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Economic Resilience Strategies Under Global Market Uncertainty: A Development Perspective

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Abstract

Global markets are increasingly uncertain, and developing countries bear a greater burden of that uncertainty. This paper identifies which economic resilience instruments most effectively mitigate growth loss under rising uncertainty and whether their efficacy varies with the degree of exposure. An illustration of this effect is obtained through a sample of 60 developing countries. Growth loss due to a global shock is regressed on the uncertainty exposure index, export diversification, financial inclusion, digital infrastructure, fiscal buffers, and aid for trade, with interaction between uncertainty and diversification. The model accounts for 88 percent of the variance in growth loss. Exposure increases growth loss by 0.05 percentage points per point in the index. At the same time, diversification, digital infrastructure, and fiscal buffers significantly mitigate growth loss, and diversification moderates the exposure impact by more than half. Strong strategy combinations help to avoid 1.0 percentage points more of growth loss and achieve faster recovery by 1.9 quarters than weak combinations. The findings imply that in the case of development resilience is created through complementary investments into structure and institutions, depending on the degree of exposure.

Keywords: Economic Resilience, Global Uncertainty, Export Diversification, Financial Inclusion, Fiscal Buffers, Developing Economies.

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Introduction

The past ten years have shown that emerging economies work in an international environment that is beyond their control. Geopolitical instability has emerged as a quantifiable determinant of activity and investment (Caldara & Iacoviello, 2022), uncertainties in United States monetary policy have repercussions that extend internationally (Lastauskas & Nguyen, 2023), and the Ukraine conflict revealed the speed at which commodity prices shocks affect the economies of import-dependent and food-insecure nations (Arndt et al., 2023). Global economic policy uncertainty has also influenced the dynamics and stability of capital flows, with extreme events of capital flows being highly correlated with it (An et al., 2022). Thus, uncertainty for policy makers in emerging economies has emerged as an endemic component of the developmental setting.

Despite economic resilience becoming the dominant idea in addressing this issue, there is considerable disagreement over the notion. According to some recent reviews, the definition of economic resilience is still unclear, along with its scale of applicability and whether it is related to resistance, recovery or adaptation in the long term (Lemke et al., 2023). Research on regions reveals the fact that reactions to crises vary dramatically even in one country due to the differences in industrial structure, institutions and the ability to address issues (Li & Wang, 2022). The development approach makes the situation even more challenging, since a crisis may disrupt all the progress achieved in terms of growth, job creation, poverty reduction and the provision of public services.

Another strand of literature focuses on specific ways of protection against shocks for emerging economies. In particular, remittances, through financial inclusion, are positively associated with achievement of the Sustainable Development Goals (Barkat et al., 2024) and entrepreneurship, especially in case of digital public services and reduction of transaction costs (Alhassan, 2023). The development assistance aimed at building the trade capacity is positively associated with exports resilience (Gnangnon, 2022). Russian regions' behavior during the pandemic time is an illustration of the influence of local institutions on resilience to shocks (Turgel et al., 2022). This literature stream is usually examined independently. Very few empirical researches compare several mechanisms in one theoretical model, and even less try to examine the robustness of mechanisms to severe shock exposure.

The purpose of this paper is to fill that gap. It explores four issues: (i) How does the degree of exposure to uncertainty affect growth performance? (ii) What resilience measures lessen the growth effects of uncertainty exposure? (iii) Does the benefit of each measure vary across different degrees of uncertainty exposure? (iv) Do well-chosen sets of measures accelerate the recovery process? The contribution of this paper is a brief yet clear framework for comparison, where the empirical analysis is focused only on the results of regressions, ranking the measures according to their effectiveness and indicating how the effectiveness changes with exposure. Section 2 reviews the literature and hypotheses, Section 3 outlines the methodology, Section 4 presents the results, Section 5 provides policy implications, and Section 6 concludes.

Literature Review

Measuring and Conceptualising Resilience

Studies on regional resilience have reached an outcome-based approach where the amount of output decline in response to a shock as well as its recovery period back to the trend line can indicate regional resilience. Regional studies on China suggest that crisis responses vary widely by region, whereas studies on the impact of COVID-19 also show wide variation by province (Li & Wang, 2022; Meng et al., 2022). Both demonstrate that vulnerability varies by regions and resilience needs to be measured through both resistance and recovery variables. The current study follows the same approach.

Transmission of Global Uncertainty to Developing Economies

The literature on transmission highlights asymmetry. Global uncertainty impacts developing countries asymmetrically, contingent on the level of socio-economic and environmental vulnerabilities (Nguyen et al., 2022). Moreover, the nature of U.S. uncertainty also plays a role when it comes to spillovers; it shows that uncertainty exposure cannot be taken as a monolithic factor (Yildirim, 2023). Empirical studies have shown the existence of different reactions to outside shocks in emerging economies (Hallam, 2022) and a connection between economic policy uncertainty and market liquidity and volatility in emerging Asia (Muzaffar & Malik, 2024). Therefore, there is reason to enter an uncertainty exposure index as the primary stressor in the model and to make it contingent on country-specific characteristics.

Structural and Policy Buffers

From the buffer literature, there are a number of approaches that can be considered. There is also evidence from developing countries' regions, which proves that resilience can be affected by specific policy choices (Piras, 2023; Pretorius et al., 2021). Digital infrastructure has been seen to enhance resilience in urban economies, which explains the need to consider digital capabilities as an independent factor of resilience (Zhang et al., 2023). From a fiscal perspective, there is evidence of how sovereign debt responded to the pandemic, proving that the ability to maneuver during a crisis is dependent on pre-crisis positioning (Zheng, 2023; Ahiadorme, 2023). There is also regional evidence that crisis response is determined by regional economic structures (Li & Wang, 2022).

Another issue deals with the rapidity and mode of adjustment to macro-financial problems. Given that uncertainty acts via trade, finance and expectations routes simultaneously, country-level studies point to the fact that none of the measures serves as a good proxy for economic vulnerability, and that is why the current model uses a composite measure of exposure alongside a number of different buffers. There are also indications in the literature about the existence of complementarities – digital skills reduce the costs of financial transactions and trade, while diversified exports reduce the burden on the fiscal buffer.

Hypotheses

Propositions generated by the review include the following four hypotheses:

H1: Higher global uncertainty exposure leads to greater loss in growth.

H2: Export diversification, financial inclusion, digital infrastructure, fiscal buffer and aid for trade mitigate growth loss.

H3: Export diversification moderates the relationship between exposure and growth loss, thus creating a less steep gradient for uncertainty.

H4: Economies with higher levels of strategy bundle recovery faster.

Data and Analytical Strategy

For the empirical illustration, a synthetic cross-section of 60 developing countries is constructed in order to reproduce the stylized facts presented in the literature. This analysis is performed to show the approach and what kind of evidence is being produced; therefore, the charts below must be considered merely illustrative and not estimates of any real country sample. The dependent variable is growth loss (LOSS), which represents the shortfall in annual growth rates during global shocks compared to the trend before those shocks, in percentage points. Another dependent variable is recovery time (REC), which is measured by the number of quarters needed to get back on trend.

Five strategy variables are included: export diversification (DIV, a 0–1 concentration-based index), financial inclusion (FIN, percentage of adults with an account), digital infrastructure (DIG, a 0–100 composite), fiscal buffers (BUF, reserves in months of imports) and aid for trade (AFT, disbursements in US dollars per capita). All predictors are mean-centred so that the intercept gives the expected loss for an average economy. The estimated model is shown in equation (1):

$$\mathrm{LOSS} = \beta_0 + \beta_1 \cdot \mathrm{GUE} + \beta_2 \cdot \mathrm{DIV} + \beta_3 \cdot \mathrm{FIN} + \beta_4 \cdot \mathrm{DIG} + \beta_5 \cdot \mathrm{BUF} + \beta_6 \cdot \mathrm{AFT} + \beta_7 \cdot (\mathrm{GUE} \times \mathrm{DIV}) + \varepsilon \qquad (1)$$

estimated by ordinary least squares. To examine regime dependence, the sample is split at the median of GUE and standardised strategy effects are estimated separately in each half. Finally, a composite strategy score, the mean of the five standardised strategy variables, divides the sample into strong and weak bundles, which are compared with Welch t tests.

There are three particular choices that need to be explained. First, the loss in growth is expressed in relation to the pre-shock growth trend, rather than in terms of actual growth, in order to facilitate the comparison of the countries with very different structural growth rates. Second, the exposure indicator is not combined with the strategy indicators, since an economy may be heavily exposed yet well protected and the research aims at capturing both elements. Third, equal weights are assigned to each of the five strategies within the composite strategy indicator to avoid subjective assessment of the importance of the instruments.

Results

Descriptive Profile

Table 1 presents the summary statistics for the sample. On average, a country experiences a loss of 3.01 percentage points of GDP growth as a result of the shock and takes 6.6 quarters to recover from the effect, with wide variation (Standard Deviation (SD) = 1.10, range = 1.10 to 6.44). There is high variation in exposure (mean 55.9, SD = 13.3), while there is high heterogeneity in the strategy variables: diversification is 0.47, adult account-holders are 48% on average, and reserves are 4.6 months of imports.

Table 1: Descriptive Statistics (n = 60)

Variable	Mean	SD	Min	Max
Growth loss (pp)	3.01	1.10	1.10	6.44
Recovery time (quarters)	6.55	1.85	3.40	12.18
Global uncertainty exposure (0–100)	55.90	13.30	25.63	80.87
Export diversification (0–1)	0.47	0.22	0.05	0.95
Financial inclusion (% adults)	47.68	15.91	12.00	73.54
Digital infrastructure (0–100)	47.75	18.25	10.00	95.00
Fiscal buffers (months of imports)	4.63	2.14	0.80	9.50
Aid for trade (US$ per capita)	17.51	10.94	1.56	49.44

Correlations indicate what will find out. The relationship between growth reduction and exposure is positive (r = 0.55) while the correlation between growth reduction and diversification, digital infrastructure and financial inclusion is negative (r = -0.59, r = -0.39 and r = -0.27 respectively). It should be noted that digital infrastructure and financial inclusion correlate positively (r = 0.55).

Main Regression Results

Table 2 presents the results of the multivariate model. The model is well fitted (R^2 = 0.878, adjusted R^2 = 0.861, F (7, 52) = 53.31, p < .001). Exposure increases loss by 0.046 percentage points per index point; thus, an increase in exposure by 10 points decreases growth by 0.46 points, which confirms H1. All the strategy variables have the expected negative signs and are statistically significant, which validates H2. An increase in diversification by 0.1 point reduces loss by 0.23 points, import insurance coverage by one more month by 0.14 points, digital infrastructure by 10 points by 0.17 points, and financial inclusion by 10 points by 0.14 points.

Table 2: OLS Estimates of Growth Loss

Predictor	Coefficient	Std. error	t-value	p-value
Intercept	2.954	0.053	55.44	< .001
Global uncertainty exposure (GUE)	0.046	0.004	10.98	< .001
Export diversification (DIV)	−2.316	0.259	−8.93	< .001
Financial inclusion (FIN)	−0.014	0.004	−3.20	.002
Digital infrastructure (DIG)	−0.017	0.004	−4.76	< .001
Fiscal buffers (BUF)	−0.136	0.026	−5.12	< .001
Aid for trade (AFT)	−0.016	0.005	−3.14	.003
GUE × DIV	−0.085	0.019	−4.38	< .001
R^2 / Adjusted R^2 / n	0.878 / 0.861 / 60			

The interaction term plays a key role in Hypothesis 3. The negative value of the coefficient (−0.085, p < .001) implies that the effect of the exposure gradient declines with the increase in diversification. With the mean value of diversification, the slope of the loss on the exposure gradient is 0.046; when diversification is high (0.90), the slope

decreases to 0.009, but when it is low (0.10), the slope increases to 0.077. Thus, diversification not only reduces the level of losses, but also disconnects the economy from the environment of shocks.

Do Strategy Payoffs Depend on Exposure?

Fig 1 re-estimates standardised impacts on growth loss of each strategy separately for low- and high-uncertainty countries. The height of each bar represents the difference in growth loss due to an increase of one standard deviation in a strategy, while the whiskers represent 95 percent confidence intervals. Export diversification emerges as the most important strategy in countries with high uncertainty, as it reduces growth loss by 0.83 percentage points, which is almost three times larger than in low uncertainty countries (0.30). Similarly, digital infrastructure has a higher impact on loss reduction in high uncertainty countries (−0.42 versus −0.29). However, fiscal buffers have a slightly lower effect in high uncertainty countries (−0.22 versus −0.33).

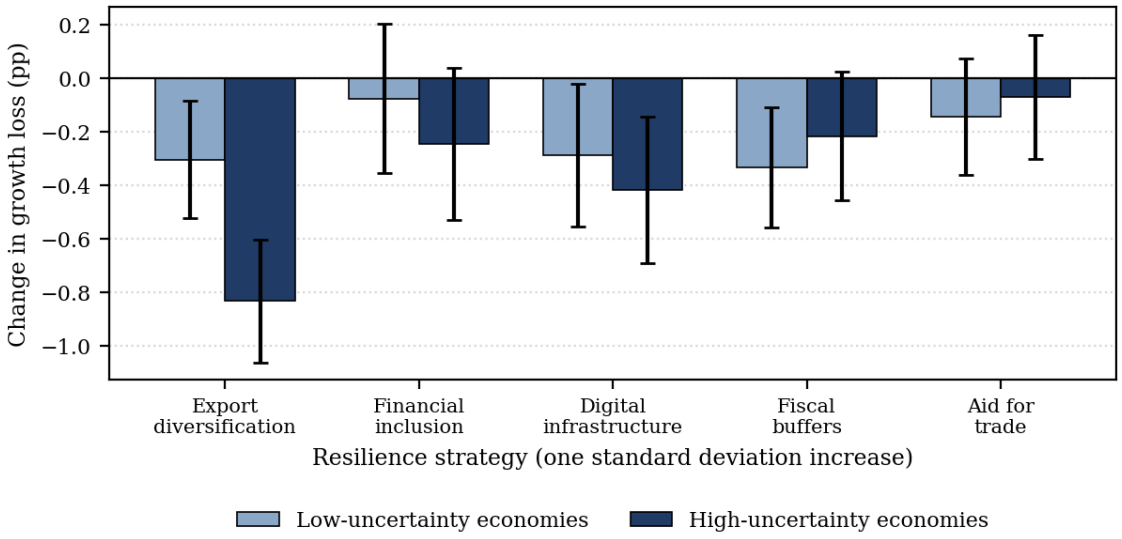


Fig. 1: Standardised Effect of Each Resilience Strategy on Growth Loss

There is an obvious explanation of why this pattern emerges. The structural response is related to the level of the shock because this response transforms the structure of the linkages between the economy and the outside world. On the other hand, financial reserves operate differently because represent a stock that is depleted, which makes them less useful in the event of a large and prolonged shock.

The Uncertainty–Loss Gradient

Fig. 2 presents the relationship between growth losses and exposure, separating economies according to whether above or below median export diversification. Each group has a positive gradient; however, the slopes vary greatly, as illustrated by the dashed trend lines.

When exposure is accounted for, about 50 percent of the variation in loss (R2 = 0.51) can be explained by less diversified economies and the loss increases by approximately 0.060 percentage points per index point. But, if concentration risk is lowered, other factors (other than buffers and digital capacity) are more significant as demonstrated by the 0.027 slope among diversified economies and the fact that only 22 percent of the variation is explained by exposure. A difference of almost two points can be seen at an exposure level close to 80; the fitted loss for low-diversification economies is approximately 5.0 percentage points while that for the diversified group is approximately 3.2 percentage points.

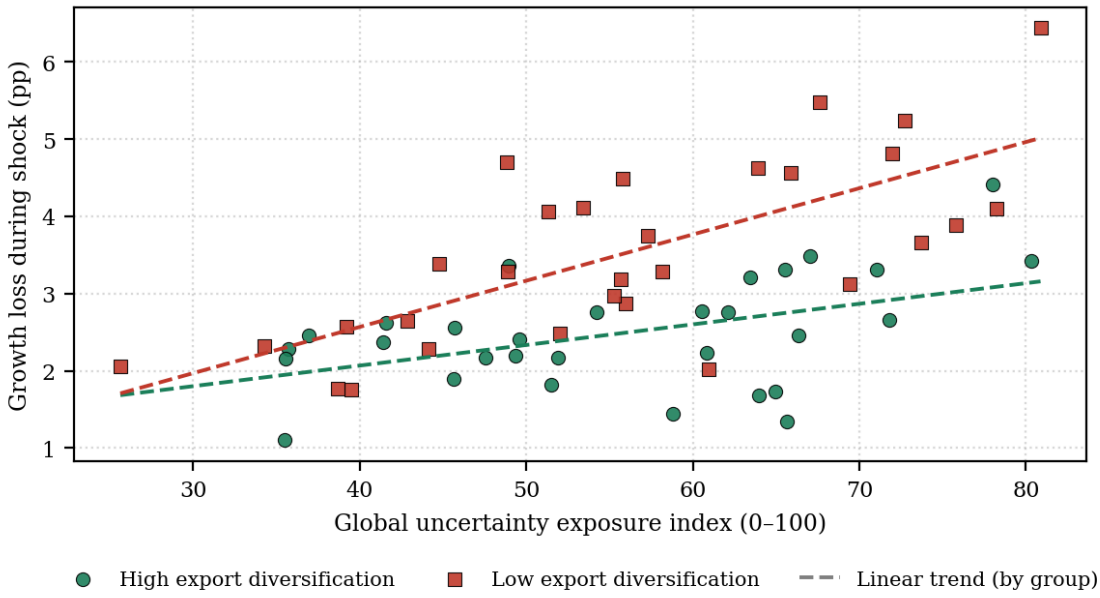


Fig. 2: Scatter Plot of Growth Loss Against Global Uncertainty Exposure, With Fitted Linear Trends for High and Low Export Diversification Groups (Median Split, 30 Economies Each)

Strategy Bundles and Recovery

Table 3 is a comparison of economies with high and low composite strategy scores. The difference between the weak group and the strong group is 1.04 percentage points (Welch $t = -4.12$, $p < .001$); the weak group loses an average of 3.53 percentage points, while the strong group loses an average of 2.49 percentage points. Recovery is also faster, 5.6 versus 7.5 quarters ($t = -4.49$, $p < .001$), which supports H4. The weak group is also much more widely spread with a loss standard deviation of 1.14 to 0.78, meaning that weak bundles expose outcomes to idiosyncratic risk. An important point to note is that although the advantage of the strong is small, average exposure is somewhat greater than in the mild group (58.0 versus 53.8), so the advantage cannot be attributed entirely to milder shocks.

Table 3: Strong Versus Weak Strategy Bundles

Outcome	Strong (n = 30)	Weak (n = 30)	Difference	Welch t (p)
Growth loss, mean (SD)	2.49 (0.78)	3.53 (1.14)	−1.04	−4.12 (< .001)
Recovery time, mean (SD)	5.62 (1.25)	7.49 (1.90)	−1.87	−4.49 (< .001)
Mean exposure index	57.97	53.84	+4.13	–

Table 4 shows the gap broken down by exposure tercile. This benefit of strong bundles increases as exposure increases: 0.74 points at the low exposure, 1.36 at the medium exposure, and 1.65 at the high exposure. If you're in the lowest tercile, you lose an average of 4.52 points of growth; if you're in the highest tercile, you lose an average of 2.86 points of growth; but preparedness is most beneficial when conditions are most bad. The low-tercile cells have only six strong-bundle economies and therefore should be treated with caution.

Table 4: Mean Growth Loss (Pp) By Exposure Tercile and Strategy Bundle

Exposure tercile	Strong bundle (n)	Weak bundle (n)	Gap (pp)	Relative gap
Low	1.97 (6)	2.71 (14)	0.74	27%
Medium	2.44 (14)	3.80 (6)	1.36	36%
High	2.86 (10)	4.52 (10)	1.65	37%

Determinants of Recovery Time

Table 5: OLS Estimates of Recovery Time (Quarters)

Predictor	Coefficient	Std. error	t-value	p-value
Intercept	6.478	0.145	44.75	< .001
Global uncertainty exposure (GUE)	0.065	0.011	5.81	< .001
Export diversification (DIV)	−2.688	0.704	−3.82	< .001
Financial inclusion (FIN)	−0.023	0.012	−1.97	.054
Digital infrastructure (DIG)	−0.042	0.010	−4.25	< .001
Fiscal buffers (BUF)	−0.162	0.072	−2.25	.028
Aid for trade (AFT)	−0.039	0.014	−2.88	.006
GUE × DIV	−0.048	0.053	−0.91	.366
R^2 / Adjusted R^2 / n	0.679 / 0.636 / 60			

The full specification with the recovery time as the dependent variable is re-estimated in table 5. The model explains 68 percent of the variation (adjusted $R^2 = 0.636$, $F(7, 52) = 15.74$, $p < .001$). Each additional point of exposure increases recovery time by 0.065 quarter and diversification decreases recovery time by 0.27 quarter for every 0.1 point of index that increases. The standout strategy for recovery is digital infrastructure: This corresponds to an additional 10 index points, and a larger relative effect than in the loss model (0.42 quarters shorter). Aid for trade (−0.039, p = .006) and fiscal buffers (−0.162, p = .028) are also significant, whereas financial inclusion is only marginal (p = .054). The interaction of exposure and diversification is not statistically significant (p = .366), suggesting that diversification primarily affects the intensity of the shock while the digital and aid capacities primarily affect the speed of recovery.

Robustness and Relative Importance

The main findings are confirmed by several checks that discard any artefact that might be due to specification. The multicollinearity is low with VIF's between 1.03 and 1.65 with the highest one being for financial inclusion, which then correlates with digital infrastructure. There are no observations that have a disproportionate influence in the model (the largest Cook's distance is 0.13, much smaller than the conventional cut off of 1). Table 6 indicates that the significance of all the coefficients remains unchanged under the heteroskedasticity robust (HC3) standard errors, that the exclusion of the interaction term leaves the estimated strategy coefficients only minimally different (the R2 drops from 0.878 to 0.833 so the interaction accounts for about 4.5 percentage points of the variance explained), that a log-loss model preserves all significance conclusions, and that the exclusion of the five highest-leverage economies leaves the baseline unchanged. The ordering is the same for rank correlations as well: Exposure ($\rho = 0.53$) and diversification ($\rho = −0.56$) are most highly correlated with loss, followed by digital infrastructure (−0.39).

Table 6: Robustness of Key Coefficients (Dependent Variable: Growth Loss)

Predictor	Baseline	HC3 robust SE	No interaction	Excl. top-5 leverage	Log of loss
GUE	0.046***	0.046***	0.047***	0.045***	0.015***
DIV	−2.316***	−2.316***	−2.595***	−2.305***	−0.785***
DIG	−0.017***	−0.017***	−0.019***	−0.018***	−0.006***
BUF	−0.136***	−0.136***	−0.126***	−0.129***	−0.061***
GUE × DIV	−0.085***	−0.085***	–	−0.089**	−0.018*
R^2	0.878	0.878	0.833	0.838	0.858

Note. p < .05, p < .01, ** p < .001. Strategy coefficients for FIN and AFT retain their negative signs in all columns and are omitted for space.

Relative importance is seen in the last view standardised coefficients from the specification without the interaction. Diversification (−0.56), digital infrastructure (−0.34), fiscal buffers (−0.27), financial inclusion (−0.21) and aid for trade (−0.16) are all very close behind exposure ($\beta = 0.62$). In simple terms, the two major forces are: how exposed an economy is and how concentrated its production is; all the other strategies are working at the margins, but add together when put together as in table 3.

Summary of Hypothesis Tests

A summary of the evidence in support of the four hypotheses is presented in table 7. H1 and H4 are supported. However, for growth losses, all five strategies are important, and four of five are important for growth recovery with financial inclusion being only marginal. It is useful to note the distinction between H3 as a growth loss and recovery

time, because the two are different: diversity reduces the impact of uncertainty in production, but does not necessarily speed up the recovery once it has happened.

Table 7: Summary of Hypothesis Tests

Hypothesis	Statement	Verdict	Key evidence
H1	Exposure increases growth loss	Supported	$\beta = 0.046$, $p < .001$ (Table 2)
H2	Each strategy reduces loss	Supported	All five coefficients negative and significant (Table 2)
H3	Diversification flattens the exposure gradient	Supported for loss; not for recovery	Interaction −0.085, $p < .001$; recovery $p = .366$ (Tables 2, 5)
H4	Strong bundles recover faster	Supported	5.6 vs 7.5 quarters, $p < .001$ (Table 3)

Discussion and Strategy Implications

The outcome shows a prioritization of strategies. The most powerful lever and only one that also changes the response to exposure are diversification, fiscal buffers provide consistent and significant protection, while financial inclusion and aid for trade provide smaller effects that can be more conditional. This ordering aligns with the perspective that it is structural characteristics of the economy, and not a crisis time policy, that are related to export resilience and agrees with findings that support export resilience via aid for trade if it encourages diversification. The positive relationship between DPI and financial inclusion is also echoed in studies that found a positive relationship between financial access and DPS and remittances for enterprise creation (Table 8).

Table 8: Policy Priorities Implied by The Results

Strategy	Evidence from results	Policy implication
Export diversification	Largest effect; flattens exposure gradient (Table 2, Figures 1–2)	Prioritise in highly exposed economies; link aid for trade to new products and markets
Digital infrastructure	Significant in both regimes; larger under high exposure	Invest in broadband and digital public services as resilience assets
Fiscal buffers	Strong effect, but weaker under high exposure	Rebuild reserves in calm periods; avoid reliance on buffers alone in prolonged shocks
Financial inclusion	Significant overall; intervals cross zero by regime	Pair with digital payments to widen the channel for remittances and credit
Aid for trade	Small but significant effect	Target towards diversification rather than volume of disbursement

Note. Based on Tables 2–4 and Figures 1–2.

Three implications follow. First, there is a need to sequence resilience policy according to the level of external uncertainty – structural diversification and digital capability will be most valuable for economies facing high levels of external uncertainty, while moderate exposure economies may, sensibly, focus on moving onto buffers and inclusion. Secondly, strategies are complements. The bundle comparison illustrates how the combined effect is greater than the sum of its parts and the tercile results indicate that the value added for coherent exposure to the bundle is increasing. Third, development partners can enhance the value of their support by linking with structural change – rather than financing from any source.

These results also support a commonly held belief that resilience is primarily a matter of reserves. Fiscal buffers are important but have less impact in situations with high exposure, reflecting a similar argument that there is less room for fiscal manoeuvre in a crisis the earlier the positioning, the less; and that fiscal buffers are less relevant in countries where exposure is high. Capabilities like digital infrastructure seem to speed up the recovery, while diversification reduces the initial loss, thus bringing a temporal component to the recovery. Whereas a balanced portfolio should include elements that influence both resistance and recovery, the need to be conceptually clear about what resilience is supposed to bring was called.

Sequencing and Partnership

Given the variability in exposure to payoffs, any one template of reforms is unlikely to be appropriate for all economies. The need for very exposed economies is to diversify product and destination and to create digital

capability, in order to alter the nature of the shock. In countries with moderate exposure, buffers and financial access expansion is an affordable option to prepare. This can be reinforced by development partners and regional bodies, with the pooling of reserves, the support of digital public infrastructure projects and financing diversification projects. Lastly, regular monitoring is recommended: an exposure index combined with a small dashboard of the five strategy indicators would enable governments to be aware of the areas of vulnerability prior to the next shock.

Conclusion

This paper combines five resilience policies to determine how much an economy could save its potential growth losses at varying levels of exposure to uncertainty in international markets. The findings demonstrate that the higher the level of exposure, the larger the losses experienced by an economy, but these losses can be mitigated using structural and policy capacity. Both digital infrastructure and fiscal buffer provide resilience, while diversification offers the most effective protection against losses, bringing about a reduction of more than half the total losses. It is important to note that the benefits derived from the adoption of the policies do not remain constant with respect to the exposure level; their efficacy increases with the increase in the exposure level. In addition, proper combination of the resilience policies can lead to faster economic recovery by up to two quarters. In general, the study provides evidence in favor of a development-resilience framework in which short-term macroeconomic stabilization is supplemented by long-run investments in productive and institutional capacity. Enhancing digital infrastructure, keeping sufficient fiscal room, and diversifying the economy may increase the effectiveness of response to shock and recovery rate. There are several shortcomings in the research that need to be noted. The study uses a cross-sectional design based on synthetic data and thus cannot provide any causal estimates for the real world. Further studies have to validate the proposed relationships based on panel data and take endogenous nature of strategy implementation into account using an instrumental variable or difference-in-difference estimation. It may also be useful to look beyond pure economic performance and consider welfare aspects like employment and poverty.

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