INTERNATIONAL MONETARY FUND

Unpacking Macroeconomic Impacts of Climate Events and Policy Implications in the Philippines

Jean Christine Armas, Yinqiu Lu, Margaux MacDonald, Nicholas Ari Sander, Jeongwon Son, Azar Sultanov, and Sihwan Yang

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January 2026

ABSTRACT: The Philippines is highly exposed to natural hazards, which are increasingly intensified by climate change, yet quantitative studies on the macroeconomic effects of climate shocks in the country remains limited. This paper finds that category-5 typhoons exert inflationary pressures on regional headline and food CPI, by around 0.4 percent and 0.7 percent respectively, with the peak impact occurring approximately one quarter after the typhoon hits. Additionally, category-5 typhoons lower regional GDP by approximately 0.4 percent on impact (or by 0.2-0.3 percent of aggregate GDP), while agricultural labor productivity declines by 2.5 percent. These estimates show that typhoons act as adverse supply shocks, particularly in the agriculture sector, likely raising inflation while dampening economic activity and further posing a dilemma for monetary policy. We then use the IMF's Global Dynamic Network (GDN) model to construct counterfactual scenarios to assess the importance of sectoral heterogeneity in shaping output and inflation outcomes and examine alternative monetary policy response functions, helping inform the central bank on tradeoffs between supporting output and containing inflationary pressures. Finally, we use the DIGNAD model to simulate the impacts of natural disasters and analyze the policy trade-offs involved in enhancing resilience to natural disasters and the macro-fiscal implications of various policy options for the Philippines.

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SELECTED ISSUES PAPERS

Unpacking Macroeconomic Impacts of Climate Events and Policy Implications in the Philippines

Philippines

Prepared by Jean Christine Armas, Yinqiu Lu, Margaux MacDonald, Nicholas Ari Sander, Jeongwon Son, Azar Sultanov, and Sihwan Yang [1]

[1] Special thanks to Agnes Isnawangsih and Patricia Tanesco for excellent research and editorial assistance. The authors additionally thank the Philippine authorities and colleagues from SPR, FAD, and RES for constructive comments and suggestions. Any remaining errors are those of the authors alone.

INTERNATIONAL MONETARY FUND

PHILIPPINES

SELECTED ISSUES

November 6, 2025

Approved By
Asia and Pacific Department

Prepared By Yinqiu Lu, Margaux MacDonald, and Jeongwon Son (all APD); Jean Christine Armas (MCM); and Nicholas Ari Sander, Azar Sultanov, and Sihwan Yang (all RES)

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ANNEX

UNPACKING MACROECONOMIC IMPACTS OF CLIMATE EVENTS AND POLICY IMPLICATIONS IN THE PHILIPPINES[1]

A. Introduction

1. **The Philippines is highly exposed to natural hazards, which are increasingly intensified by climate change**. Various global climate risk indices and assessments, reflect the country's significant exposure to climate shocks—stronger typhoons, heavier rainfall, higher temperatures, and rising sea levels—which are expected to have increasingly devastating effects on its people and economy as slower-moving climate change proceeds (BSP Governor Remolona, 2023 BSP Sustainability Report).[2] Estimates by the World Bank suggest that cumulative economic costs of climate change could reach 7.6 percent of GDP by 2030 and 13.6 percent by 2040 (World Bank CCDR 2022). Accordingly, the Philippines has positioned climate resilience as a cross-cutting development strategy in its Development Plan (PDP 2023-2028) and National Adaptation Plan (NAP 2023-2050), in line with the United Nations' Sustainable Development Goal 13 on climate action—with relevant targets on strengthening resilience to climate-related hazards (13.1) and on integrating climate measures into policies and planning (13.2).

2. **In the Philippines, quantitative studies on the macroeconomic effects of climate shocks remains limited**. While the government has made strides in advancing climate resilience through national strategies and legal frameworks, there remains a need to support these efforts with evidence-based assessments that quantify the potential economic costs and risks. This Selected Issues Paper (SIP) extends previous empirical research studies, including Armas et. al. (2024), by incorporating additional climate variables to capture broader macroeconomic impacts and support the design of an effective monetary and fiscal policy responses. We present stylized facts related to the impact of climate-events and trends for the Philippines (Section B) using a mix of empirical methods and climate model simulations to examine the impact of climate shocks on key macroeconomic outcomes (Section C). Given that typhoons represent the most frequent and costliest climate shocks in the Philippines, we analyze the monetary policy trade-offs associated with typhoon shocks and the fiscal implications of building resilience amid more frequent and stronger typhoons (Section D).

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[1] This chapter was prepared by Yinqiu Lu, Margaux MacDonald, Jeongwon Son, and Renz Torillos (all APD); Jean Christine Armas (MCM); and Nicholas Ari Sander, Azar Sultanov, and Sihwan Yang (all RES). Special thanks to Agnes Isnawangsih and Patricia Tanesco for excellent research and editorial assistance. The authors additionally thank the Philippine authorities and colleagues from SPR, FAD, and RES for constructive comments and suggestions. Any remaining errors are those of the authors alone.

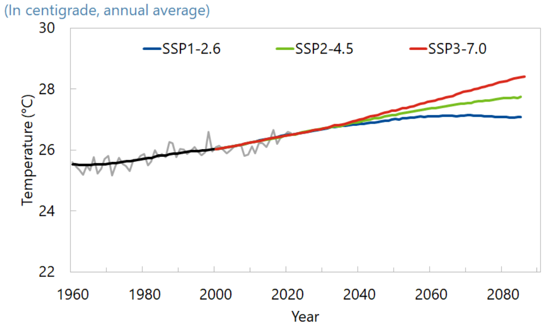
[2] In 2025, the World Risk Index ranked the Philippines as the most at-risk country worldwide for 15th consecutive year, with a score of 46.56 out of 100 (Bündnis Entwicklung Hilft and Ruhr University Bochum – IFHV, 2025). The United Nations' 2023 assessment of natural disaster risks places the Philippines at the top of the list.

B. Climate Trends and Shocks in the Philippines

3. The Philippines has seen a clear trajectory of intensifying climate change events over the years and is expected to see more going forward (Figure 1). Over the past century, the country experienced a significant warming trend. Historical temperature records indicate an average increase of approximately 1.1℃ with respect to 1901-1930 most of which recorded after 1960 (Figure 1). This warming trend has contributed to more frequent episodes of extreme heat in recent years, with PAGASA's (Philippine Atmospheric, Geophysical and Astronomical Services Administration) real-time heat index monitoring system reporting dangerously high temperatures in many regions, increasing the risks of heat-related illnesses (PAGASA, 2023). Country-wide precipitation has remained stable historically and is projected to remain largely unchanged in most of the country, with a modest but not statistically significant increase in the north of the country (+150mm/year, Figure 1). In addition, the sea level has continued to rise historically and is projected to continue increasing, posing an economic challenge for the Philippines (Figure 1).

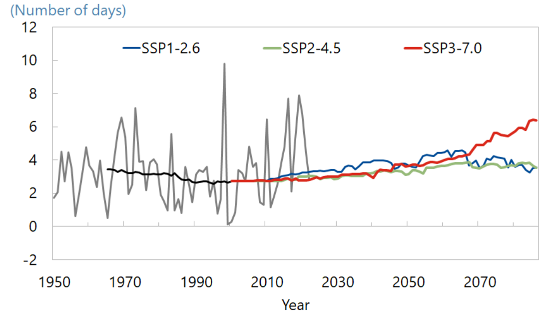
Figure 1. Philippines: Historical and Projected Changes of Temperature and Annual Precipitation

Historical and Projected Temperature
(In centigrade, annual average)



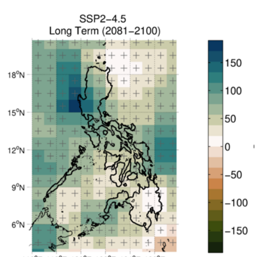
Source: FADCP Climate Dataset (Massetti and Tagklis, 2024), using CRU data (Harris et al., 2020), and CMIP6 data (Copernicus Climate Change Service, Climate Data Store, 2021).

Historical and Projected Extreme Heat Days
(Number of days)



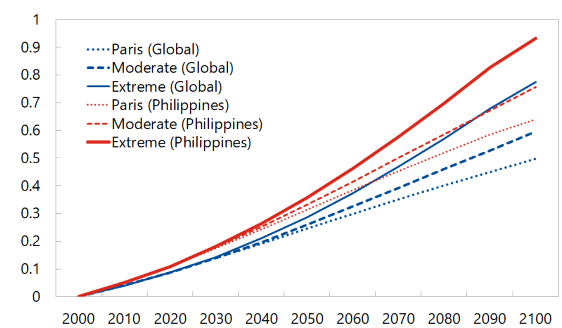
Source: FADCP Climate Dataset (Massetti and Tagklis, 2024), using ERA5 reanalysis data (Hersbach et al. 2023), and CMIP6 data (Copernicus Climate Change Service, Climate Data Store, 2021).

Average Annual Precipitation Change Relative to 1985-2014
(In mm/year)



Note: Regions without any crosses indicate robust signals. Crosses indicate conflicting signals where only 60-80% of models agree on the sign of change.
Source: FADCP Climate Dataset (Massetti and Tagklis, 2024), using CMIP6 data (Copernicus Climate Change Service, Climate Data Store, 2021: CMIP6 climate projections).

Historical and Projected Sea Level Rise

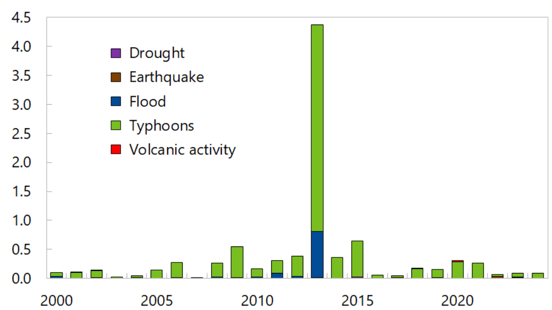


Source: CIAM Model database (Diaz, 2016) based on data from Kopp et al. (2014).

4. Typhoons represent the most frequent and costliest climate shocks in the Philippines (Figure 2). The country experiences, on average, the most intense Category-5 typhoons twice per year, while lower-intensity typhoons (Categories 3 and 4) occur more frequently, (Figure 2). The economic impact is particularly damaging for the agricultural sector. A single Category-5 typhoon can inflict losses equivalent to about 0.1 percent of GDP in the agriculture sector alone, highlighting broader implications for food security and rural livelihoods (Figure 2).[3] Exposure to severe typhoons is geographically concentrated, with several regions—particularly in the eastern and central parts of the country—facing disproportionately high risks.[4] Seven regions have more than 15 percent probability of experiencing Category-5 typhoons in a year, while four regions face more than 25 percent likelihood (Figure 2).

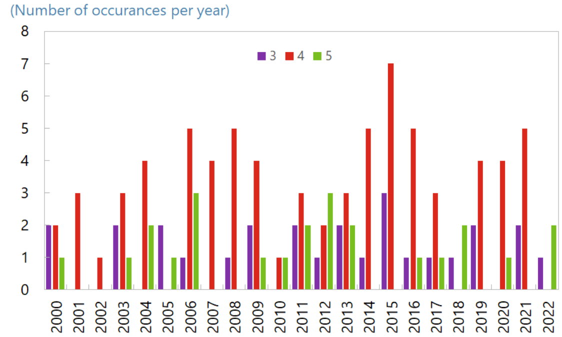
Figure 2. Philippines: Frequency and Severity of Typhoons

Total Economic Damages from Disasters
(In percent of GDP)



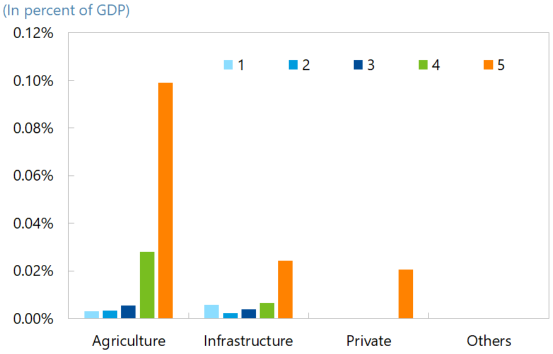
Sources: National Disaster Risk Reduction and Management Council (NDRRMC); and IMF staff estimates.

Typhoon Frequency by Category
(Number of occurances per year)



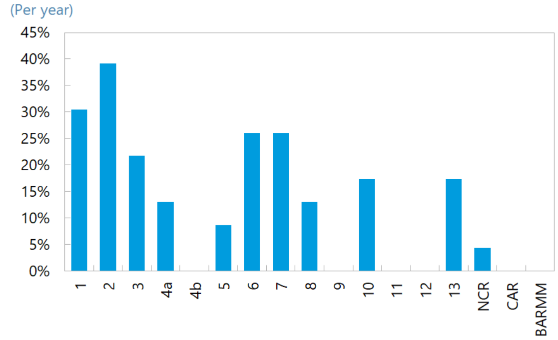
Sources: National Disaster Risk Reduction and Mangement Council (NDRRMC); and IMF staff estimates.

Average Cost of Damages by Sector and Typhoon Category
(In percent of GDP)



Sources: Authorities data; and IMF staff estimates.

Average Occurance of Category-5 Typhoon By Region
(Per year)



Sources: National Disaster Risk Reduction and Mangement Council (NDRRMC); and IMF staff estimates.

C. Macroeconomic Impact of Climate Shocks and Trends

5. Typhoons are similar to supply shocks, creating inflationary pressure and reducing economic activity.[5] We estimate the impact of typhoons using local projection methods following Jorda et al (2005), by utilizing regional macroeconomic data from the Philippine Statistics Authority and typhoon data collected by the National Disaster Risk Reduction and Management Council.[6] Regional data allows us to exploit cross-regional variation in the impact of typhoons, not possible

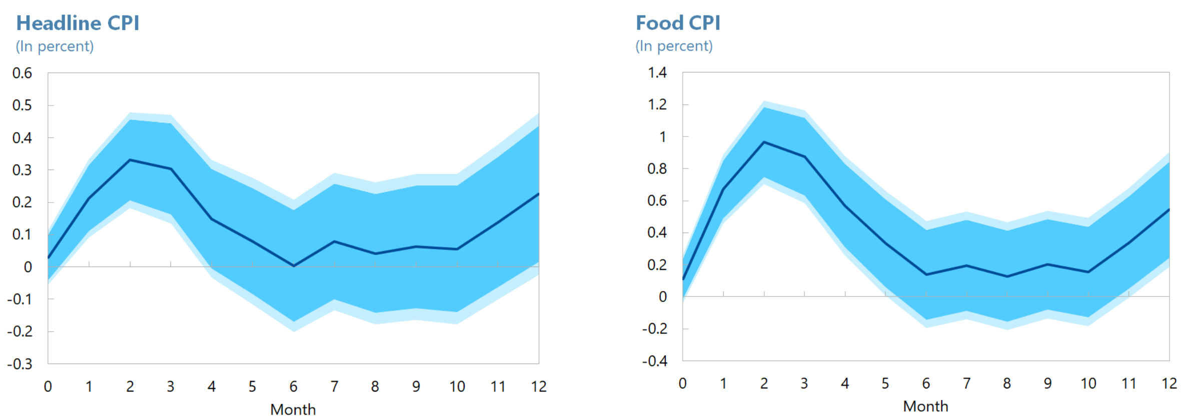
[3] Hallegatte et al. 2022 show that the impact of severe typhoons can worsen with climate change using a dynamic stochastic general equilibrium model for bank stress testing.
[4] The Assessment Report of the International Panel on Climate Change (IPCC) finds evidence of an increase in the frequency of tropical cyclones in the South East Asia region.

[5] Using Lasso regressions, we find that typhoons are the most statistically relevant climate variable in explaining GDP per capita growth, providing rationale for focusing on typhoons.

[6] See Annex I for technical details on the data and regression specifications.

with country-level macro data, increasing the sample size and statistical significance of our findings. We find that category-5 typhoons, considered to be the most destructive, tend to exert inflationary pressures. Both regional headline and food CPI increase when a category-5 typhoon occurs, with the peak impact occurring approximately one quarter after the typhoon hits (Figure 3). Headline and food CPI increase by around 0.4 percent and 0.7 percent respectively. By contrast, the impact on inflation in other sectors appears to be limited, highlighting the importance of the agriculture sector in driving the inflationary impact of typhoons. Additionally, category-5 typhoons lower regional output and labor productivity. As shown in Figure 3 real GDP in the region impacted by the typhoon falls by approximately 0.4 percent on impact, while agricultural labor productivity declines by 2.5 percent.[7] Using the estimated impact on regional GDP of category-5 typhoons, we approximate the average aggregate GDP impact of typhoons to be around 0.2-0.3 percent of GDP.[8] These local projections show that typhoons act as adverse supply shocks, likely raising inflation while dampening economic activity and further posing a dilemma for monetary policy which we explore in detail in Section D.

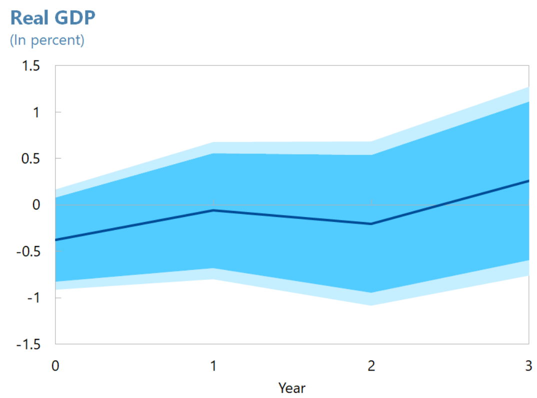
Figure 3. Philippines: Local Projection Estimates for Typhoons

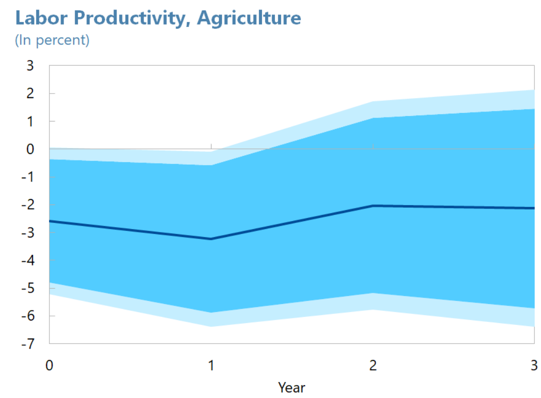


[7] The impact of typhoons on labor productivity is widespread across sectors, with the estimated impact on the Utilities, Mining, Manufacturing and Transportation sectors at around 2 percent and on the Construction sector at around 4 percent. These estimates are used to calibrate the model in Section D.

[8] The average impact of typhoons in general on GDP is estimated by multiplying the 0.4 percent regional impact by 2/17, representing the average fraction of regions impacted by a category-5 typhoon, and scaled up to additionally consider the persistence of the impact, and the frequency and impact of category-1 to category-4 typhoons. The estimated aggregate impact is slightly smaller than in Hallegatte et al (2022) which uses a New Keynesian Model to show that the impact of a once-in-ten-year typhoon reduces GDP by around 1 percent in the Philippines.

Figure 3. Philippines: Local Projection Estimates for Typhoons (Concluded)



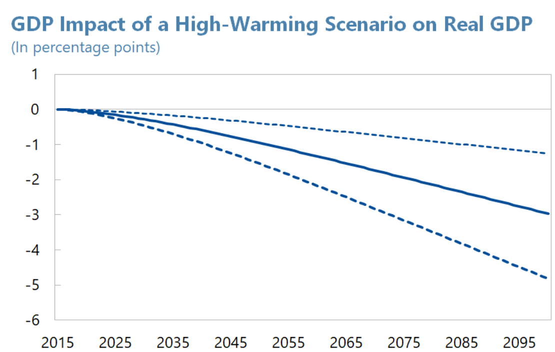


Source: Philippine Statistical Authority and IMF staff estimates

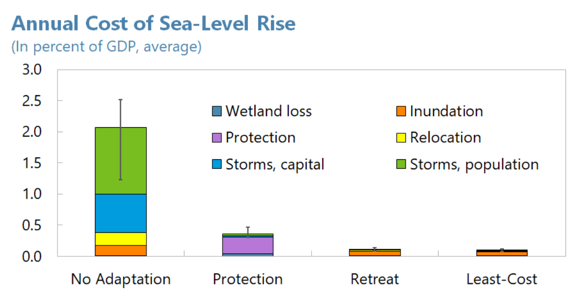
Notes: Local projections for CPI are at the monthly frequency while those for GDP and productivity are at the annual frequency. All impacts are at the regional level. The shaded areas represent the 5 percent and 10 percent confidence intervals.

6. **The potential long-term macroeconomic impact of rising temperatures and sea levels pose substantial risks for the Philippines**. Using empirical evidence from Kahn et al. (2021) and the high-warming SSP3-7.0 scenario for the Philippines, in which average temperatures are 3.1℃ above their pre-industrial level, Centorrino et al (2025) find that gradual warming can reduce real GDP growth resulting into a 1 to 5 percent real GDP loss in 2100 compared to a scenario in which temperature continues increasing following present trends (Figure 4).[9] Sea-level rise is expected to cause costs as large as 1.8 percent annually without adaptation (Figure 4). Using CIAM, a model of sea-level rise costs, simulations show that with an optimal mix of protection and retreat from coastal areas the cost of sea level rise can be reduced by as much as 95 percent, from 2.1 to 0.1 percent of GDP, annually (Figure 4).

Figure 4. Philippines: Estimates of Long-Term Climate Change Costs



Sources: Centorrino et al. (2025) using Kahn et al. (2021); and CMIP6 data (Copernicus Climate Change Service, Climate Data Store, 2021) processed by Massetti and Tagklis (2024).



Sources: CIAM Model (Diaz, 2016); and IMF staff calculations.

Notes: Whiskers on top of each bar indicate the range of total cost using the 5th and 95th percentile of the probabilistic distribution of sea-level rise for the RCP 4.5 scenario. Due to the highly non-linear nature of coastal impacts, adaptation costs, and effectiveness of adaptation measures, ranges are not always symmetric around total costs. Prepared by Emanuele Massetti and Filippos Tagkils (FAD).

[9] For empirical details see Centorrino et al. (2025). This estimate assumes that the Philippines will need 30 years to adapt to the new temperature level. Adaptation in 20 years allows to reduce losses by 50% but without any adaptation losses would double.

D. Policy Implications of Climate Shocks and Trends

Monetary Policy Implications

7. **Severe climate events have important implications for the conduct of monetary policy in the Philippines given their impact on inflation and output**. The Philippines' high vulnerability to climate events is already an important consideration in achieving the Bangko Sentral ng Pilipinas' (BSP) inflation target. The growing frequency and intensity of climate-related disruptions suggests that these events will increasingly challenge monetary policy in the years ahead.[10] Since 2020 the BSP has been assessing the implications of climate shocks and slow-onset climate change on the economy and financial system to guide its policy. This includes conducting research studies that integrate climate and environmental related factors into macroeconomic models and monetary policy analysis, capacity building for staff in climate risk modeling, the publication of the *Philippine Sustainable Finance Taxonomy Guidelines*, the inclusion of climate considerations into the BSP Systemic Risk Crisis Management framework, and institutionalizing the requirements for banks to conduct climate scenarios and stress-testing.[11]

8. **This section presents scenario analyses that can help guide central banks like the BSP, in determining the appropriate policy response to climate shocks**. The IMF's Global Dynamic Network (GDN) model is well-suited to study the inflationary and output impacts of climate shocks as it includes rich input-output linkages across sectors. This allows the model to directly impose a shock on a specific sector(s) that is more acutely hit (e.g. agriculture) and trace its indirect impacts on other sectors via supply chains. The model is used to construct counterfactual scenarios to assess the importance of sectoral heterogeneity in shaping output and inflation outcomes. These scenarios also include alternative monetary policy response functions, helping inform the BSP on tradeoffs between supporting output and containing inflationary pressures.

9. **Our results show that severe climate events can be macro-critical in the Philippines, and the BSP should weigh tradeoffs between anchoring inflation expectations and supporting economic recovery**. While a single typhoon is unlikely to impact the macroeconomy in the Philippines, we show that a year with multiple, consecutive, and strong typhoons can become macro-critical by lowering GDP and raising prices. In such instances, our model results indicate how the BSP can weigh the tradeoff between anchoring inflation expectations and supporting the post-disaster recovery. We also show that Philippine-specific characteristics, such as the salience of food prices in inflation expectations, play an important role in these tradeoffs. On balance, we find that a monetary policy reaction function that supports rebuilding while maintaining credibility to keep expectations anchored is the most appropriate.

[10] The BSP, in its Open Letter to the President, has noted that deviations from the inflation target range have often been linked to supply-side disruptions, including extreme weather events and shifts in weather patterns that adversely impact output.

[11] See 2023 BSP Sustainability Report and 2024 Annual Report for further details of these and other efforts.

Model

10. The analysis uses the IMF's GDN model which can capture a rich set of sectoral linkages throughout the Philippines economy. The version of the GDN model used in this exercise is a 16-sector, 2-country model calibrated to the Philippines and the rest of the world using production network data from the Philippine Statistics Authority input-output (IO) tables and the 2018 Global Resource Input-Output Assessment (GLORIA) multi-regional IO (MIRO) database.[12] Figure 5 shows the input-output data for the 16 sectors used to calibrate this model. The left panel shows how labor and capital are used as inputs to each of the 16 sectors. To capture the disproportionate impact of a typhoon on the agriculture sector, we assume two types of capital in our calibration – agriculture-specific capital and other non-agriculture capital.[13] The right panel shows how sector-specific production (left side of figure) is used, either by other sectors or for consumption, investment, government spending and exports (right side of figure). Compared to a typical economy, the Philippines economy is more concentrated in agriculture and construction (see Figure I.1 in the Technical Annex which showcases the rest of the world's production structure as compared to Figure 5).

11. The model contains many features to help investigate the challenges to monetary policy in response to a severe weather event. First, the GDN model includes investment adjustment costs for each type of capital to reflect that rebuilding the destroyed agricultural capital is costly and cannot easily be replaced with other types of capital. Second, intermediate inputs are assumed to be difficult to replace with other types of goods so that, for example, after a natural disaster food manufacturers cannot substitute away from expensive agricultural inputs. Third, each sector faces different degrees of pricing frictions to capture that agricultural goods prices are often more flexible and volatile whereas prices in IT and communications are less responsive to shocks (see Table 1, Technical Annex). Finally, we assume that workers and firms are slow to adjust their beliefs on inflation and focus disproportionately on food prices relative to other prices in the economy when setting prices and wages ("food price salience"), reflecting evidence on inflation expectations formation in the Philippines.[14] Food price salience leads inflation expectations to react strongly to spikes in food prices and the slow adjustment of these expectations leads these spikes to continue to impact inflation expectations over the medium term.

12. Using capital destruction and productivity shocks we match empirical estimates of the impacts of a typical year of typhoons; then we simulate a "downside scenario" representing a year with particularly severe typhoons. We use the sector-specific impacts of an average year of typhoons, which includes a category-5 typhoon, on the Philippine economy to calibrate the model. We match the economic damages (GDP losses plus damage to capital) in agriculture and non-agriculture sectors using data from the National Disaster Risk Reduction and Management Council. We match the estimated reductions in value-added per worker for six different sectors of

[12] See IMF (2024) and Ozhan et al. (2025) for a detailed description of the model.

[13] Limited data on capital usage by sector and on capital destruction by sector in the national accounts IO tables restricts the analysis to two sectors: agriculture and all other.

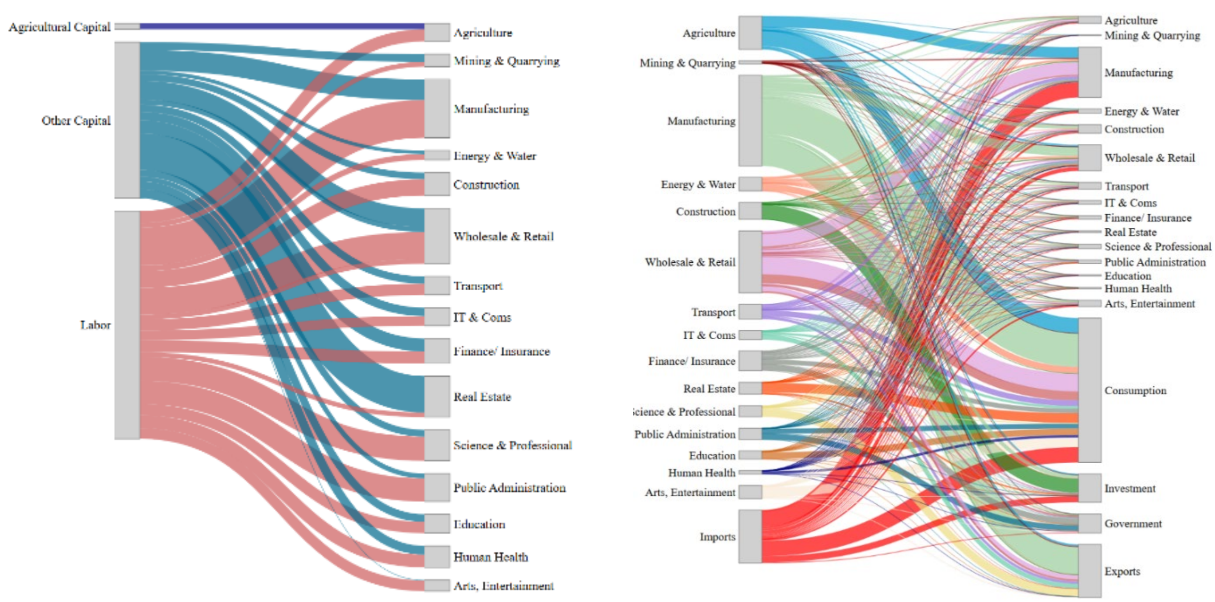
[14] See Mapa et al. (2024) for detailed evidence.

the Philippines economy using our local projections estimates from Figure 3, Panel D. See Tables 2-4 of the Technical Annex for specifics of our calibration. These data are matched using capital destruction and productivity shocks in the model.[15] We then consider a downside scenario or "bad year" of typhoons. For this scenario, we scale the baseline by the ratio between a category 5 typhoon causing more damage than 90 percent of observed typhoons (such as Super Typhoon Pablo in 2012) with the average category-5 typhoon. This ratio is approximately 3-to-1, which is, for example, roughly the difference between damages from Super Typhoon Pablo (about 0.3 percent of GDP damage to the agriculture sector) and an average category-5 typhoon (about 0.1 percent of GDP damage to the agriculture sector). In these simulations we assume that the central bank follows a similar rule to the baseline calibration of the BSP's macroeconomic forecasting model (PAMPh) to capture how the BSP might realistically react to these events:[16]

$$i_t = 0.7 \times i_{t-1} + 0.3 \times (\bar{r} + CPI\ target + 2.5 \times (CPI\ Inflation_{t+3} - CPI\ target) + 0.3 \times Output\ Gap_t)$$

where i_t is the nominal interest rate and $\bar{r}$ is the neutral rate of interest.

Figure 5. Philippines: Input-Output Data



Sources: Philippines Statistics Authority; IMF calculations.

Results

13. A shock from a single category 5 typhoon has modest impacts on the overall economy but becomes critical on a macro level in the downside scenario. Figure 6 shows our GDN model estimates of the following (i) the baseline scenario of a single typical category 5 typhoon (red line); and (ii) the downside scenario (blue line). Despite category 5 typhoons being usually disruptive locally, they have limited macroeconomic impact in the baseline scenario. By contrast, the downside

[15] Productivity shocks are assumed to be an AR(1) process with a persistence parameter of 0.4.

[16] See Dakila Jr. and others (2024) for a detailed description of the BSP's forecasting model.

scenario suggests macro-relevant damage, with quarterly GDP falling by 0.25 percent and quarter-on-quarter inflation rising by 0.4 percentage points (1.7 percentage points annualized). The initial GDP decline reflects weaker consumption (about one-third of the decline) and net exports (two-thirds) as imports temporarily rise to compensate for destroyed capital and food, while exports fall more sharply and persistently due to the typhoons' impact on capital and productivity. After the first year, the composition of the decline in output shifts towards investment and consumption, with a lower contribution from net exports. Nominal interest rates rise in response to the typhoons in the downside scenario, but real interest rates fall by 50 basis points (bps) in the first year, providing a temporary stimulus to the economy. On the other hand, food price spikes have a disproportionate impact on inflation expectations given their salience. As a result, this spike in food prices, albeit temporary, has a lasting impact on inflation expectations, which only gradually adjusts over time, and therefore on inflation.

Figure 6. Philippines: GDN Estimates of the Impact on the Philippines of Typhoons

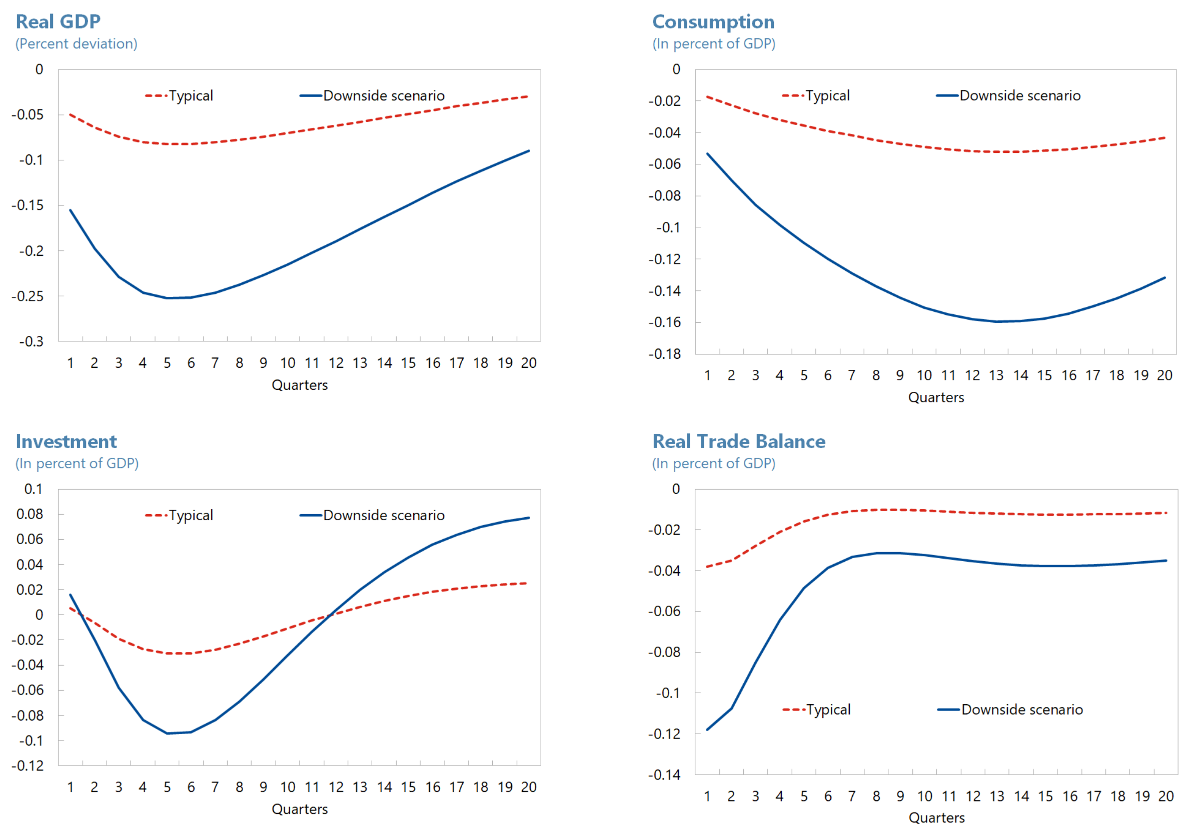
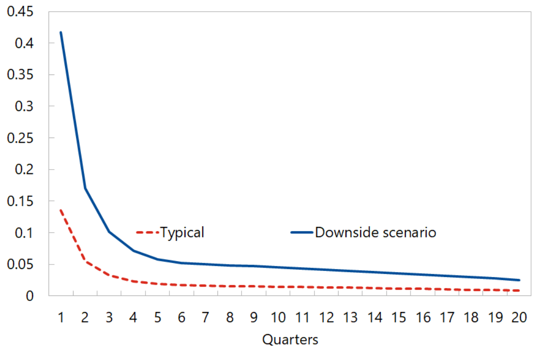
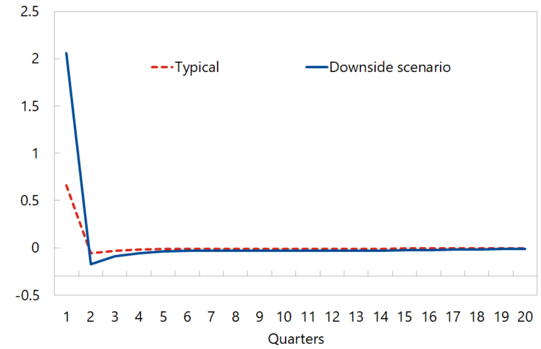


Figure 6. Philippines: GDN Estimates of the Impact on the Philippines of Typhoons (Continued)

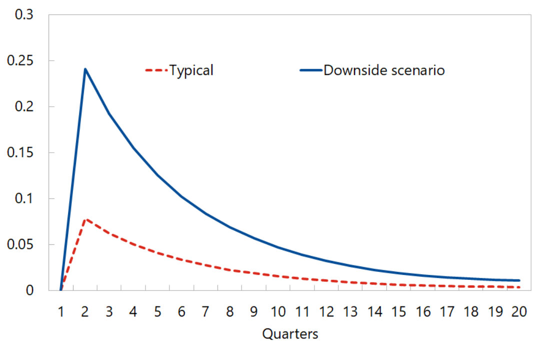
CPI Inflation
(Quarter-on-quarter)



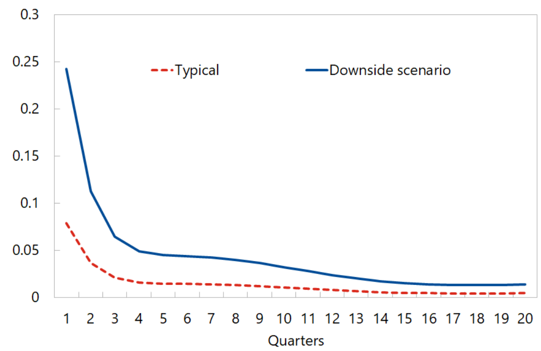
Food Inflation
(Quarter-on-quarter)



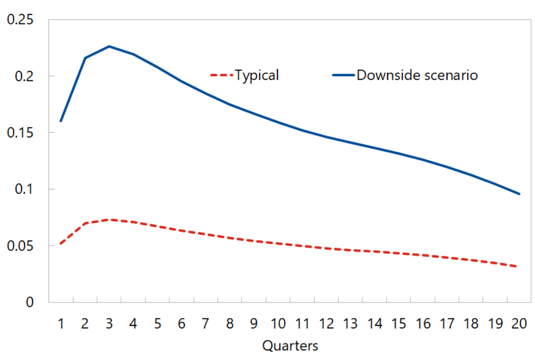
Non-Rational Expectations



Real Exchange Rate
(Up=appreciation)



Nominal Interest Rate



Real Interest Rate

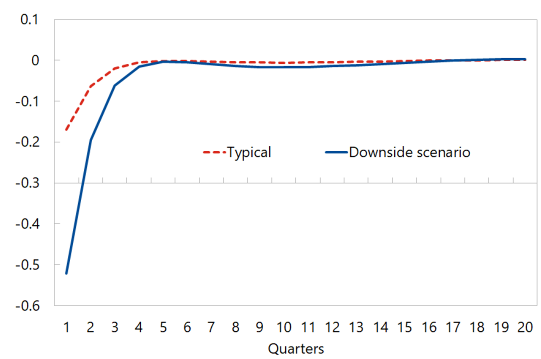
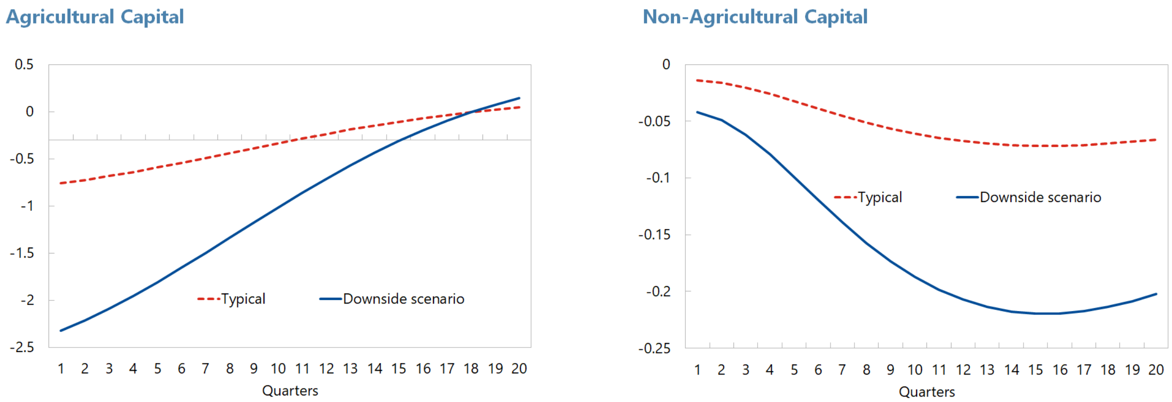


Figure 6. Philippines: GDN Estimates of the Impact on the Philippines of Typhoons (Concluded)

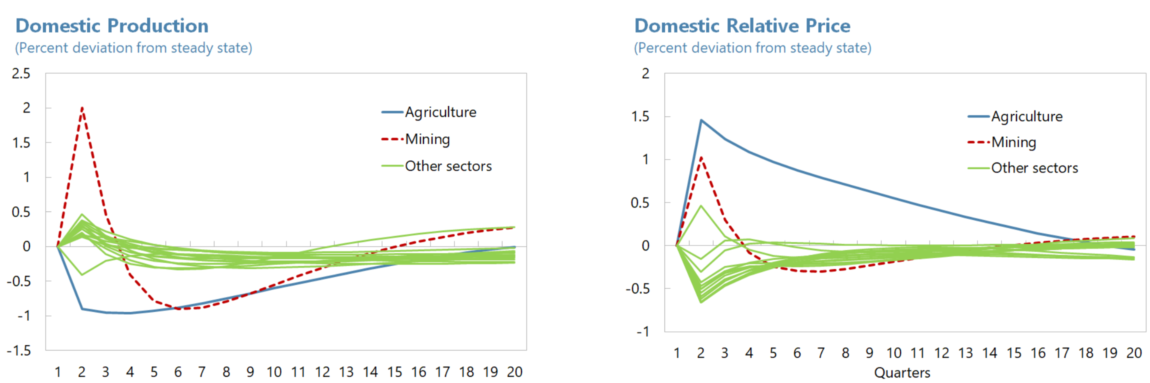


Source: IMF staff calculations.

Note: All variables in the first row show percent deviation from steady state real GDP. In the case of nominal and real interest rates these changes are linear so that the units are percentage points. In all other cases each variable's responses are expressed as percent deviations from steady state.

14. **Sectoral output and price responses vary according to the degree of pricing frictions and their positions within production networks**. Figure 7 illustrates the responses of domestic production (left) and relative prices (right) under the downside scenario. The downside scenario implies that the construction sector experiences the largest decline in labor productivity, followed by the mining sector, as shown in the calibrated shock in Table 2. These negative supply shocks feed into marginal costs and raise relative prices. Moreover, agriculture and mining are the two most flexible-price sectors, thus prices immediately increase from any climate impact. However, their output responses diverge: agriculture production contracts and prices rise due to agricultural capital destruction. In other sectors, relatively lower prices lead to some substitution away from agriculture towards these sectors, which leads to increased demand and production. The mining sector, because it is upstream from almost all other sectors and provides intermediate goods, receives a very large boost in demand. Furthermore, because pricing in the mining sector is relatively more flexible, its prices rise more than in other sectors.

Figure 7. Philippines: Sectoral Impact of Typhoons on the Philippines



Source: IMF staff calculations

Source: IMF staff calculations.

Note: All variables are calculated as a percent deviation from steady state.

15. The nature of climate shocks and model assumptions on food price salience have important impacts on our results.[17] Figure 8 shows that in our downside scenario, about 50 percent of the CPI response (Figure 8, column A) and most of the RGDP response (Figure 6) stem from agricultural capital losses rather than productivity declines. While productivity losses have an important impact on inflation, their effect on real GDP is negligible. An alternative way to confirm this is by reducing the persistence of productivity shocks to zero (Figure 8, Column B). The simulations remain largely unchanged, further suggesting that the persistence of productivity losses does not play a key role in understanding the impact of climate shocks. Food price salience in inflation expectations, on the other hand, has an important impact on inflation and real GDP dynamics (Figure 8, column C). Linking slow-moving inflation expectations to food prices leads to a lasting belief of future inflation from a temporary rise in food prices. This belief becomes self-fulfilling to some extent and leads to more persistent inflation and a weaker economy.

16. Monetary policy faces a trade-off between anchoring inflation expectations and supporting economic recovery and rebuilding. Our monetary policy counterfactual analysis is presented in Figure 9.[18] This shows the impact of our downside scenario under 3 different monetary policy rules: (i) the BSP's PAMPh rule (blue); (ii) strict CPI targeting where CPI inflation is always kept at target (green); and (iii) a "dovish" rule with a one-quarter delay in tightening (red). To benchmark these rules, we show in the real GDP panel (top left) a dotted line representing potential real GDP conditional on the lost capital and lower productivity. Both the PAMPh rule and the "dovish rule" support activity and rebuilding because real interest rates fall on impact.[19] As a result, output remains above potential GDP, while CPI inflation remains elevated. In contrast, strict CPI targeting successfully neutralizes the impact of the typhoon on inflation but is accompanied by a large decline in real GDP and a negative output gap.

[17] Response for all variables shown in Figure 7, for the corresponding alternative assumptions, are included in Figures I.2-I.4 of the Technical Annex.

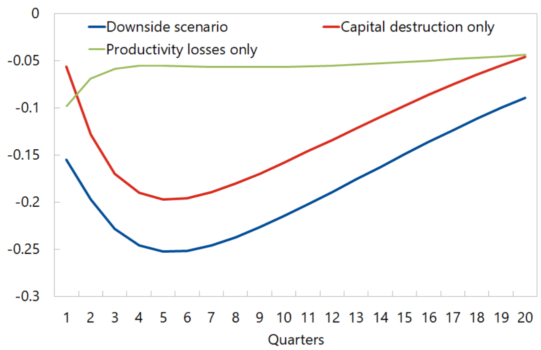
[18] Figure I.5 in the Technical Annex provides the full set of impulse responses for all variables included in Figure 8.

[19] The PAMPh rule and the dovish rule assume that the BSP focuses on medium term inflation and output relative to the steady state. Because of this, after the shock, the nominal interest rate rises but by less than 1-quarter ahead inflation. Households define real interest rates as the nominal rate divided by 1-quarter ahead inflation. As such, real rates fall on impact.

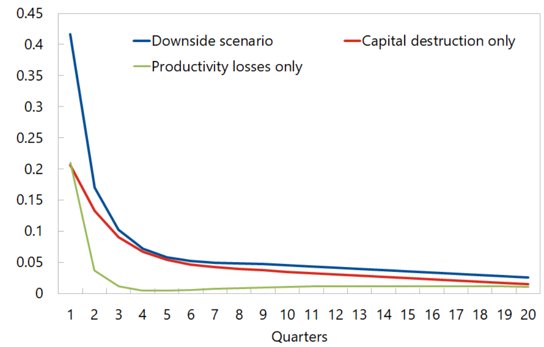
Figure 8. Philippines: Key Drivers, Capital Destruction and Food-Price Salience in Inflation Expectations

A: Breakdown of Capital Destruction and Productivity

Real GDP
(Percent deviation)

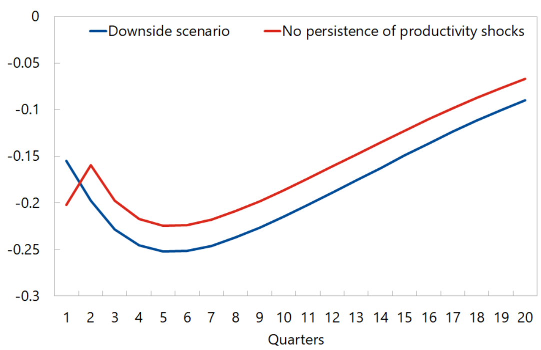


CPI Inflation
(Quarter-on-quarter)

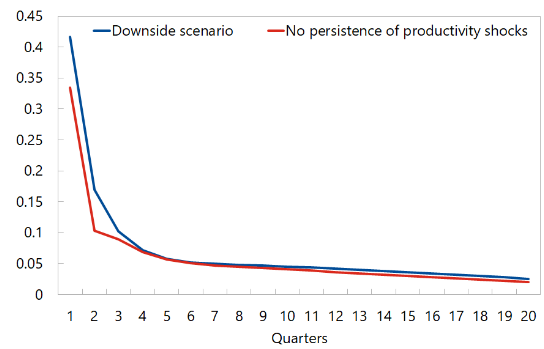


B: Impact of Productivity Shock Persistence

Real GDP
(Percent deviation)

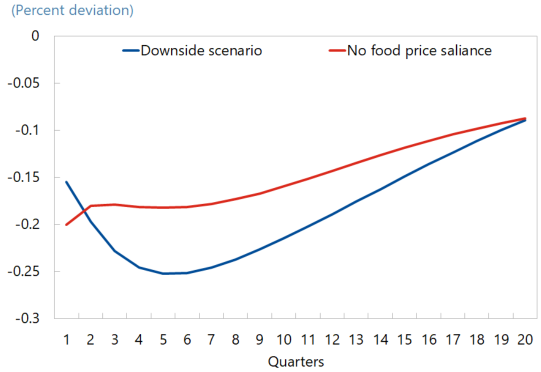


CPI
(Quarter-on-quarter)

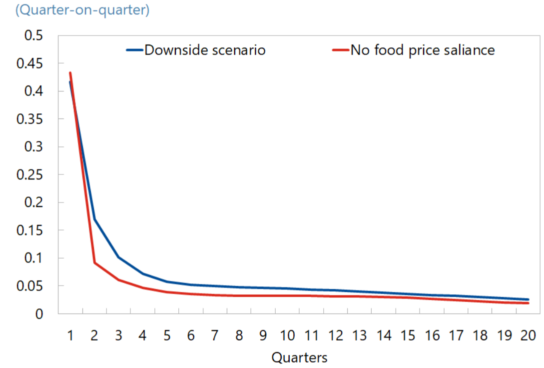


C: Impact of Food Price Salience in Inflation Expectations

Real GDP
(Percent deviation)



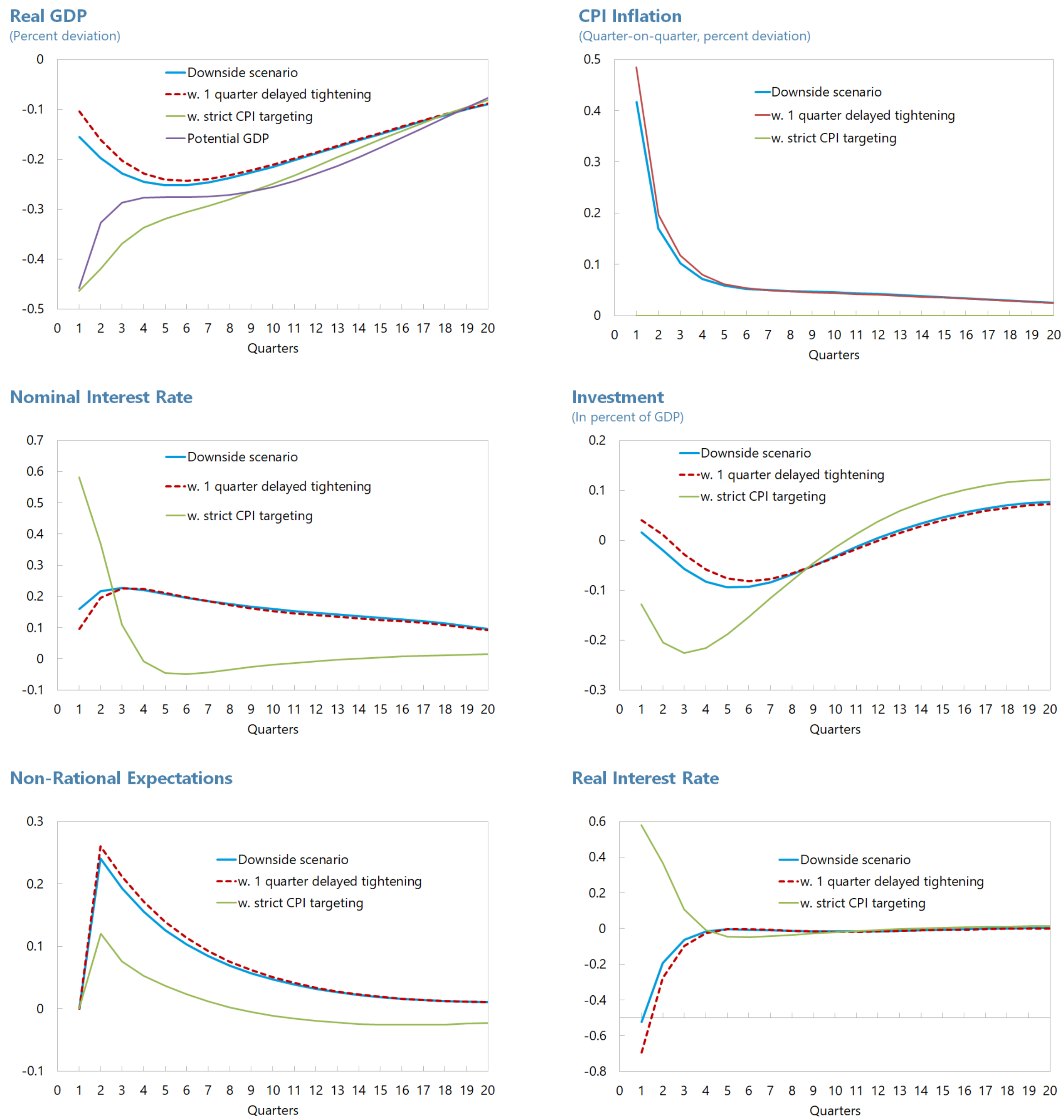
CPI
(Quarter-on-quarter)



Source: IMF staff calculations.

Note: Both real GDP and inflation are calculated as percent deviation from steady state.

Figure 9. Philippines: Alternative Monetary Policy Choices



Source: IMF staff calculations.

Note: All variables in the first column show percent deviation from steady state real GDP. Nominal and real interest rates are in percentage point deviations from steady state and all other variable's responses are expressed as percent deviations from steady state.

Policy Implications

17. While a single severe typhoon may not have significant effects, a year marked by multiple particularly severe typhoons can pose a challenge for monetary policy. In such a downside scenario, the output losses and inflationary pressures—especially through the rise in food prices—require the BSP to balance stabilizing inflation with supporting reconstruction. The policy priority is twofold: to anchor inflation expectations, especially when food prices are volatile, and to ensure financial conditions remain supportive of investment and capital rebuilding. This underscores the importance of incorporating climate-related risk scenarios into a policy framework.

18. Post-disaster monetary policy involves a clear trade-off between anchoring inflation expectations and supporting economic recovery. Strict CPI targeting is effective in keeping inflation expectations low and reducing the risk of de-anchoring. However, this comes at the cost of deeper output losses and a slower pace of rebuilding. In contrast, a more accommodative policy stance – such as a short delay in tightening – helps sustain activity above potential, but at the expense of higher and more persistent inflation. Policymakers therefore need to carefully balance inflation and output tradeoffs, recognizing that excessive tolerance for inflation would risk eroding credibility and de-anchoring of inflation expectations. The suggested policy response may lie in a balanced approach that supports rebuilding while maintaining credibility to keep expectations anchored. The BSP's PAMPh rule is a useful starting point in this regard, with data-dependent adjustments to the policy response as the shock dissipates and the persistence of inflation becomes clearer.

19. Food price salience in expectations plays a critical role in shaping the macroeconomic transmission of a severe weather event in the Philippines and should be considered in policy decisions.[20] When agents place greater weight on food price changes in forming their inflation expectations, a climate shock generates a more persistent inflation response and dampens the output recovery. This behavioral channel prolongs the policy trade-off between stabilizing inflation and supporting output. From a monetary policy perspective, this suggests the importance of anchoring expectations through clear communication and credible policy actions that reduce the salience bias. Central banks, including the BSP, can enhance policy effectiveness by fostering more rational and broad-based expectation formation.

Fiscal Policy Implications

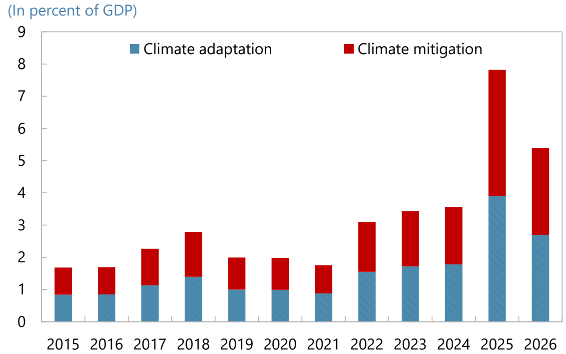
20. The Philippine government has developed a comprehensive and proactive plan for climate change adaptation. The Philippine Development Plan (2023-2028) incorporates climate change as a cross-cutting strategic area for development. The National Climate Change Action Plan (NCCAP) (2011-2028) outlines the strategic direction for action from 2011 to 2028, while the National Adaptation Plan (NAP) (2023-2050) sets the country's adaptation priorities at the national level, aiming to enhance adaptive capacities and increase resilience of communities, ecosystems,

[20] Aside from the salience of food in shaping overall inflation expectations, high food prices disproportionately affect the lower income groups, given the large share of food in their consumption basket. Such distributional impacts are not considered in the policy decisions modelled here but are nonetheless important.

and the economy against natural hazards and climate change. The Financial Sector Forum has developed the Philippine Sustainable Finance Taxonomy Guidelines (SFTG) as a tool for financial institutions to classify whether an economic activity is environmentally and socially sustainable. The SFTG implements one of the recommendations contained in the Philippine Sustainable Finance Roadmap, a high-level action plan to promoting sustainable finance in the country.

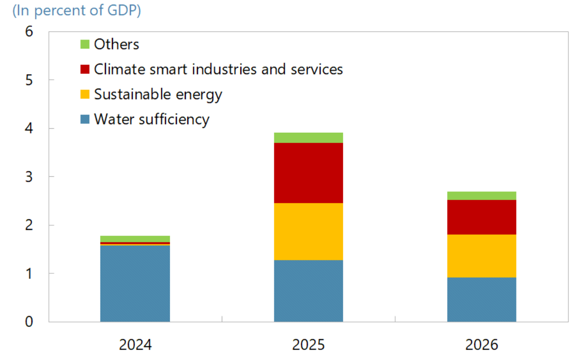
21. Climate adaptation spending has become a key budget priority. The Philippines has implemented the Climate Change Expenditure Tagging (CCET) since 2015 to monitor the execution of priorities outlined in the NCCAP. The climate change expenditures reported in the Budget of Expenditures and Sources of Financing indicate that actual spending on climate adaptation averaged 1.7 percent of GDP annually during 2022-2024, compared to an annual average of 1.0 percent of GDP during 2015-2021. Moreover, programmed climate change adaptation expenditure for 2025 amounts to 3.9 percent of GDP, while proposed spending for 2026 is projected at 2.7 percent of GDP. The main strategic priorities under climate adaptation expenditure include water sufficiency, sustainable energy, and climate smart industries and services.

Climate Change Expenditure
(In percent of GDP)



Sources: Philippine authorities; and IMF staff calculation and estimates.

Climate Adaptation Expenditure by Strategic Priorities
(In percent of GDP)



Sources: Philippine authorities; and IMF staff calculation.

22. The costs associated with adapting to climate-resilient infrastructure are not explicitly specified in the CCET and could potentially be large. The Philippines Country Climate and Development Report (CCDR) (World Bank, 2022) highlights that, from a macroeconomic standpoint, a key adaptation strategy is to safeguard vulnerable infrastructure from typhoons, which could greatly mitigate potential damages. The report estimates that the cost of new climate-resilient infrastructure is about 0.6 percent of GDP, which is considered conservative since it does not account for the costs of retrofitting existing infrastructure.

23. This spending underscores the trade-offs involved in enhancing resilience to natural disasters and the costs of doing so. Relying solely on borrowing to finance these costs could lead to higher public debt, complicating the authorities' consolidation efforts under the Medium-Term Fiscal Framework. If the government chooses to invest in resilient infrastructure without incurring additional debt, revenue mobilization and/or expenditure rationalization may be required. A model-based approach can help analyze the trade-offs and the implications for growth and debt sustainability under different policy options.

Model-based Scenario Analysis

24. A model-based approach is used to analyze the trade-offs involved in enhancing resilience to natural disasters and the macro-fiscal implications of various adaptation policy options for the Philippines. The Debt-Investment-Growth and Natural Disasters (DIGNAD) model, developed by Marto, Papageorgiou, and Klyuev (2018), simulates the impacts of natural disasters within a dynamic small open economy framework. The model introduces natural disasters as shocks and evaluates their impact on public and private capital, productivity, and the efficiency of public investment during the reconstruction phase. It features both standard and adaptation infrastructure. Adaptation infrastructure is more expensive but yields higher returns and has lower depreciation than standard infrastructure. In addition, it also integrates multiple channels that illustrate the linkages between public investment, growth, and debt, such as the investment-growth nexus, fiscal adjustment, and private sector response.

Table 1. Philippines: Calibrated Parameters and Steady State Values

(In percent)

Definition	Value
Real Economy and Public Finance	
Trend per capita growth rate in absence of natural disasters	5.0
Imports to GDP ratio	35.8
Remittances to GDP ratio	8.8
Consumption tax (VAT) rate	12.0
Labor income tax rate	24.4
Public domestic debt to GDP ratio	41.3
Public concessional debt to GDP ratio	8.7
Public external commercial debt to GDP ratio	10.7
Private external debt to GDP	11.3
Public Infrastructure Related	
Public investment to GDP ratio	5.9
Cost ratio adaptation vs standard investment (i.e., adaptation is % expensive than standard)	25.0
Return to standard infrastructure	30.0
Return to adaptation infrastructure	50.0
Depreciation rate of standard public infrastructure	7.5
Depreciation rate of resilient public infrastructure	3.0
Public investment efficiency	53.0

Sources: Country authorities; and IMF staff calculations.

25. The model is calibrated to capture the characteristics of the Philippine economy. It uses country-specific macroeconomic indicators, along with the magnitude and timing of natural disasters, as well as the various mechanisms through which these events affect macroeconomic aggregates. The calibration of initial values and parameters (Table 1) is based on historical averages to reflect the Philippines' steady state, supplemented by parameters derived from existing literature (e.g., Buffie et. Al., 2012; Marto, Papageorgiou, and Klyuev, 2018; and Aligishiev, Ruane, and Sultanov, 2023).

26. The baseline natural disaster scenario assumes recurring shocks. In this extension of the DIGNAD model application, natural disasters are represented as continuous, recurring shocks to the economy. Each year, a shock of average magnitude occurs, which causes destruction to both public and private capital and reduces total factor productivity (TFP). This results in a permanent downward level shift in the GDP relative to the counterfactual baseline without shock. Natural disasters destroy capital which is rebuilt (partially) through investment and reconstruction efforts by private agents and the government. However, the recurring nature of shocks means that the capital stock and TFP might not fully recover to the pre-disaster level, thus permanently lowering the GDP level. In other words, given that many disaster-prone countries are projected to experience natural disasters more frequently, they are less likely to fully recover from a disaster shock before another shock occurs. The effects of sequences of shocks accumulate overtime weighing permanently on macroeconomic outcomes, as recently shown by Cantelmo, Melina and Papageorgiou (2019), Cantelmo et al. (2019), and Melina and Santoro (2021).

27. The calibration of the recurring output loss is based on the estimates from Section C.[21] It assumes that recurrent typhoons reduce output by 0.1 percent of GDP every year, and have persistent effects (about 4 years), consistent with estimates from Section C. The impact on output comes from a combination of public and private capital destruction and productivity shocks as well as reduced public investment efficiency. The share of adaptation infrastructure impacts the economic cost of recurrent typhoons. Typhoons impact fiscal position through lower revenue caused by output loss and higher spending due to emergency response, and reconstruction.

28. Alternative policy simulations are used to assess policy tradeoffs associated with recurrent natural disasters and adaptation investment. In the active scenario, it is assumed that the government invests in resilient infrastructure to mitigate the impact of climate shocks. For illustrative purposes, resilient investment is set at 0.3 percent of GDP, half the size suggested by the World Bank (2022) to account for the government's other priorities. Three scenarios are presented to illustrate how different financing strategies and reform measures could influence macroeconomic variables under this active scenario. Simulations are presented as deviations from a steady state scenario with no climate shocks.

- ***Government borrowing scenario***. In this scenario, the financing for resilient infrastructure spending is achieved by borrowing. The government plans to utilize a combination of domestic and external borrowing, with a ratio of 80 to 20 percent, in line with its borrowing strategy.

- ***Tax reform scenario***. This scenario assumes that government tax reforms will create fiscal space to fund investments in resilient infrastructure.[22]

[21] This concept is different from damages from typhoons, which are estimated at 1.2 percent of GDP (World Bank, 2022), as the former implicitly incorporates factors that help mitigate the impact of typhoons on output. An earlier application of the DIGNAD model in the 2023 Article IV consultation considered a one-off shock scenario to mimic one of the most powerful typhoons experienced in the Philippines (see Selected Issues Paper, "Building Resilience to Natural Disasters and Climate Change: A Model Application", Philippines 2023 Article IV consultation).

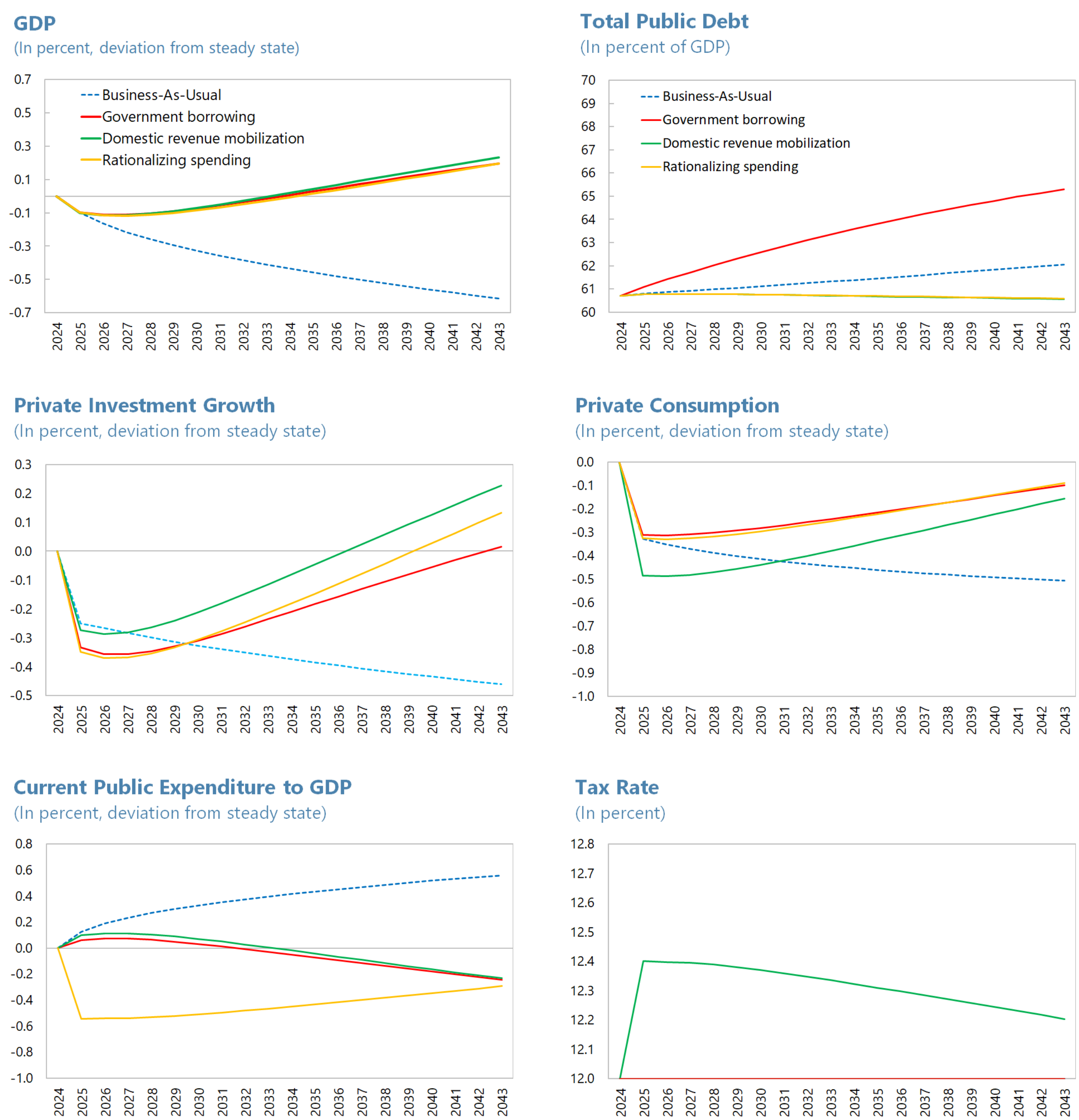
[22] See the 2025 Article IV Staff Report for more detailed discussion on potential tax policy measures.

- ***Rationalizing spending scenario***. In this scenario, resilient infrastructure is financed through expenditure prioritization and shifting the spending composition towards resilient infrastructure, while keeping the total expenditure envelope unchanged.

29. We also compare these active scenarios to a passive "business-as-usual" (BAU) scenario. The BAU scenario assumes that the government does not increase its adaptation investment despite the recurring shocks.

Results

Figure 10. Philippines: Simulation Results Under Recurring Natural Disasters



30. Figure 10 illustrates how key macroeconomic variables evolve under different policy scenarios. Recurrent typhoons reduce GDP relative to the steady state baseline with no climate shocks. The fiscal position deteriorates, reflecting lower revenues due to output losses, higher reconstruction spending, and a lower denominator for the debt-to-GDP ratio. In the active scenarios where the government invests in adaptation infrastructure, output eventually rises above the BAU scenario, as investment in resilient infrastructure exceeds the negative impact of typhoons on output.[23]

- ***Government borrowing scenario***. In this scenario, the positive effect of investment in resilient infrastructure is less pronounced due to the crowding-out impact from public spending on private investment. Public debt-to-GDP ratio increases over time and relative to the BAU scenario, indicating that borrowing to finance resilient infrastructure is costly, even with its beneficial impact on growth.

- ***Tax reform scenario***. Despite the initial largest impact on consumption from this scenario, it produces a relatively more favorable overall impact on growth, as mobilizing revenue yields a smaller multiplier effect compared to cuts in public spending. Although it dampens private consumption, it has a relatively benign effect on private investment. Importantly, the public debt-to-GDP ratio decreases, as investment in resilience no longer requires financing through borrowing.

- ***Rationalizing spending scenario***. Rationalizing current spending yields similar impact on GDP as the government borrowing scenario, but private investment is higher in this scenario as there are no crowding-out effects but that is offset by lower current public spending.

Simulations highlight the potential for resilient infrastructure to offset the impact of recurrent climate shocks on GDP over time, regardless of the different financing strategies. Revenue mobilization helps achieve a higher level of GDP, as it does not crowd out private investment and other public spending. Simulations show that relying solely on borrowing to finance resilient investment could increase the debt burden over time.

E. Conclusion

31. The Philippines' high exposure to natural disasters makes climate change a structural macroeconomic risk, underscoring the need for a whole-of-government response. Our study contributes to the policy discussion by providing new evidence on the macroeconomic impacts of typhoon shocks in the Philippines, with important implications for both monetary and fiscal policies. For monetary policy, the findings highlight the careful balance between anchoring inflation expectations and supporting post-disaster economic recovery. For fiscal policy, the results underscore the value of creating fiscal space to invest in climate-resilient infrastructure to mitigate long-term costs.

[23] In the active scenarios, investment to adaptation made in 2025 will only mitigate the losses in 2026.

32. **Climate change poses macro-critical risks for the Philippines**. Using a combination of local projections method and IMF's GDN model, our study provides evidence that the occurrence of multiple, consecutive, and most intense typhoons within a year can become macro-critical. The results show that such shocks reduce aggregate output and raise inflation through food price shocks and supply chain disruptions, reflecting agricultural capital and labor productivity losses. Moreover, the model incorporates the Philippine economy's high food price salience feature in inflation expectations, where households and firms place disproportionate weight on food prices when forming expectations about future inflation. This behavioral channel amplifies the macroeconomic impact of typhoon shocks, turning temporary food price shocks into more persistent inflationary pressures.

33. **Monetary authorities navigate complex policy trade-offs when responding to severe typhoon shocks**. Given that severe weather events often cause sector-specific disruptions, central banks can benefit from using models with rich sectoral granularity, such as the GDN model. These frameworks capture how shocks concentrated in a few sectors propagate through supply chains, affecting broader economic activity and inflation dynamics. Our GDN model results reveal that severe weather events present difficult trade-offs between anchoring inflation expectations and supporting economic recovery, with the salience of food prices complicating this balance. Counterfactual analyses under the BSP's PAMPh rule, strict CPI targeting, and a "dovish" rule illustrate how different policy responses affect this policy balance. While both the PAMPh and "dovish" rules support economic activity, a strict CPI targeting prioritizes taming inflationary pressures, yet each approach inevitably entails cost in terms of output and inflation. On balance, our findings suggest that a policy stance which supports post-disaster rebuilding while maintaining credibility in inflation expectations is the most effective. This suggests that the BSP's inflation-targeting framework, supported by clear public communication and data-dependent adjustments, is well-suited to manage these climate-related policy trade-offs. More broadly, equipping policy toolkits with this type of sectoral model can enhance preparedness and support more effective decision-making in the face of unanticipated severe climate events or natural disasters.

34. **Fiscal policy is central to building climate resilience, with investment in climate-resilient infrastructure playing a key role in mitigating the macro impacts of natural disasters**. Model simulations show that recurrent typhoon shocks reduce output and weaken fiscal positions. Evidence from the DIGNAD model indicates that while resilient investment entails higher upfront fiscal costs, it delivers higher long-term returns by mitigating productivity losses, safeguarding capital, and sustaining growth. Creating fiscal space through stronger revenue mobilization and more efficient spending is therefore critical to financing resilience without increasing public debt. In addition, though not modeled, mobilizing private investment through various public-private partnership modalities could also be an option to finance resilient infrastructure. Enhancing green public financial management in line with the recommendations of the recent Public Investment Management Assessment Update and Climate PIMA will help enhance the effectiveness and accountability of adaptive investment.

Annex I. Technical Annex

Local Projections Method

1. **Region- and sector-level data from the authorities are used to estimate the impact of typhoon shocks**. We utilize regional and sectoral data on CPI, GDP, Consumption, Investment, labor productivity, and employment from the Philippine Statistics Authority (PSA). We have a balanced panel and our sample consists of 17 regions and covers the period from 2000 to 2022. For our climate-related variables, the National Disaster Risk Reduction and Management Council (NDRRMC) provides data on the cost of damages by cyclone intensity—categorized as: 1 (tropical depression), 2 (tropical storm), 3 (severe tropical storm), 4 (typhoon), and 5 (super typhoon). The exact dates of events are drawn from the Emergency Events Database (EM-DAT). Damage costs are disaggregated into agriculture (including output and capital losses), infrastructure (non-agricultural capital), and others.

2. **We employ local projections method to estimate the impulse response function of the macroeconomic variables under study to typhoon shocks**. More formally, the exact specification of the local projections is given as below:

$$\Delta y_{r,t}^{h} = \beta \cdot Typhoon_{r,t} + \sum_{j=1,2,\ldots,K}\left(y_{r,s,t-1} - y_{r,s,t-1-K}\right) + FE_t + FE_r + \varepsilon_{r,t,h} \qquad eq.(1)$$

where $\Delta y_{r,t}^{h} = y_{r,t+h} - y_{r,t-1}$ is the log change in the macroeconomic variable of interest between horizons $t-1$ and $t+h$. The subscript i pertains to the region while t is the index for time period with annual frequency. The superscript h denotes time horizon macro variable for region r at time t. FE_t, and FE_r are dummies controlling for time and region fixed effects.[1]

IMF GDN Model and Estimates

3. **of price adjustment frequencies**. Where we have the CPI data, we estimate using Jorda local projections the peak response of inflation in that sector to a 100-basis point monetary policy shock. We then simulate the same shock in the GDN model and compare the coefficients. We then adjust the price adjustment frequencies in the model until the two responses are broadly similar. This is shown in Table I.1 for 9 of our 16 sectors where we have data (column 1 shows the model response, column 2 the data and column 3 the price adjustment frequency in the model to achieve these results). For 7 of the 9 sectors, inflation data for the Philippines was unavailable or of insufficient length to conduct the empirical analysis. In these cases, we use parameter values from Pasten, Schoenle & Weber (2020).

4. **Size of shock and model performance**. We calibrate the shocks in a typical category 5 typhoon and bad year of typhoons by matching the economic losses in agriculture and infrastructure sectors, along with the value-added in 6 sectors. Table I.2 shows the size of shocks in each scenario in percent. Table I.3 and Table I.4 display the model performance of matching data estimates.

[1] The results are robust to clustering standard errors at the regional level, except for the impact on agricultural GDP.

Table I.1. Philippines: Estimates of Price Adjustment Frequencies

Sector	Model Response	Data Response	Price Adjustment Frequency
Education	-0.79	-0.58	0.03
Agriculture	-4.92	-5.83	1.00
Energy and Water	-1.42	-1.84	0.30
Real Estate	-1.98	-1.84	0.37
Manufacturing	-1.27	-1.25	0.50
Human Health	-1.52	-1.78	0.35
Transport	-3.14	-4.35	1.00
IT & Communications	-0.75	-0.10	0.01
Arts, Entertainment and Other Services	-2.60	-2.22	0.45
Mining & Quarrying	No Data		0.97*
Construction	No Data		0.42*
Accomodation & Restaurants	No Data		0.21*
Professional,Scientific & Technical	No Data		0.09*
Wholesale and Retail	No Data		0.39*
Finance	No Data		0.31*
Public Administration	No Data		0.19*

Sources: IMF estimates; and Pasten, Schoenle and Weber (2020).
Note: * In the absense of data from the Philippines, we use data from Pasten, Schoenle & Weber (2020) for the USA.

Table I.2. Philippines: Size of Shock in Typical Category 5 Typhoons and Bad Year of Typhoons
(In percent)

Shock	Typical Category 5	Bad Year
Agricultural Capital	-0.79	-2.41
Other Capital	-0.01	-0.04
Labor Productivity: Agriculture	-0.39	-1.20
Labor Productivity: Mining	-1.59	-4.67
Labor Productivity: Manufacturing	-0.49	-1.49
Labor Productivity: Utilities	-0.82	-2.49
Labor Productivity: Construction	-1.63	-4.92
Labor Productivity: Transportation	-0.97	-2.95

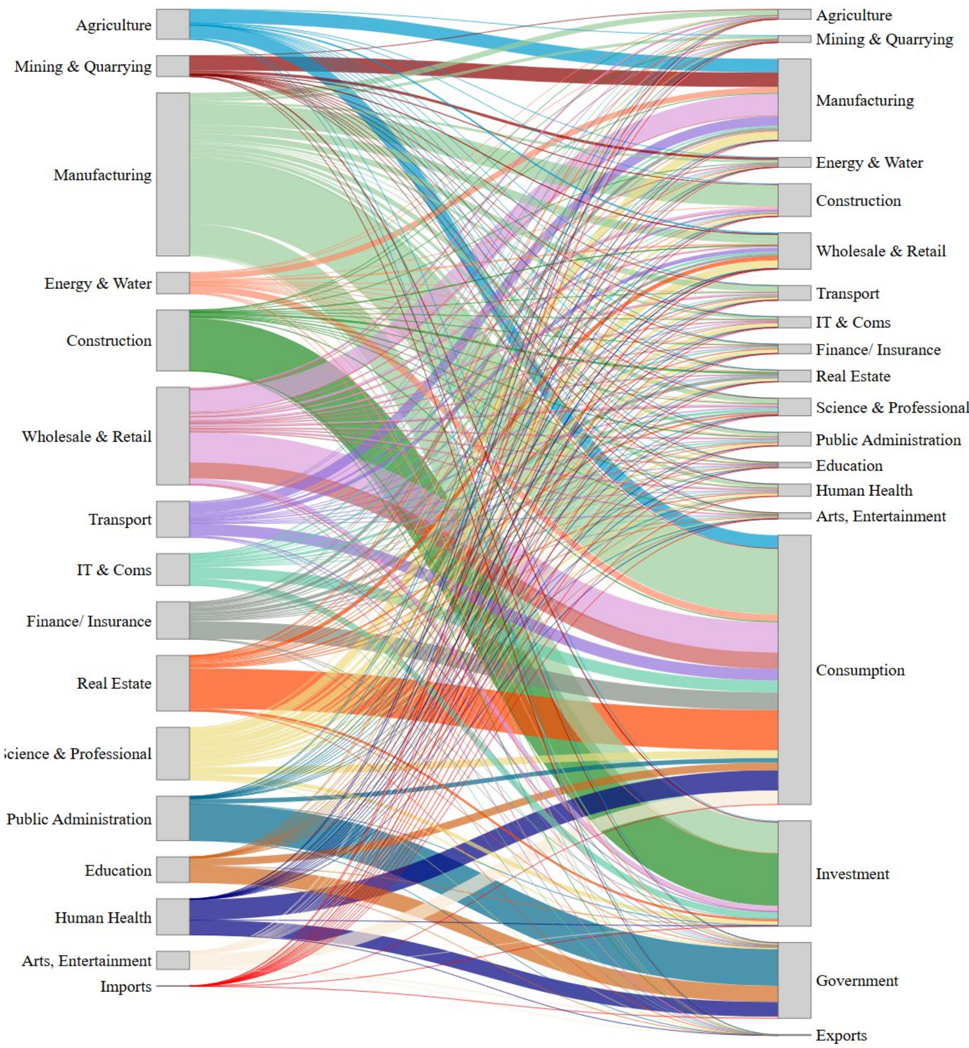
Table I.3. Philippines: Data and Model Estimates of Typical Category 5 Typhoon
(In percent)

Impact	Data	Model
Damages in Agriculture/GDP	0.2583	0.2583
Damages in Infrastructure/GDP	0.0771	0.0898
Value-added per worker in Agriculture	-0.7315	-0.7310
Value-added per worker in Mining	-0.6357	-0.6281
Value-added per worker in Manufacturing	-0.3934	-0.3857
Value-added per worker in Utilities	-0.4766	-0.4711
Value-added per worker in Construction	-1.0304	-1.0258
Value-added per worker in Transportation	-0.6968	-0.6876

Table I.4. Philippines: Data and Model Estimates of Bad Year of Typhoons
(In percent)

Impact	Data	Model
Damages in Agriculture/GDP	0.7900	0.7898
Damages in Infrastructure/GDP	0.2357	0.2707
Value-added per worker in Agriculture	-2.2373	-2.2377
Value-added per worker in Mining	-1.9442	-1.9221
Value-added per worker in Manufacturing	-1.2031	-1.1795
Value-added per worker in Utilities	-1.4578	-1.4408
Value-added per worker in Construction	-3.1512	-3.1387
Value-added per worker in Transportation	-2.1310	-2.1032

Figure I.1. Philippines: Rest of the World: Input-Output Data



Sources: GLORIA database; IMF calculations.

Figure I.2. Philippines: Full Responses of Breakdown Between Capital Destruction and Productivity Shocks

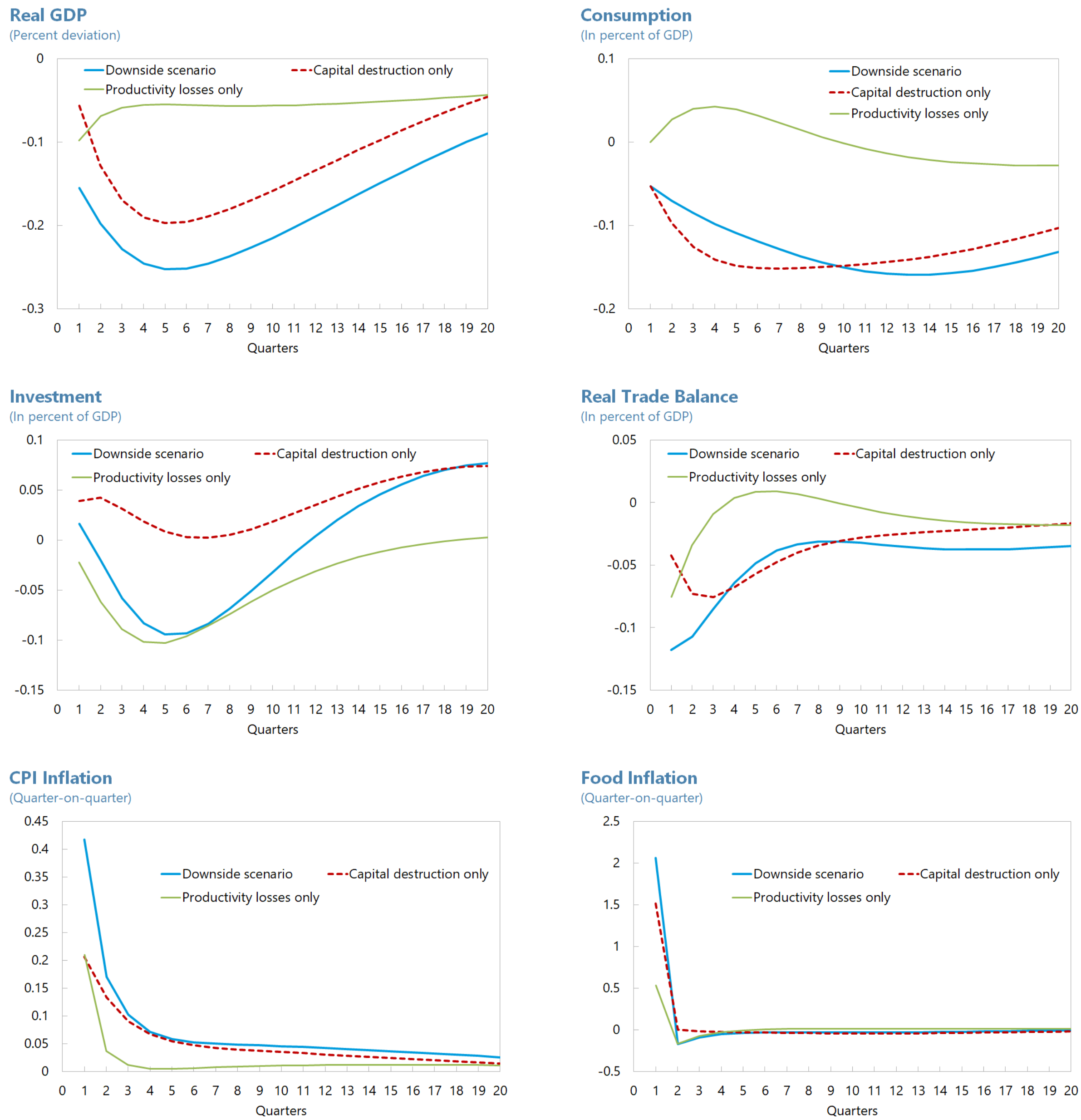
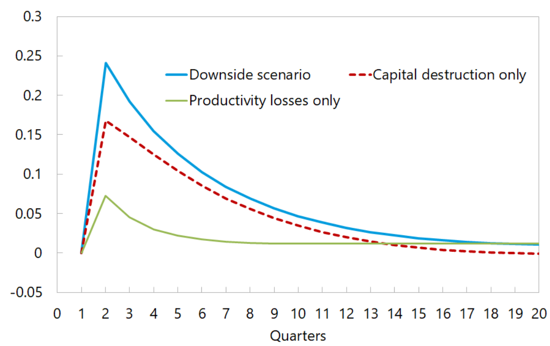


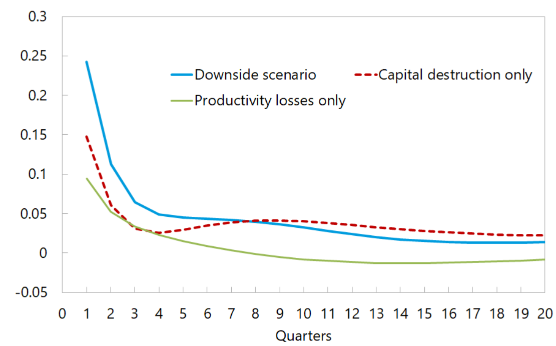
Figure I.2. Philippines: Full Responses of Breakdown Between Capital Destruction and Productivity Shocks (Concluded)

Non-Rational Expectations

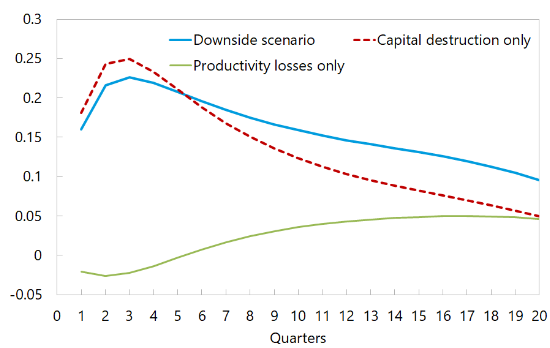


Real Exchange Rate

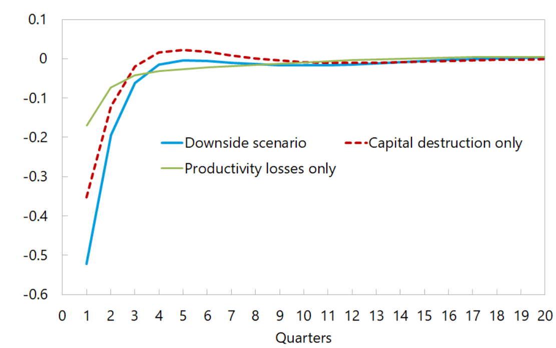
(Up=depreciation)



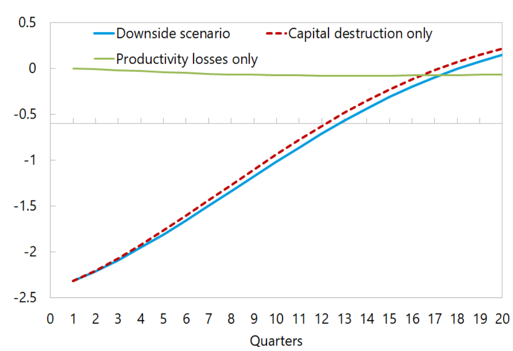
Nominal Interest Rate



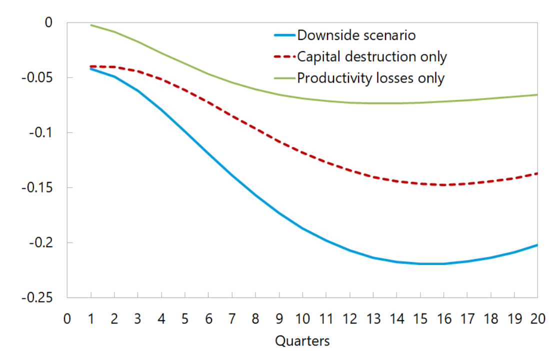
Real Interest Rate



Agricultural Capital



Non-Agricultural Capital



Source: IMF staff calculations.

Note: All variables in the first row show percent deviation from steady state real GDP. In the case of nominal and real interest rates these changes are linear so that the units are percentage points. In all other cases each variable's responses are expressed as percent deviations from steady state.

Figure I.3. Philippines: GDN Estimates of the Impact on the Philippines of Typhoons

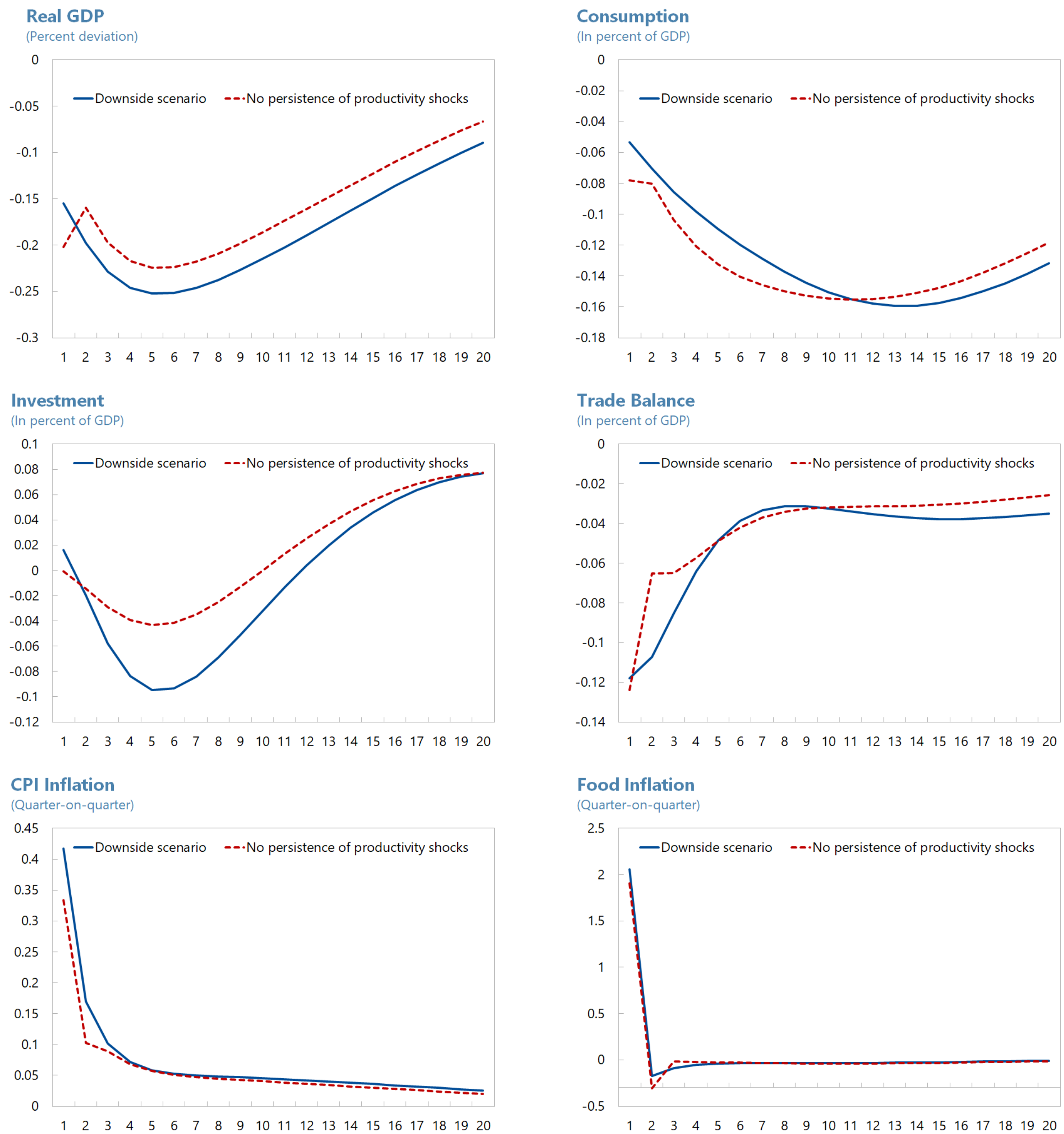
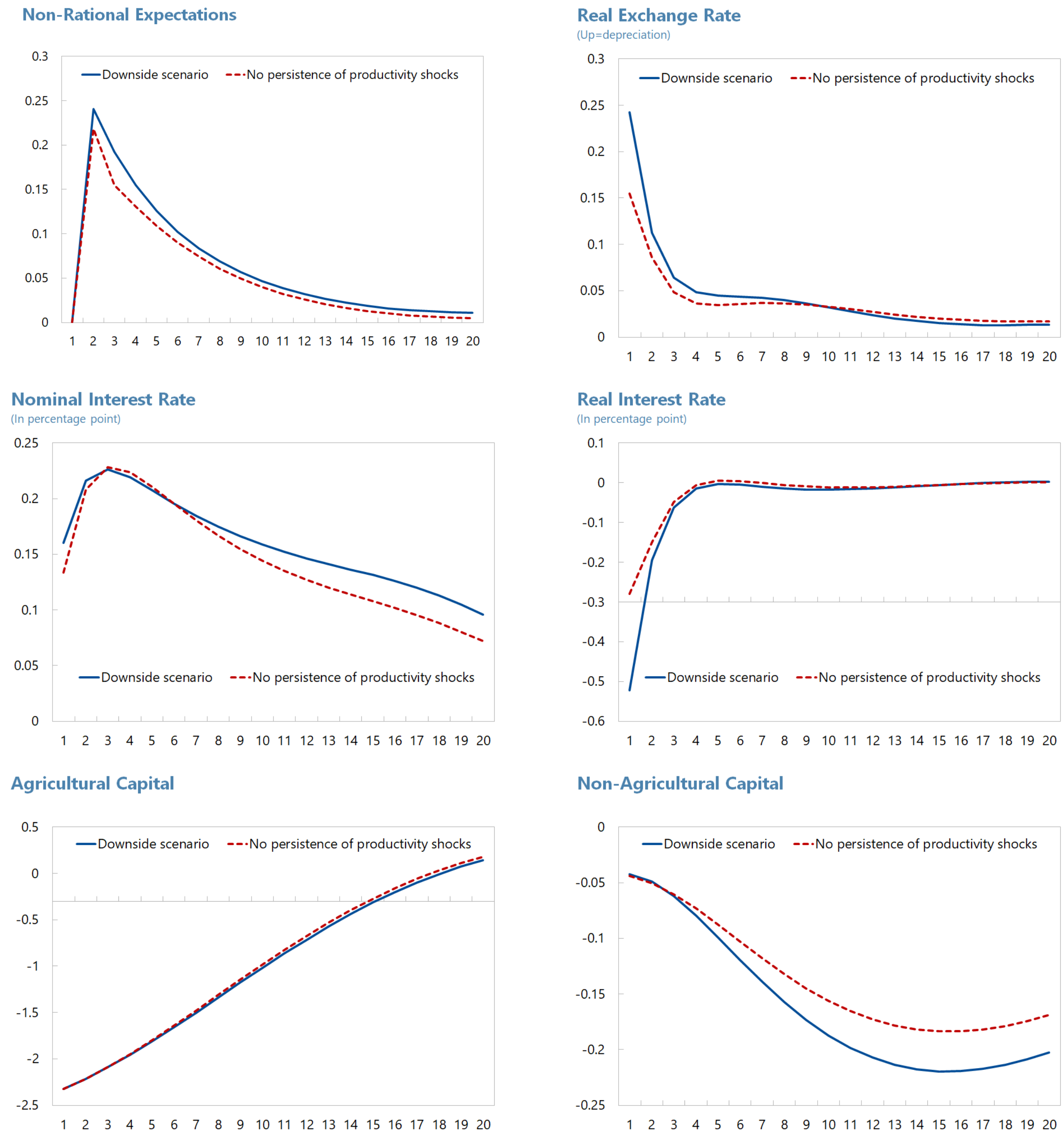


Figure I.3. Philippines: GDN Estimates of the Impact on the Philippines of Typhoons (Concluded)



Source: IMF staff calculations.

Note: All variables in the first row show percent deviation from steady state real GDP. In the case of nominal and real interest rates these changes are linear so that the units are percentage points. In all other cases each variable's responses are expressed as percent deviations from steady state.

Figure I.4. Philippines: Full Responses of the Impact of Food Price Salience

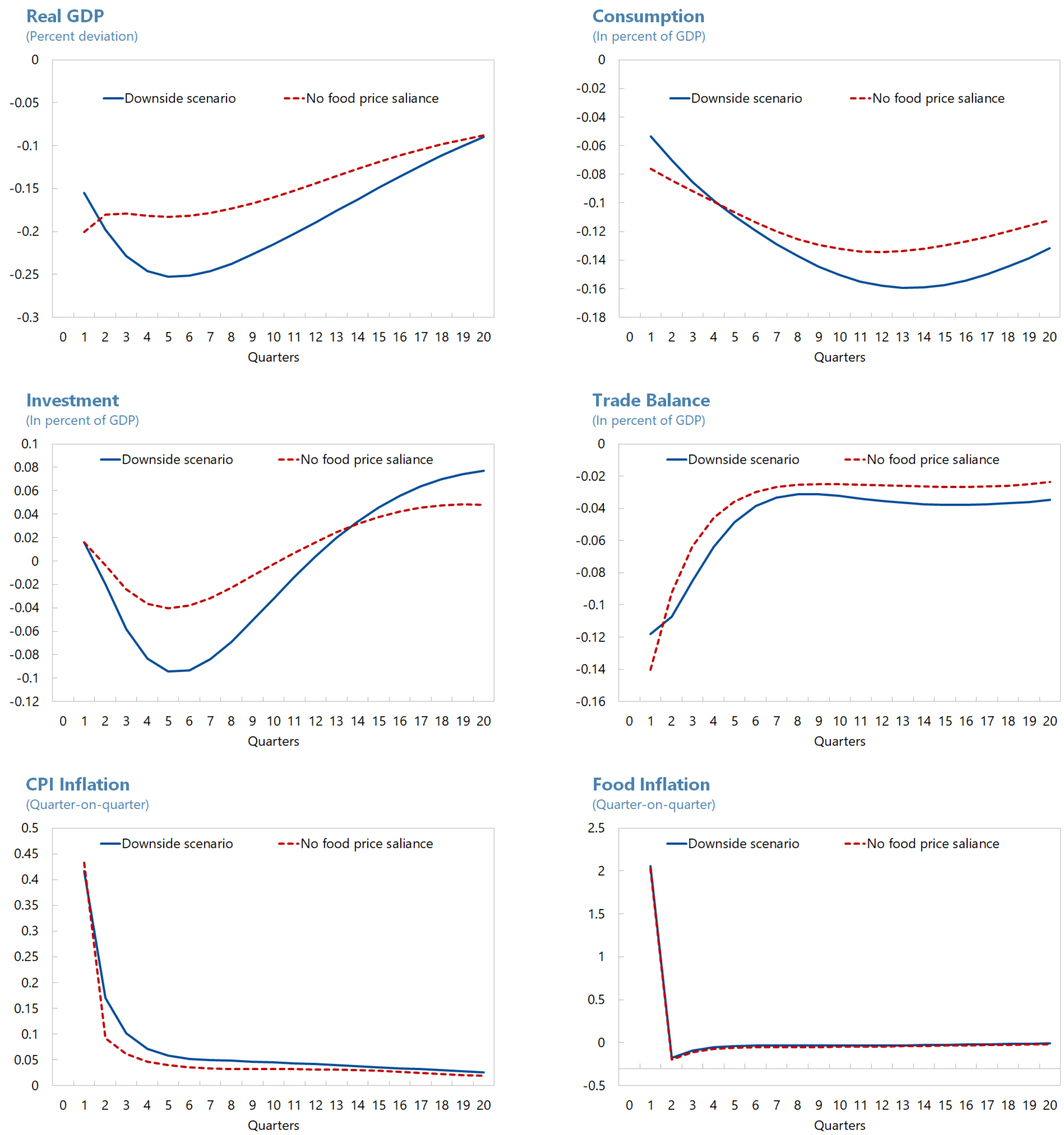
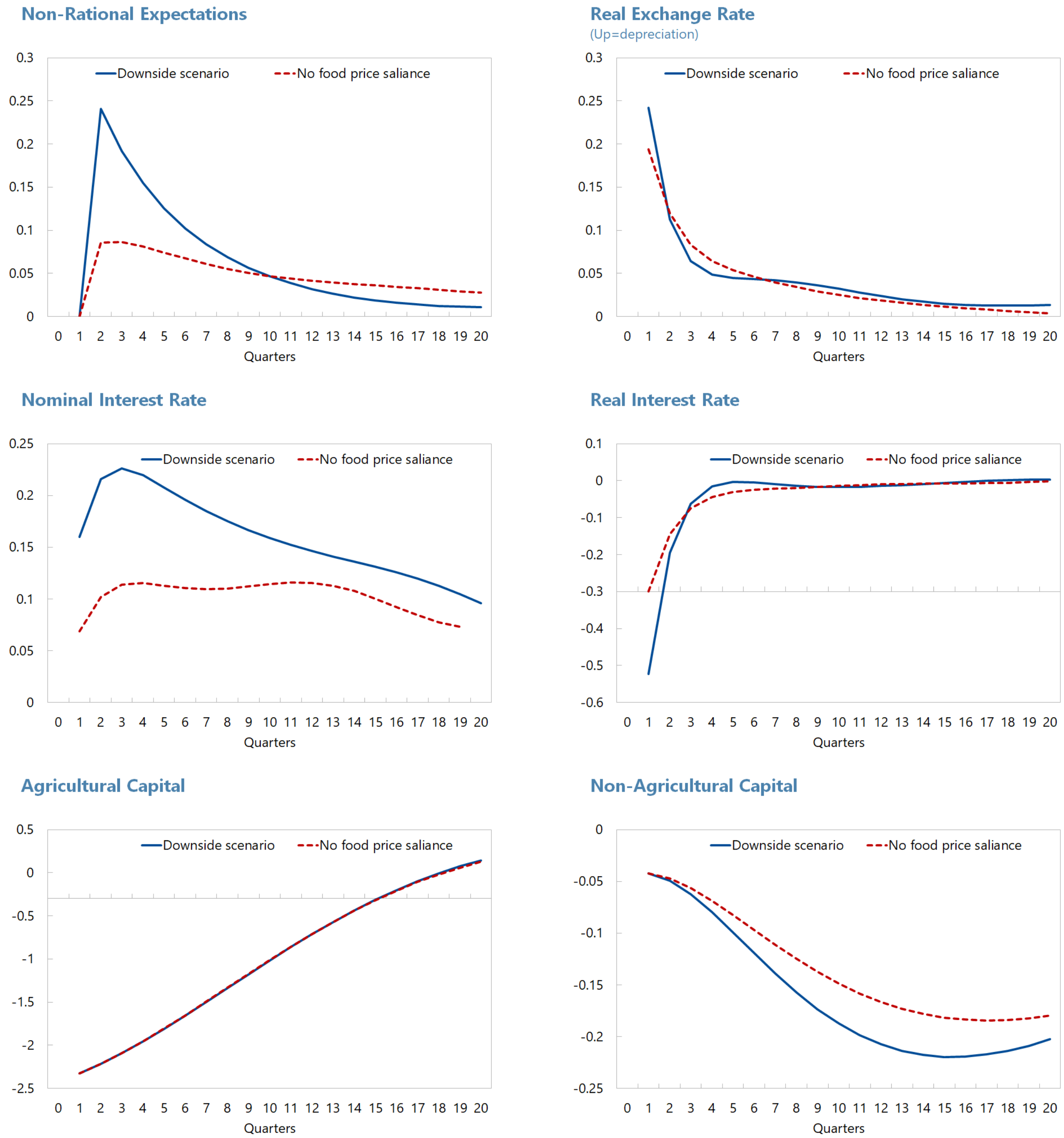


Figure I.4. Philippines: Full Responses of the Impact of Food Price Salience (Concluded)



Source: IMF staff calculations.

Note: All variables in the first row show percent deviation from steady state real GDP. In the case of nominal and real interest rates these changes are linear so that the units are percentage points. In all other cases each variable's responses are expressed as percent deviations from steady state.

Figure I.5. Philippines: Full Responses for Different Policy Rules

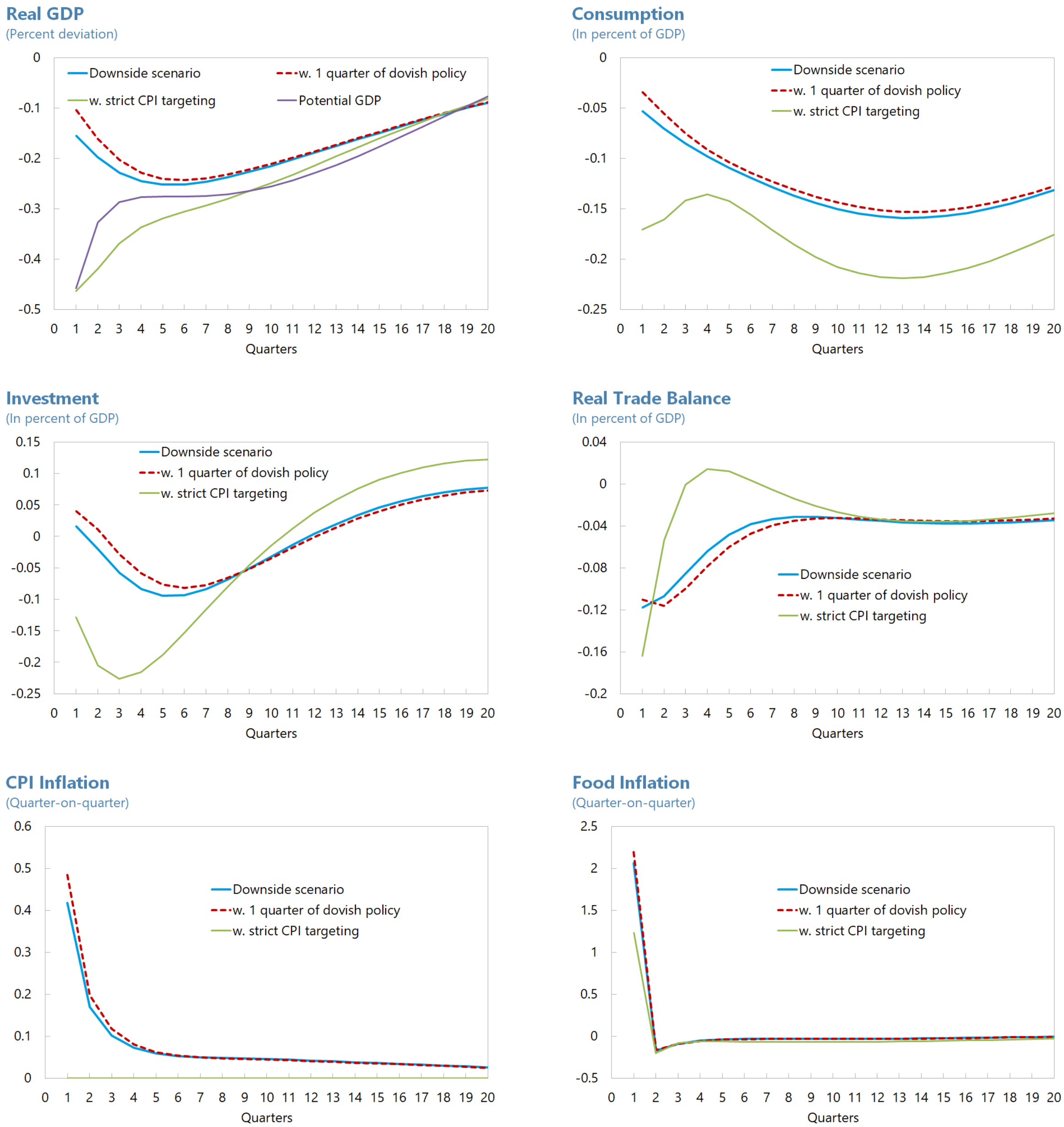
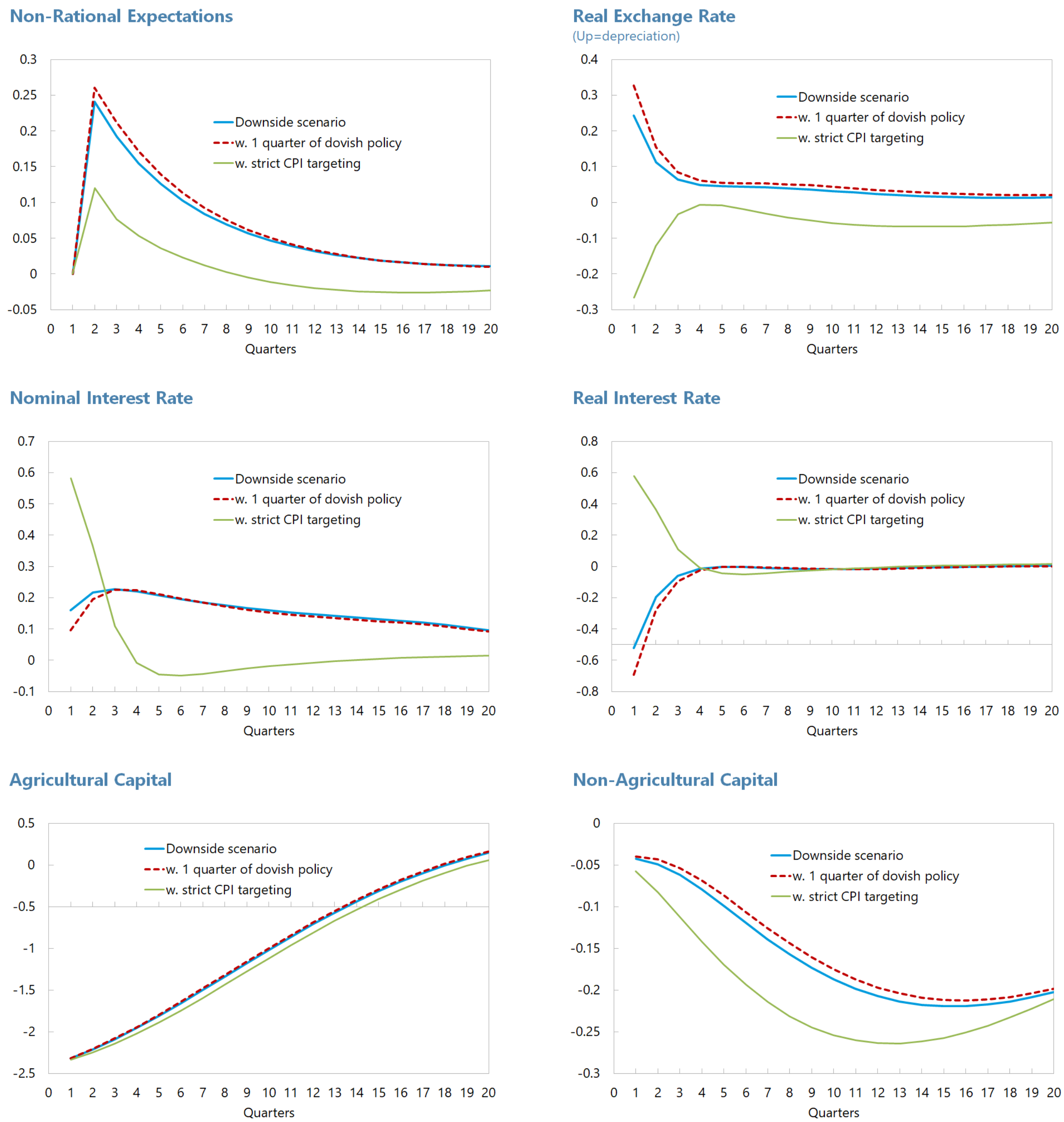


Figure I.5. Philippines: Full Responses for Different Policy Rules (Concluded)



Source: IMF staff calculations.

Note: All variables in the first row show percent deviation from steady state real GDP. In the case of nominal and real interest rates these changes are linear so that the units are percentage points. In all other cases each variable's responses are expressed as percent deviations from steady state.

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