers in 2022 and again in 2026	Diversified energy supply; strategic stocks; regional trade arrangements; domestic renewables that cut fuel imports
Disaster–debt	A disaster destroys assets and revenue, reconstruction is debt-financed, higher debt raises borrowing costs and delays investment	Caribbean and Pacific small states	Pre-arranged finance; climate-resilient debt clauses; resilient design standards
Budget–human capital	Fiscal stress forces cuts, which fall on schools, clinics and transfers, turning a temporary shock into a permanent loss of skills and health	Pandemic-era learning losses; post-default austerity	Protected core social spending; adaptive social protection; fiscal rules with escape clauses

Examples are illustrative. Most major developing-country crises have involved more than one loop at once.

The common thread is that each loop depends on an exposure that was acquired in calm times, often because it was cheaper: foreign-currency borrowing at lower nominal rates, banks loaded with government paper, a concentrated energy mix, budgets that expanded with commodity revenues. The cost of the exposure is paid only when the shock arrives. That timing mismatch is why coupling is chronically under-managed, and why reducing it is among the cheapest forms of resilience available.

7.3 Procyclicality: the loop policy builds itself

One channel deserves particular emphasis because it is entirely internal to government. When budgets expand in booms and contract in busts, fiscal policy amplifies shocks rather than absorbing them. The World Bank estimates that in the average commodity-exporting EMDE, procyclical fiscal policy has made commodity price shocks more than one-fifth worse, and that by 2025 median government debt in commodity-exporting EMDEs had nearly doubled from its 2010 level.

Procyclicality is a coupling channel in the purest sense: it links the external shock to domestic demand through the budget. It is also one of the best-understood problems in development macroeconomics, with a well-tested remedy in rules that save windfalls and allow spending to be sustained in downturns. Chile's experience with such a rule, discussed in section 11, is the reference case.

8. Depleted Buffers: Fiscal, Financial and Social

8.1 The fiscal buffer

Depth, the second term in the identity, depends above all on buffers: the resources available to sustain spending, support incomes and keep the financial system functioning when a shock hits. The 2020s have drawn those buffers down across the developing world and made them more expensive to rebuild.

UNCTAD's *A World of Debt 2025* reports that public debt in developing countries has reached about US\$31 trillion, having grown twice as fast as in developed economies since 2010, and that their net interest payments reached US\$921 billion in 2024, a 10 per cent increase on the previous year. A record 61 developing countries now allocate 10 per cent or more of government revenue to interest. Developing regions borrow at rates two to four times those paid by the United States and six to twelve times those paid by Germany.

Those numbers describe an economy that enters each new shock with less room to respond. A government spending a large share of revenue on interest cannot readily expand transfers, maintain public investment or support banks without triggering doubts about its solvency, and those doubts raise borrowing costs further. The fiscal buffer is not only smaller than it was in 2019; it is also more fragile, because using it is more likely to set off the currency–debt and bank–sovereign loops described in section 7.

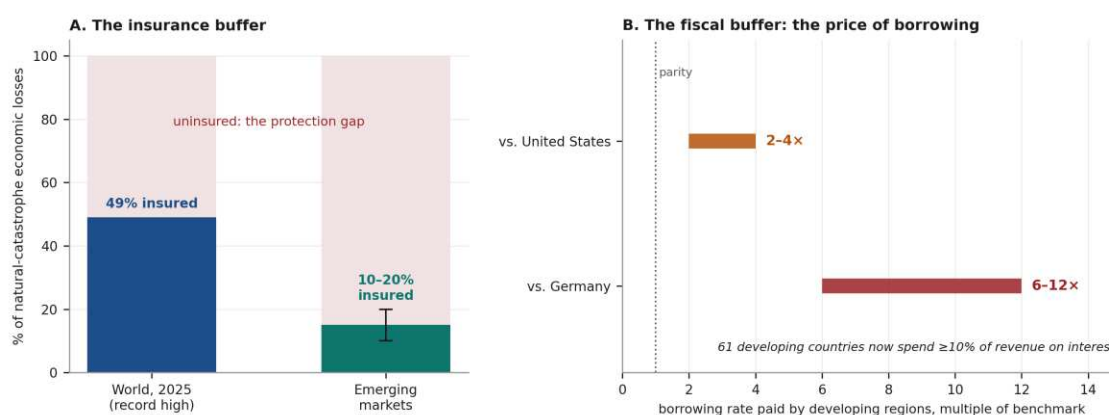


Figure 8. Two depleted buffers: most disaster losses in emerging markets are uninsured, and borrowing to cover them is expensive.

Data: panel A: Swiss Re Institute, *sigma* 1/2026 (global, 2025) and Swiss Re estimates of the emerging-market protection gap (80–90% uninsured; midpoint shown with range); panel B: UNCTAD, *A World of Debt 2025*.

8.2 The insurance buffer

A second buffer is insurance, public and private. The Swiss Re Institute reports that natural catastrophes caused about US\$220 billion of economic losses in 2025, of which about 49 per cent was insured, the highest share on its records. That global average is dominated by advanced economies. In emerging markets, Swiss Re's estimates of the protection gap indicate that the large majority of disaster losses, typically 80 to 90 per cent, are uninsured.

An uninsured loss does not disappear. It falls on households, firms and ultimately the government, which becomes the insurer of last resort through reconstruction spending and support for affected sectors. In a

developing economy, the protection gap is therefore a contingent fiscal liability, unrecorded in any debt statistic until the disaster arrives.

8.3 The social buffer

The third buffer is the capacity to protect household incomes and human capital. The pandemic showed both the value of that capacity and its uneven distribution. Countries with digital payment systems and existing registries of poor and vulnerable households were able to expand transfers within weeks. Countries without them faced a choice between slow, leaky programmes and none at all. The difference mattered for persistence: households that received timely support were less likely to sell productive assets or take children out of school.

The lesson generalises to every class of shock. **Adaptive social protection**, meaning programmes designed to scale up automatically when a shock is detected, is among the most effective ways to cut both the depth of a crisis and its persistence, because it acts on the household coping decisions through which temporary shocks become permanent losses.

8.4 Buffers have a price

None of these buffers is free. Reserves earn less than the cost of the debt that often finances them. Insurance premiums exceed expected payouts. Fiscal space held in reserve is spending not undertaken today. The argument of this report is not that developing nations should maximise buffers regardless of cost, but that the value of a buffer rises steeply with the frequency and coupling of the shocks it protects against. In the calm environment of the 2000s, thin buffers were a reasonable bet for many economies. In the environment of the 2020s, the same bet has a much worse expected return.

9. The Speed of Money: Pre-Arranged Finance

Persistence is shaped heavily by time. A dollar that arrives in the first weeks after a shock protects firms, jobs and school enrolment; the same dollar arriving a year later mostly pays for damage that has already become permanent.

9.1 Why timing matters

The channels of scarring described in section 5 operate quickly. Firms without liquidity fail within weeks. Households sell assets within the first season after a harvest failure. Children withdrawn from school during a crisis often do not return. Damaged infrastructure that is not repaired quickly disrupts supply chains for months. Money that arrives after these decisions have been made cannot reverse them.

Yet most crisis finance in developing economies is arranged after the event. It depends on damage assessments, appeals, negotiations and approvals that take months. The Centre for Disaster Protection found that in 2021 only about 2.7 per cent, some US\$1.9 billion, of US\$71 billion in international crisis financing was pre-arranged, and that only a small fraction of that reached low-income countries. The arrangement of crisis finance is, in effect, optimised for accountability after the fact rather than for speed.

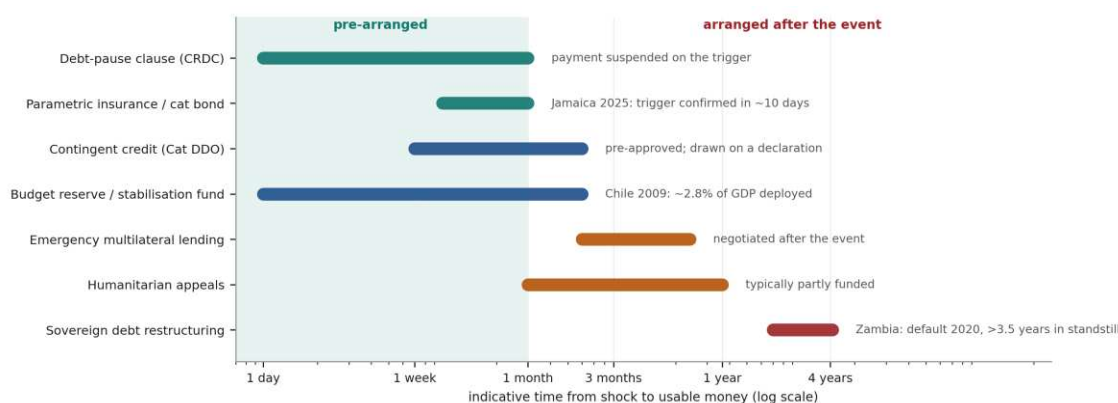


Figure 9. Indicative time from shock to usable money, by instrument.

H Heuristics. Indicative ranges compiled from the instrument descriptions and cases cited in sections 9 and 11 (World Bank on Jamaica's catastrophe bond; Centre for Disaster Protection on debt-pause clauses; UNU-WIDER on Chile's stabilisation fund; CGD on Zambia's restructuring). Actual timelines vary by contract and country.

9.2 The instruments

Figure 9 arranges the main instruments by speed. At the fast end sit instruments whose terms are agreed before any shock occurs.

- **Budget reserves and stabilisation funds** are the fastest of all, because the money is already held. Chile's Economic and Social Stabilization Fund allowed the government to assign about US\$4 billion, roughly 2.8 per cent of GDP, to recovery in January 2009.
- **Parametric insurance and catastrophe bonds** pay when a measurable trigger, such as wind speed or central pressure within a defined area, is met, rather than after losses are assessed. When Hurricane Melissa struck Jamaica in late October 2025, the World Bank confirmed on 7 November that the storm had met the triggers for a full US\$150 million payout under the catastrophe bond issued in 2024.

- **Contingent credit lines** are negotiated and approved in advance and drawn on the declaration of an emergency, avoiding months of loan preparation.
- **Climate-resilient debt clauses** allow a sovereign to defer debt service after a qualifying disaster. After Hurricane Beryl in 2024, Grenada and St Vincent and the Grenadines became the first countries to trigger such clauses, with Grenada suspending about US\$12 million of interest payments on its bond.

At the slow end sit emergency loans negotiated after the event, humanitarian appeals that are often only partly funded, and, slowest of all, sovereign debt restructuring. Zambia defaulted in late 2020 and spent more than three and a half years in protracted negotiations under the G20 Common Framework before its restructuring was largely completed in 2024. For an economy in that position, the persistence term is set not by the shock but by the resolution process.

9.3 Layering

No single instrument covers every risk efficiently. The standard approach, which the World Bank and others describe as **risk layering**, matches instruments to the frequency and severity of events. Frequent, small shocks are best absorbed by budget contingency lines and reserves, because insuring them is expensive relative to their cost. Less frequent, larger shocks justify contingent credit. Rare, catastrophic events, which would overwhelm any reserve a small state could hold, are the natural domain of insurance and catastrophe bonds, which transfer risk to international markets.

Jamaica's approach combines these layers explicitly. As a World Bank account of its disaster financing strategy puts it, the aim is that when a storm hits, cash is not the constraint. The payout from Melissa was only a fraction of the damage; its value lay in its speed, and in the fact that it arrived alongside a budget reserve, contingent credit and a fiscal framework credible enough to allow a temporary suspension of fiscal rules without a loss of market confidence.

9.4 The pre-arrangement dividend

Pre-arranged finance delivers three distinct benefits that together justify a large expansion. It reduces depth, because resources are available on impact. It reduces persistence, because firms, households and public services receive support before coping decisions become irreversible. And it reduces coupling, because the sovereign does not need to borrow in a panic at the worst possible moment. A 2025 initiative of former leaders and development institutions called for a tenfold increase in the share of international crisis finance that is pre-arranged. The analysis in this report suggests that such a shift would be among the highest-return changes available to the international system.

10. A Portfolio of Resilience Strategies

Each term of the shock-loss identity has its own family of strategies. The strongest national approaches combine all four, calibrated to the country's shock profile, rather than betting everything on one.

10.1 Four families

Table 3 organises the principal instruments by the term of the identity they act on most directly. Many instruments act on more than one term, and the table places each where its effect is largest.

Table 3. Resilience strategies organised by the term they reduce

Family	Term reduced	Core instruments	Typical owner	Cost profile
Prevent	Frequency	Risk-informed land use and building codes; early warning and evacuation; macroprudential limits on credit booms and currency mismatch; diversification of exports, energy and food supply; conflict prevention and trade agreements	Line ministries, disaster agencies, central bank, foreign ministry	Moderate up-front; high benefit-cost ratios for early warning and codes
Buffer	Depth	Fiscal space and stabilisation funds; adequate reserves; risk-layered insurance; adaptive social protection; strategic food and fuel stocks	Finance ministry, central bank, social-protection agency	Ongoing carrying cost; value rises with shock frequency
Repair	Persistence	Pre-arranged finance; firm-liquidity and insolvency frameworks; school and clinic continuity plans; build-back-better standards; orderly and fast debt resolution	Finance ministry, education and health ministries, courts	Low to moderate; the benefit is time
Decouple	Coupling	Local-currency and longer-maturity debt; limits on bank holdings of sovereign debt; countercyclical fiscal rules with escape clauses; climate-resilient debt clauses; domestic renewable energy	Debt office, bank regulator, energy ministry	Often low; exposure was usually acquired because it was cheap

Assignments reflect the principal effect of each instrument. Early warning, for example, also reduces depth; adaptive social protection also reduces persistence.

10.2 Why a portfolio beats a flagship

The simulation introduced in section 6 can be used to compare the families directly. Figure 10 starts from a baseline in which shocks arrive on average every four years, each costs 6 per cent of output before amplification, half of each loss is permanent, the transient part has a five-year half-life, and coupling is strong. Under those conditions the median economy does not converge at all: after thirty years it stands at about 19 per cent of the advanced-economy income level, slightly below where it started, against 36 per cent in the absence of shocks.

Each family, applied alone with substantial strength, recovers part of the lost ground: making shocks a third less frequent lifts the end point to about 25 per cent; making impacts a third smaller, to about 24 per cent; halving persistence and doubling the speed of recovery, to about 26 per cent; largely removing amplification, to about 26 per cent. A portfolio that applies each lever at roughly half of those strengths reaches about 28 per cent, better than any single family at full strength.

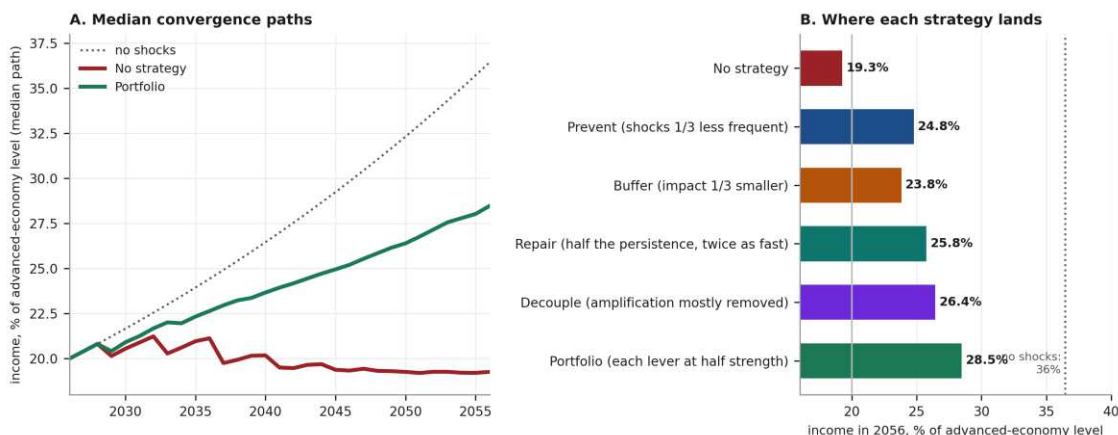


Figure 10. A balanced portfolio of resilience strategies outperforms any single strategy applied at full strength.

H Heuristics. Illustrative simulation (section 6.2), median of 4,000 paths. Baseline: shock probability 25% a year, base depth 6%, 50% permanent, 5-year half-life, coupling coefficient 0.8. Strategy parameters as labelled. Not an estimate for any country.

The result follows directly from multiplication. Reducing one term yields diminishing returns once that term is small relative to the others, while modest reductions across all four compound. It also has a practical corollary. The instruments at half strength are generally much cheaper than those at full strength, because the first units of resilience in each family are the cheapest: early warning before seawalls, contingency reserves before large sovereign funds, debt-maturity lengthening before wholesale currency conversion.

10.3 Calibrating to the shock profile

A portfolio should still be weighted to the country's particular exposures. A small island state faces rare but catastrophic disasters: its priorities are risk transfer, resilient building standards and debt clauses. A commodity exporter faces frequent terms-of-trade swings: its priority is a fiscal rule and stabilisation fund. A fuel-importing frontier market with foreign-currency debt faces the currency–debt and import–bill loops: its priorities are debt management, reserves and energy diversification. A large, climate-exposed agrarian economy faces frequent, moderate disasters whose damage persists through household coping: its priorities are early warning, adaptive social protection and agricultural risk management.

The recovery-interval ratio from section 6 helps set the overall level of effort. Economies with low ratios can treat resilience as a prudent complement to growth policy. Economies with ratios near or above one should treat it as the growth policy, because without it the other elements of the strategy will be repeatedly undone.

11. Country Experience

The countries that have protected their convergence did not avoid shocks. They changed how much each shock cost them. The countries that lost ground usually did so through the coupling and persistence terms rather than through the size of the initial blow.

11.1 Bangladesh: reducing the frequency of catastrophe

Bangladesh is among the most cyclone-exposed countries on earth, and its experience is the clearest demonstration that the frequency with which a hazard becomes a catastrophe is a policy variable. The Bhola cyclone of 1970 killed at least 300,000 people; the 1991 cyclone killed at least 138,000. Cyclone Sidr in 2007, a storm of comparable strength, killed 3,363. When Cyclone Amphan struck in 2020, authorities evacuated more than three million people and deaths in Bangladesh numbered in the dozens ([Dhaka Tribune](#); [Our World in Data](#)).

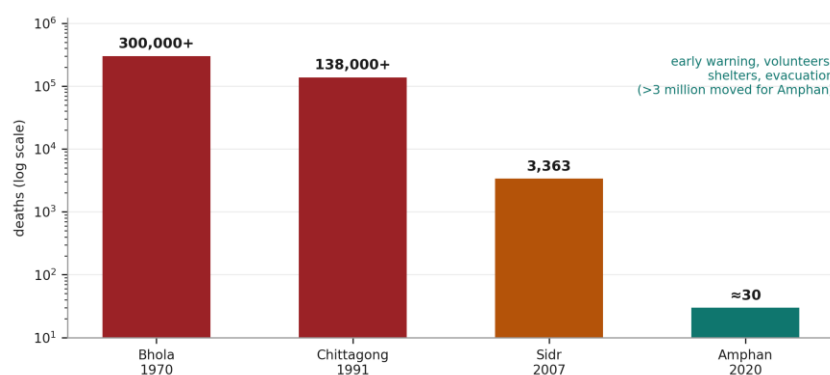


Figure 11. Bangladesh: deaths from major cyclones, 1970–2020 (log scale).

Data: Dhaka Tribune compilation of major cyclones; Our World in Data. Amphan figure rounded; reported Bangladesh tolls vary slightly by source.

The change was built from unglamorous components: a volunteer-based warning system that reaches coastal villages, thousands of multipurpose cyclone shelters, improved forecasting, and evacuation protocols rehearsed repeatedly ([UCL analysis](#)). But the country has shown that the most extreme outcomes can be made far less frequent at modest cost, and that doing so protects the human capital on which convergence depends.

11.2 Indonesia: learning from 1998

Indonesia's 1997–98 crisis was a textbook compound shock. A regional currency crisis met a fragile banking system, large unhedged foreign-currency corporate debt and a political transition. The rupiah lost most of its value, real GDP fell by around 13 per cent in 1998, and poverty rose sharply, with estimates suggesting that it roughly doubled between mid-1997 and late 1998 ([ADB](#); [Frankenberg, Thomas and Beegle](#)). All five of the doom loops in Table 2, apart from the disaster loop, were active at once.

What Indonesia did afterwards amounts to a sustained programme of decoupling. A fiscal law capped the deficit at 3 per cent of GDP and public debt at 60 per cent. Banking supervision was rebuilt. Reserves were accumulated. The share of government debt in local currency rose substantially. The global financial crisis and the pandemic brought large shocks but none of the cascading failures of 1998; in 2020 it was able to

suspend the deficit ceiling temporarily and bring the deficit back below it in 2022, a year ahead of the legislated deadline. The initial shocks were not smaller. The coupling was.

11.3 Chile: breaking the procyclical loop

Chile's economy is heavily exposed to copper prices, the textbook source of procyclical fiscal policy. Its structural balance rule, in operation since 2001 and formalised in the 2006 Fiscal Responsibility Law, sets spending according to estimates of trend output and the long-term copper price produced by independent expert panels, rather than according to current revenues (Marcel, IDB). Between 2003 and 2007, when copper prices rose by 220 per cent in real terms, the structural balance averaged a surplus of 1.1 per cent of GDP while the actual surplus averaged 4.2 per cent; the difference was saved.

When the global financial crisis struck, those savings allowed a large countercyclical response. Close to US\$4 billion from the stabilisation fund, about 2.8 per cent of GDP, was assigned to recovery in January 2009, and the actual deficit reached 4.4 per cent of GDP that year (UNU-WIDER). The rule has been adjusted several times, but it shows that a commodity exporter can turn its budget from an amplifier into an absorber.

11.4 Jamaica: from debt trap to layered protection

In 2012 Jamaica's public debt stood at about 147 per cent of GDP, among the highest in the world. Over the following decade, under a sequence of IMF-supported programmes and with unusual cross-party and civil-society oversight, the country ran large and sustained primary surpluses. By fiscal year 2024–25, public debt had fallen to about 62 per cent of GDP. Alongside the consolidation, Jamaica built a layered disaster-financing strategy combining a contingency fund, contingent credit, parametric insurance through the Caribbean Catastrophe Risk Insurance Facility and a World Bank catastrophe bond.

Hurricane Melissa tested that strategy in October 2025, causing preliminary physical damage estimated at 41 per cent of GDP. The catastrophe bond paid in full; fiscal rules were temporarily suspended through March 2027 under a credible framework; the government now targets a return to a 60 per cent debt ratio by fiscal year 2029–30. The recovery is still under way, but the case shows how much a decade of preparation shapes the cost of a catastrophe.

11.5 Grenada: from disaster to contract design

Grenada's experience spans both ends of the persistence spectrum. Hurricane Ivan in 2004 caused damage exceeding twice the country's GDP, derailed a growth forecast of nearly 5 per cent and contributed to a sequence of debt restructurings. When Grenada restructured its debt in 2015, it introduced a hurricane clause allowing debt service to be deferred after a qualifying storm. After Hurricane Beryl in 2024 the clause was triggered, providing immediate liquidity at exactly the moment it was needed. The Paris Summit call for creditors to offer such clauses widely by the end of 2025 draws directly on this precedent. The lesson is that decoupling can be written into contracts, and that the moment to write it is before the next disaster.

11.6 Sri Lanka: when every term went wrong

Sri Lanka's crisis shows how the four terms can reinforce one another. The country entered the 2020s with high public debt, a large share of it in foreign currency and on commercial terms, and thin reserves. Tax

cuts in 2019 reduced revenue. The pandemic devastated tourism, a major source of foreign exchange. A sudden ban on chemical fertiliser in 2021 cut agricultural output. When global food and fuel prices surged in 2022, the country could not pay for essential imports. It announced a suspension of external debt service in April 2022; the economy contracted by 7.3 per cent that year and inflation approached 70 per cent (MIT Press, Asian Economic Papers).

No single shock need have produced a crisis of that scale; operating together through the import-bill, currency–debt and budget–human-capital loops, they did. Sri Lanka has since stabilised under an IMF-supported programme and a debt restructuring, and growth has resumed; but on the evidence of section 5, most of the lost output, and the schooling and nutrition lost by a cohort of children, will not be recovered.

11.7 Zambia: persistence set by the resolution process

Zambia defaulted on its external debt in late 2020, the first African sovereign to do so during the pandemic. The subsequent restructuring under the G20 Common Framework, which required agreement among official bilateral creditors, including China, and private bondholders, took more than three and a half years to complete, with the bilateral agreement reached in 2023 and the implementing agreements and bondholder deal finalised in 2024 (CGD; French Ministry for Europe and Foreign Affairs). Throughout that period investment was constrained and market access absent. In 2024 a severe drought, which crippled hydroelectric generation, arrived before the economy had recovered: a compound shock in the most literal sense.

Persistence, in other words, is also a property of the international architecture: every year added to a restructuring is added to the persistence term.

Table 4. Country experience mapped to the shock-loss identity

Country	Shock profile	Term most changed	Key instruments	Lesson
Bangladesh	Frequent severe cyclones and floods	Frequency (of catastrophe)	Volunteer early warning; shelters; evacuation drills	Cheap prevention protects human capital at scale
Indonesia	1998 currency, banking and political crisis	Coupling	Fiscal law; supervision; reserves; local-currency debt	Later shocks became recessions, not crises
Chile	Copper price swings; global financial crisis	Coupling and depth	Structural balance rule; stabilisation fund	A budget can absorb rather than amplify
Jamaica	Debt overhang; Category 5 hurricane	Depth and persistence	Consolidation; layered disaster finance; cat bond	Preparation sets the cost of disaster
Grenada	Catastrophic hurricanes; debt distress	Coupling and persistence	Hurricane clause in restructured debt	Decoupling can be written into contracts
Sri Lanka	Pandemic, policy errors, food-fuel shock	All four worsened	(Post-crisis) IMF programme; restructuring	Unmanaged coupling turns shocks into collapse
Zambia	Default; long restructuring; drought	Persistence	(Post-crisis) Common Framework restructuring	Slow resolution extends every loss

Summaries are necessarily simplified; see the text and cited sources.

12. Archetypes and Priorities

12.1 Exposure and repair capacity

Two dimensions capture much of the variation in how developing economies experience compound shocks: their exposure to frequent, coupled shocks, and their capacity to repair the damage, which combines buffers, pre-arranged finance and state capability. Figure 12 arranges a set of economies on those two dimensions. The placements are qualitative judgements drawn from the evidence in this report and are intended to illustrate the archetypes, not to rank countries.



Figure 12. Four archetypes of shock resilience: exposure to frequent, coupled shocks against capacity to repair.

H Heuristics. Qualitative placements based on the evidence discussed in this report; positions are indicative and not derived from a composite index.

12.2 Four archetypes

- **Shock-hardened** economies face high exposure but have built substantial repair capacity. Chile, Indonesia, Jamaica, Bangladesh and Viet Nam fit this description in different ways. Their priority is to maintain buffers as exposure rises, particularly from climate, and to avoid complacency after successful recoveries.
- **Sheltered** economies have relatively lower exposure and reasonable repair capacity. Their risk is that exposure is rising faster than their institutions are adapting, particularly where climate hazards are new. Hsiang and Jina's finding that losses are larger where cyclones are historically rare applies to every hazard that is moving into new territory.
- **Latent-risk** economies have moderate exposure but thin repair capacity, often because debt, weak revenue or a narrow social-protection system has left few buffers. They may look stable in calm years. Their priority is to build buffers and reduce coupling before the next shock tests them.
- Economies in the **ratchet zone** combine high exposure with weak repair capacity. They are the economies most likely to have a recovery-interval ratio above one, and for them resilience is a precondition for convergence rather than a complement to it. They are also the economies least

able to finance resilience themselves, which is why the international architecture discussed in section 13 matters so much to them.

12.3 What to do first

Across archetypes, the evidence points to a consistent ordering of priorities. The first instruments to put in place are those that are cheap, fast to deploy and act on several terms at once: a risk register and a contingency line in the budget; a registry that allows transfers to be scaled up quickly; early warning for the most frequent severe hazards; and a first layer of pre-arranged finance. The second tier strengthens the core buffers and rules: a fiscal rule with a credible escape clause, a stabilisation fund where commodity revenues justify one, and debt management that lengthens maturities and reduces foreign-currency exposure. The third tier addresses the deeper structural couplings: financial-market development, diversification of exports and energy, and the integration of resilience standards into the whole public investment programme. Section 13 sets this out as a sequence.

13. Sequencing and the International Architecture

13.1 A three-phase sequence

Resilience is built over years, but some elements can be put in place within months. Figure 13 sets out an indicative sequence for a shock-prone developing economy starting with limited resilience infrastructure. The phases overlap by design: preparation for later phases should begin while earlier phases are still being completed.

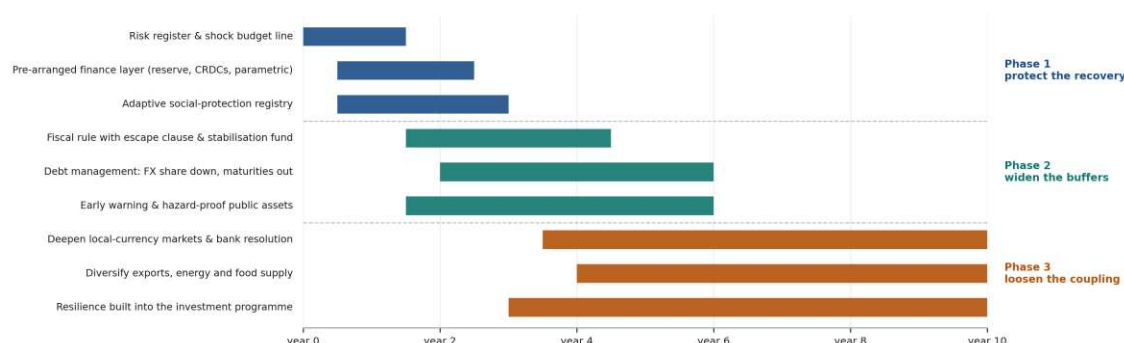


Figure 13. An indicative ten-year sequence for building resilience to compound shocks.

H Heuristics. Illustrative roadmap; durations are indicative and will vary with country capacity and starting point.

- **Phase 1: protect the recovery (years 0–3).** Create a consolidated register of fiscal risks, including contingent liabilities from disasters, state enterprises and the banking system. Establish a contingency line in the budget. Put in place a first layer of pre-arranged finance. Build or extend the social registry and payment rails that allow rapid scale-up of transfers.
- **Phase 2: widen the buffers (years 1–6).** Adopt a fiscal rule with a clearly defined escape clause for large shocks and a path back afterwards. Where revenues depend on commodities, establish a stabilisation fund. Lengthen debt maturities and raise the local-currency share. Extend early warning to all major hazards and apply resilience standards to new public assets.
- **Phase 3: loosen the coupling (years 3–10).** Deepen local-currency bond markets and strengthen bank-resolution regimes. Diversify exports, energy supply and food sources. Integrate resilience appraisal into the entire public investment programme.

Table 5. Eight principles for resilient convergence

Principle	What it means in practice
1. Budget for the bad years	Treat expected shock costs as a recurrent fiscal item, not an unforeseeable emergency; publish a fiscal risk statement.
2. Protect the level, not only the growth rate	Judge recovery policy by whether output returns to its pre-shock path; scale support to prevent scarring rather than merely restart growth.
3. Watch the recovery-interval ratio	Estimate typical recovery times and shock intervals; where the ratio approaches one, treat resilience as the growth strategy.
4. Pre-arrange before you need it	Layer reserves, contingent credit, insurance and debt clauses so that money arrives in weeks, not months.
5. Break the loops in calm times	Reduce foreign-currency debt, bank concentration in sovereign bonds and procyclical spending while it is cheap to do so.

Principle	What it means in practice
6. Shield human capital	Protect core education, health and transfer spending during crises; keep schools open and children enrolled.
7. Build a portfolio, not a flagship	Spread effort across prevention, buffers, repair and decoupling; the first units in each family are the cheapest.
8. Own the product of the terms	Give one institution, ideally the finance ministry, responsibility for the overall shock-loss profile of the economy.

Principles synthesise the argument of sections 4 to 12.

13.2 What the international system must supply

Developing nations cannot build this resilience alone, particularly those in the ratchet zone. Four changes in the international architecture would make the largest difference.

First, faster and more predictable sovereign debt resolution. Zambia's experience shows that a slow restructuring process extends every loss. Clearer timelines, stronger comparability-of-treatment mechanisms and a standstill on debt service during negotiations would materially shorten the persistence term for distressed sovereigns. The broad adoption of climate-resilient debt clauses by official and private creditors, as called for at the 2023 Paris Summit, would reduce the need for restructuring in the first place.

Second, a large shift towards pre-arranged finance. Initiatives such as the Global Shield against Climate Risks, launched by the V20 and G7 in 2022, aim to expand pre-arranged protection for vulnerable countries. Their scale remains small relative to the protection gap, and a move from under 3 per cent of crisis finance being pre-arranged towards the tenfold increase that advocates have called for would be among the most valuable reforms available.

Third, resilience lending that is used. The IMF's Resilience and Sustainability Trust offers long-term financing for countries addressing climate and pandemic risks. Its uptake has been slower than intended: ODI describes the facility as underused, and by early 2026 about SDR 5.9 billion of SDR 10.8 billion in approved arrangements had been disbursed, with no new arrangements approved in the second half of 2025. Simplifying access and linking it more directly to the instruments that reduce the terms of the shock-loss identity would increase its value.

Fourth, cheaper capital for resilience. Developing regions pay several times the borrowing costs of advanced economies, which makes the carrying cost of buffers and the up-front cost of prevention far higher than they need be. Guarantees, local-currency lending by development banks and the reallocation of reserve assets towards resilience would all lower that cost. Because resilience reduces the risks that drive borrowing costs, well-designed finance for it can be partly self-financing.

14. Limits, Trade-offs and Falsification

14.1 The costs of buffers

Every buffer has an opportunity cost. Reserves held in low-yielding assets could have financed roads or schools. Fiscal space held back is spending forgone. Insurance premiums exceed expected payouts by design. For a poor country with urgent development needs, these costs are real, and the argument of this report does not imply that more resilience is always better. It implies that the optimal level of resilience rises with the frequency and coupling of shocks, and that for many developing economies in the 2020s that level is higher than current practice.

14.2 Moral hazard and basis risk

Pre-arranged finance and debt clauses can weaken incentives for prevention if they are poorly designed, although the evidence for large moral hazard effects in sovereign disaster finance is limited. Parametric instruments carry **basis risk**: a disaster may cause severe damage without meeting the trigger, or a payout may exceed the damage. Careful trigger design and layering with other instruments reduce but do not eliminate these problems.

Similar tensions affect fiscal rules, which reduce procyclicality only if they are credible, and they are credible only if they are not suspended too easily. Yet rules that cannot be suspended in a genuine catastrophe force damaging austerity at the worst moment. The design challenge is an escape clause that is triggered by clearly defined events, time-limited and paired with a credible path back. Jamaica's suspension after Melissa and Indonesia's pandemic suspension of its deficit ceiling are encouraging examples, but the balance is delicate, and a rule that is suspended repeatedly loses its value.

14.3 The limits of the model

The simulation behind Figures 5, 6 and 10 treats shocks as independent, ignores positive shocks and build-back-better upgrades, applies one set of parameters to every shock and ignores the cost of the strategies. Its qualitative conclusions (persistence dominates when shocks are frequent, the effect is non-linear, multiplicative terms reward a portfolio) follow from its structure and match the empirical literature; its specific numbers are illustrations of magnitude, not estimates.

14.4 What would falsify the argument

The argument would be substantially weakened by evidence of any of the following:

- systematic rebound of output to its pre-shock trend after financial, climate and health shocks in developing economies, contrary to the hysteresis literature;
- no relationship between the frequency of shocks and long-run convergence once conventional growth determinants are controlled for;
- evidence that countries with stronger buffers, pre-arranged finance and lower coupling do not experience shallower or shorter crises when hit by comparable shocks;
- evidence that resilience costs consistently exceed the losses averted, even where shocks are frequent. Current evidence points the other way on each count, but the coming decade will test it.

15. Conclusion

The developing world's convergence problem in the 2020s is not, at its core, a problem of insufficient growth in good years. It is a problem of losing ground in bad ones, more often, more deeply and more permanently than before. The historical evidence that long-run progress comes mainly from shrinking less often, the econometric evidence that crisis losses are largely permanent, and the experience of a decade in which shocks have arrived before recoveries were complete all point to the same conclusion. For a large and growing number of developing economies, resilience is no longer a complement to the growth strategy. It is the growth strategy's foundation.

The shock-loss identity offers a practical way to act on that conclusion. It separates the four properties of shocks that determine their long-run cost, frequency, depth, persistence and coupling, and matches each to a family of policies. Because the terms multiply, the most effective approach is a portfolio that trims all four, beginning with the cheapest instruments in each family. Because the value of resilience rises steeply as the recovery-interval ratio approaches one, the economies closest to that threshold stand to gain the most.

The country cases show that the approach is achievable. Bangladesh made catastrophic cyclone deaths rare. Indonesia and Chile broke the loops that had turned earlier shocks into crises. Jamaica and Grenada built fiscal and contractual defences that made their next disasters less damaging. Sri Lanka and Zambia show what happens when coupling and persistence are left unmanaged, and how much of the cost is set by the speed of the response rather than the size of the shock.

The shocks of the coming decades will not be smaller than those of the 2020s, and many will be larger. Developing nations cannot control how often the world delivers them. They can control, to a considerable degree, how much of each shock becomes permanent. That is where convergence will be won or lost.

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