



PHILIPPINES

SELECTED ISSUES

December 2022

This Selected Issues paper on Philippines was prepared by a staff team of the International Monetary Fund as background documentation for the periodic consultation with the member country. It is based on the information available at the time it was completed on November 8, 2022.

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International Monetary Fund
Washington, D.C.



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November 8, 2022

Approved By
**Asia and Pacific
Department**

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APPLICATION OF THE INTEGRATED POLICY FRAMEWORK TO THE PHILIPPINES¹

The Philippine economy is recovering from the pandemic, but the outlook remains uncertain with risks tilted to the downside. This note adds to the Staff Report's discussion of managing downside risks and the scenario analysis, to illustrate how the Integrated Policy Framework can help to analyze the use of multiple instruments and policy tradeoffs.²

1. Philippines' economic recovery accelerated in 2022Q1, but a confluence of global shocks weigh on prospects ahead. Growth is expected to slow to 5 percent in 2023 and inflation has risen sharply, surpassing the high end of the government target range of 3.0 percent \pm 1.0 percentage point since March. The current account deficit is expected to widen further in 2022 as the trade gap broadens, driven mainly by high global commodity prices. Financial conditions have tightened, raising the external and domestic borrowing costs for both the public and private sector, at a time when government debt has increased significantly due to pandemic related spending. In addition, downside risks to the baseline projections are considerable, including from intensifying spillovers from Russia's war in Ukraine, a deepening of the global slowdown, and a surge in COVID-19 cases from more deadly variants.

2. Policy responses under downside scenarios can be analyzed using the IMF's Integrated Policy Framework (IPF). The IPF aims to provide a systemic analytical approach to selecting an appropriate mix of policies for achieving macroeconomic and financial stability. It jointly considers the role of monetary, exchange rate, macroprudential and capital flow measures, and their interactions with each other and other policies. The work on the IPF draws together economic models, empirical analysis, and a review of country experiences. A key finding of the IPF is that optimal policy combinations depend on the country's initial conditions and specific characteristics, and the underlying financial frictions and nature of shocks. In other words, optimal policies will not be the same across countries and will differ according to the situation.

3. The IPF model used in this note is an estimated linearized variant of Adrian et al, 2021. Adrian et al 2021, expands the standard class of New Keynesian open economy models to include financial frictions that capture key features of financial stress episodes in emerging market economies. Specifically, the model includes a nonlinear balance sheet channel to capture capital flow and exchange rate pressures when global risk sentiment deteriorates and allows exchange rate fluctuations to affect domestic financial conditions to account for the effects of foreign currency mismatch. An indexation mechanism is included to proxy for imperfect monetary policy credibility.

¹ Prepared by Kaili Chen, Leni Hunter, Cheng Hoon Lim, Jesper Linde, and Hou Wang. Elif Arbatli-Saxegaard and Sarwat Jahan also contributed to this paper. We would like to thank the Philippine authorities for their constructive comments.

² See IMF 2020, and <https://www.imf.org/en/Topics/IPF-Integrated-Policy-Framework>.

The model is estimated using Philippine data and Bayesian techniques. Policy rules are not formally optimized; instead we use the scenarios to compare policy outcomes.

4. The note is structured as follows. Section A discusses initial conditions and characteristics of the Philippine economy that are relevant for the IPF. Section B constructs two illustrative downside scenarios: in the first, inflation remains stubbornly high in the Philippines and globally, financial conditions around the world continue to tighten, triggering a “risk-off” environment with significant and disorderly capital outflows from emerging market economies. The second scenario assumes a similar “risk-off” environment but allows for a higher degree of pass-through from the real exchange rate to core inflation, importantly via a steeper import price Philips curve. In both scenarios, the role of fiscal policy and the impact on government debt are included but capital flow measures and macroprudential policy, which are better suited to address financial stability risks, are not considered.³ While the results depend on the full model specification, in section C we highlight two key economic channels of relevance for the IPF: the effectiveness of foreign exchange intervention in leaning against the wind of global capital flows and preventing sharp exchange rate movements; and the degree of exchange rate pass-through to inflation and output. In section D, we discuss caveats around the model and the importance of calibrating model parameters to the initial conditions and characteristics of the Philippine economy.

A. Initial Conditions, Country Characteristics, and Underlying Frictions

5. An economy’s initial conditions, including the availability of policy space, are a key factor in determining how well it can weather a negative shock. The Philippine economy remains fundamentally sound despite the deep contraction in 2020, thanks to sustained reforms and disciplined macroeconomic policies that contained macro-financial vulnerabilities and mitigated the effects of the pandemic. The negative output gap is expected to close this year following strong GDP growth in 2021 and the first half of 2022. The exchange rate is in line with fundamentals and desirable policies and there are large reserve buffers (Staff Report Appendix 1). While inflation risks have increased significantly, the Philippine central bank (Bangko Sentral ng Pilipinas) has a credible inflation targeting framework and the policy instruments to anchor inflation expectations, and the government still has some fiscal space to respond to adverse shocks. These initial conditions leave the Philippine economy well positioned to manage downside risks.

6. Country characteristics, including financial frictions and vulnerabilities, also determine the set of appropriate policy options.⁴ For the Philippines, the optimal response to shocks depends on the degree of currency mismatches, the depth of FX markets, and external trade invoicing practices.

- *Currency mismatches on borrowers’ balance sheets.* In the presence of currency mismatches, an exchange rate depreciation is a source of vulnerability as it increases the value of unhedged

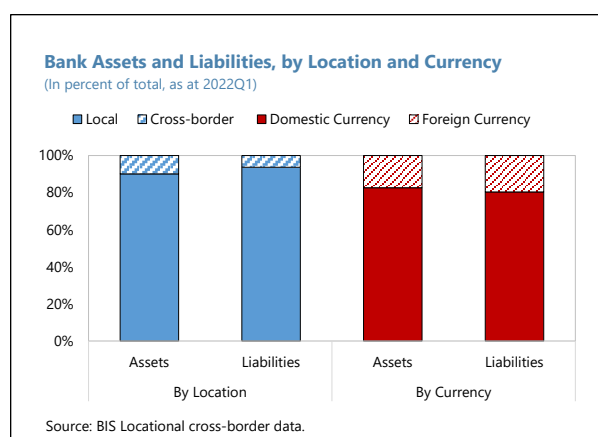
³ The Philippines does not have a history of using CFMs.

⁴ This paragraph draws from IMF 2020, Basu et al 2020, Adrian et al 2021.

foreign currency debt and the risk of defaults. Creditworthiness and asset quality deteriorate, lending capacity weakens and borrowing costs increase.

- *The depth and liquidity of the foreign exchange market.* Intervention is less likely to be successful in a deep and liquid FX market but may potentially have traction in a shallow illiquid market.⁵
- *Dominant currency pricing (DCP).*⁶ With DCP, exports are priced in dollars and foreign demand is not sensitive to changes in the local currency exchange rate. The short-term response of trade volumes to exchange rates is likely to be manifested mostly through imports with little competitiveness boost to exports.⁷

7. Philippines' banking system has only limited levels of currency mismatch, but further analysis is needed on exposures in non-financial corporates (NFCs). As reported in the Financial Sector Assessment Program, the level of banks' direct cross-border exposure is relatively low and are mostly to service foreign workers, while dollarization is moderate.⁸ Cross-border exposures represent 10 percent of bank assets and 6 percent of liabilities, and foreign currencies represent 18 percent of assets and 20 percent of liabilities. Banks' exposures to foreign exchange risks are tightly regulated, with separate licensing requirements to conduct foreign exchange transactions and strict limits on banks' net open positions. The limited exposures in banks help to reduce Philippines' exposure to negative balance sheet effects from an exchange rate depreciation. However, risks could still arise in individual banks and further analysis outside the banking sector is needed. As noted in the FSAP, banks are indirectly exposed to international spillovers through NFCs (which represent around 80 percent of bank lending).



8. The Philippine foreign exchange market is subject to periods of illiquidity. The FX market experiences periods of liquidity tightening, as indicated by spikes in the bid-ask spread. Another common proxy measure is exchange rate volatility, which experienced a sharp spike at the onset of the pandemic, suggesting a tightening in FX market liquidity at that time. Turnover data is also used to assess market liquidity, subject to challenges and considerations noted by Moreno et al 2019, and BIS 2017. According to BIS data, turnover in the Philippine peso was less than 1 percent of global OTC FX turnover in April 2019, on a net-net basis. Internal IMF analytical work has found that

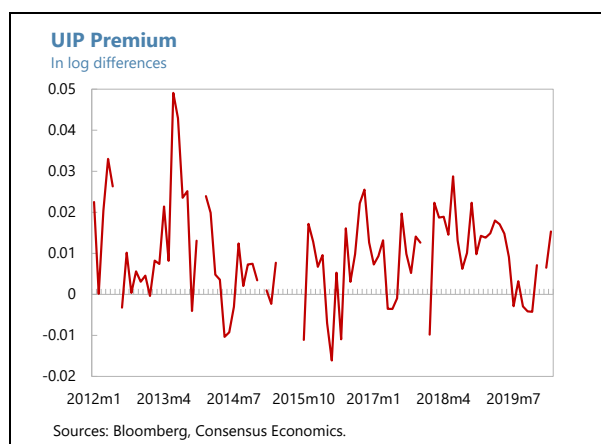
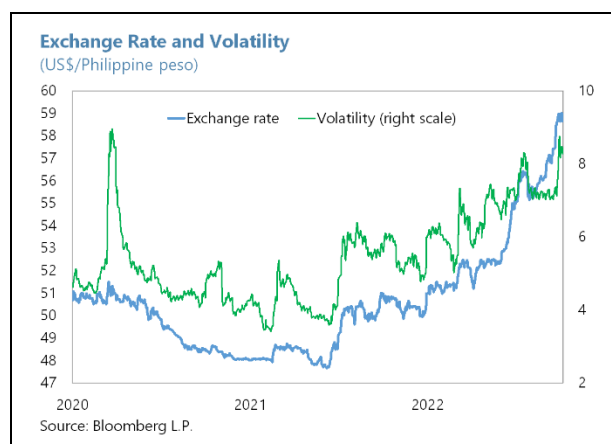
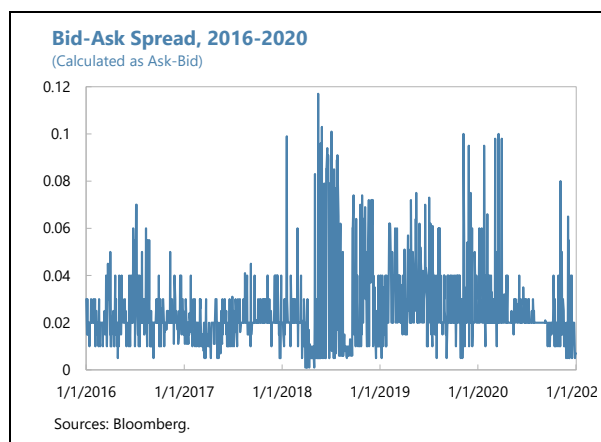
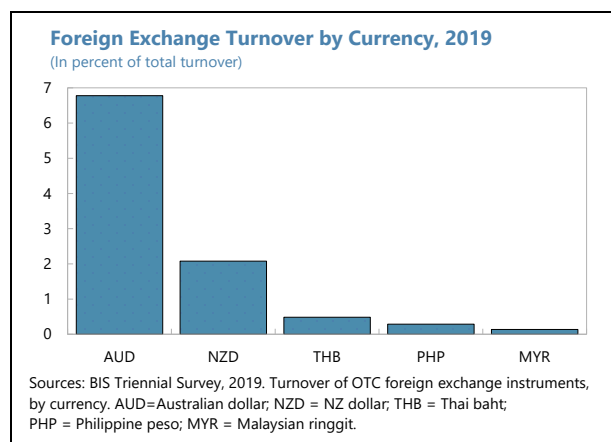
⁵ Policies to deepen the FX market would contribute to macroeconomic stability, as noted in the Staff Report paragraph 13.

⁶ Gopinath et al, 2020.

⁷ IMF 2020, "Towards an Integrated Policy Framework", page 22.

⁸ IMF-World Bank 2022, "Financial Sector Assessment Program Technical Note: Risk Assessment of Banks, Non-Financial Corporates, and Macro-Financial Linkages", paragraph 7.

an abrupt change in a country's UIP premium may be consistent with period of shallowness or illiquidity in the FX market, during which there are too few market participants to absorb an external shock.⁹ The UIP premium for Philippines shows periods of illiquidity, such as during the 2013 taper tantrum. The UIP premium increased at the onset of COVID-19, though remained within the range of recent years.



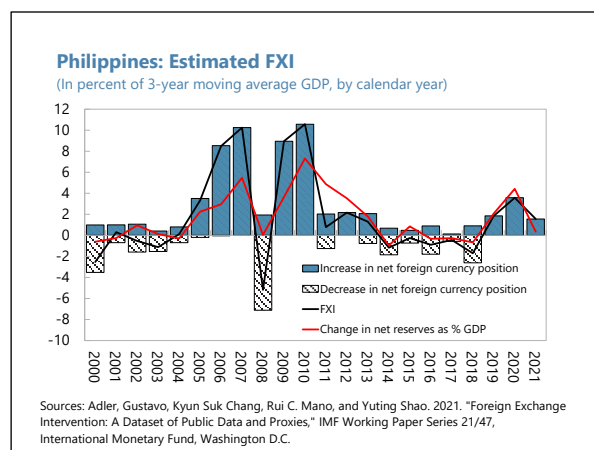
9. DCP is prevalent in Philippines' external trade and constrains the extent to which the exchange rate acts as an automatic stabilizer. Between 2014 and 2019, around 92 and 87 percent of exports and imports respectively, were priced in US dollars.¹⁰ Since DCP reduces the benefits of exchange rate depreciation on exports, the short-term response of Philippine trade to exchange rates is manifested mostly through imports. Nevertheless, there are countervailing effects to DCP. Export income will increase when converted to pesos, benefitting exporting firms and by extension consumption. Similarly, a depreciation will raise the peso-denominated value of remittance inflows when they are converted into domestic currency by households, and increase the competitiveness of tourism-related services exports, which are priced in pesos.

⁹ IMF, 2022.

¹⁰ Using the dataset from Boz et al, 2020.

10. The above analysis of frictions suggests a possible role for FXI in the Philippine policy toolkit.¹¹ While there is only moderate currency mismatch evident in the banks and DCP does not void the exchange rate's automatic stabilizing role, the shallowness of the foreign exchange market, along with large FX reserves, implies FXI can be used to improve policy tradeoffs and mitigate downside risks. By limiting exchange rate and inflationary pressures, FXI eases the inflation-output trade-off for interest rate policy and enables better inflation-output stabilization. In the process, FXI attenuates the impact of shocks on the UIP risk premium and private borrowing spreads. This benefit is potentially larger if inflation expectations are less anchored or are at risk of being de-anchored, or if the level of exchange rate pass-through to inflation is high. However, an assessment of both the benefits and costs of FXI is needed to determine whether and how it should be used as part of the policy toolkit.

11. FXI should be conducted within a clear operational framework, taking account of likely effectiveness. As discussed in Lafarguette et al 2021, FXI may lead to either the depletion of official FX reserves or a costly accumulation of them, which entails risks to central banks. A clear intervention framework is needed, which supports sound risk management practices for FXI and takes account of FXI effectiveness (paragraph 17). Lafarguette et al note several properties for intervention triggers, including that they should: (1) depend on market conditions; (2) depend on the exposure and resilience of the economy to exchange risk; (3) ensure that interventions are effective under the central bank FXI budget constraint; (4) capture asymmetries between appreciation and depreciation; (5) be operationalizable. They also suggest components of program design, including: communication, governance, modalities, transparency, accountability. FXI should be aligned with the monetary policy stance and expected fiscal actions.¹² The Philippines does not publish FXI data, but estimates provided by Adler et al 2021 show periods of active intervention in the past (e.g., 2005-2010).



B. Scenario-Based Analysis

Two scenarios were considered where near-term risks to the outlook materialize in increasing severity relative to staff's baseline.

12. In scenario 1, shocks to global inflation and risk premia lead to a disorderly tightening of global financial conditions. Global supply disruptions and elevated commodity prices trigger

¹¹ IMF 2012. Integrated Surveillance Decision notes that "A member should intervene in the exchange market if necessary to counter DMC, which may be characterized inter alia by disruptive short-term movements in the exchange rate of its currency."

¹² See for example Eckhold, K and C. Hunt, 2004.

more persistent price pressures and wage compensation demands that become embedded in inflation expectations (cost-push shocks). This leads to higher inflation and stronger monetary policy tightening by major foreign central banks, contraction in the foreign economy, and capital outflows from emerging markets. In the context of stressed and illiquid financial market conditions, the Philippines is subject to a risk-off shock to the UIP premium and domestic risk premium, which results in a weaker exchange rate and an increase in the long-term rate (shocks are listed in Table 1).

13. Scenario 2 considers higher exchange rate pass-through to inflation, in the context of a similar “risk off” environment as in scenario 1. The range of staff’s estimates of exchange rate pass-through for EMDEs and countries with high USD trade invoicing suggests potential upside risk to staff’s baseline estimate, which is consistent with scenario 1 (Staff Report paragraph 35 text chart, and paragraph 18 below). Scenario 2 allows for a steeper import price Philips curve and larger and more persistent UIP risk premium shocks. This results in about twice the exchange rate pass-through to core inflation as in scenario 1, and thus higher inflation despite the fact that the two scenarios have similar degrees of depreciation.

14. Each scenario has the following policy combinations: (i) monetary policy interest rate; (ii) monetary policy interest rate and FXI; (iii) monetary policy interest rate and fiscal policy; (iv) monetary policy interest rate, FXI and fiscal policy. The assumed fiscal policy response is in the form of 0.5 percent of GDP of government spending in each of the first and second years which is withdrawn in subsequent years for a cumulative 1.8 percent of GDP fiscal stimulus over 5 years. The domestic interest rate policy follows a Taylor-rule type reaction function, where the policy rate responds to the output gap and expected inflation, with additional monetary policy shocks added to capture the aggressive monetary policy response to high inflation and temporary deviation from the estimated reaction function. FXI follows a policy rule in which the central bank intervenes in the FX market to partially offset nominal exchange rate movements. Such interventions have a direct impact on the level of central bank FX reserves. Figure 1 shows model responses in terms of deviation from baseline under both scenarios for: the output gap, nominal policy interest rate, core inflation, real and nominal exchange rates, long-term interest rate, the size of FXI, and the foreign variables.

In scenario 1, the response for the exchange rate, inflation, and monetary policy depend mainly on whether or not FXI is used.

- *In the absence of FXI,* the shock to the Philippines’ UIP risk premium causes a 10 percent nominal exchange rate depreciation, increasing core inflation by 150 basis points (bp) relative to the baseline. Monetary policy is tightened by around 130 bp to return inflation to target (but does not rise as quickly as inflation resulting in an initial fall in the real policy interest rate). The contraction in foreign demand weighs on net exports and pushes the output gap negative. When the policy interest rate is used on its own, the output gap widens to about -2.5 percent after 4 quarters; with fiscal policy the output gap widens to -2.1 percent.
- *When FXI is used,* it reduces the nominal exchange rate depreciation from 10 percent to 4 percent, which all else equal removes some of the pressure on inflation and the need for

tighter monetary policy. The impulse response for core inflation peaks at around 115 bp, and for the policy rate at around 80bp. The use of FXI thus improves the policy tradeoff, as inflation peaks at a lower level and can be returned to target with a less negative output gap. When the policy interest rate is used with FXI, the output gap widens to about -2.1 percent after 4 quarters, but with fiscal policy the output gap improves to about -1.7 percent. The use of FXI leads to a cumulative loss of foreign exchange reserves of 2.6-2.8 percent of GDP in the first four quarters. As the shocks prove temporary, the FXI is gradually reversed from the fourth quarter, such that the cumulative loss of foreign reserves after 20 quarters is 0.9 percent of GDP.

In scenario 2, the responses for the exchange rate, inflation, and monetary policy again depend largely on the use of FXI.

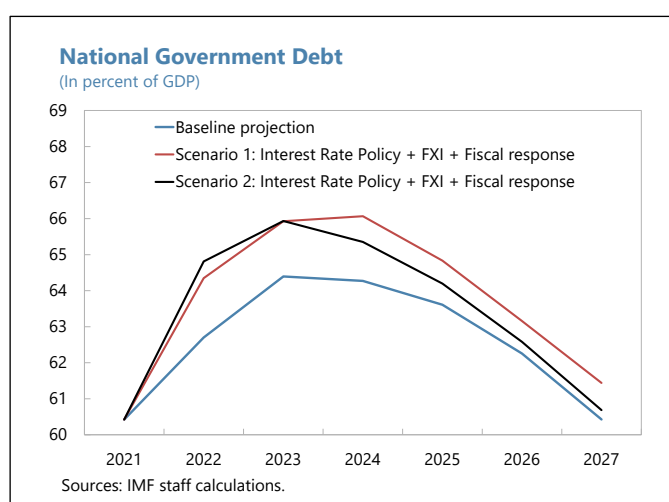
- *In the absence of FXI*, the UIP risk premium shock again leads to a 10 percent nominal exchange rate depreciation. However, the larger exchange rate pass-through applied to the similar exchange rate path causes core inflation to rise by more relative to scenario 1, peaking at 2.25 percent in the fourth quarter relative to baseline. The policy interest rate peaks at around 2.6 percent. The output gap widens to -3.2 percent when only interest rate policy is used, and about -3 percent when interest rate policy is supported by fiscal policy.
- *When FXI is used* it again stabilizes the exchange rate. As the exchange rate pass-through is stronger, monetary policy is tightened more than in scenario 1. However, by offsetting some of the depreciation the FXI reduces the extent to which interest rates would have to rise. Core inflation peaks at around 1.5 percent above baseline, while the nominal policy interest rate tightening peaks at about 2 percent. When the policy interest rate is used with FXI, the output gap widens to about -2.9 percent after 4 quarters, but when fiscal policy is also used the output gap widens by less to -2.6 percent. As the persistence and size of UIP shocks has increased in this scenario, there is more depreciation pressure on the exchange rate, necessitating a larger intervention to stabilize the exchange rate at a similar level as in scenario 1. Over the first 4 quarters the loss of foreign reserves is about 3.1 percent of GDP, after which reserves are subsequently with a cumulative reserves loss after 20 quarters of 0.9 percent of GDP.

15. A combination of modest fiscal expenditure with monetary tightening and FXI provides the most favorable outcome, in terms of reducing output loss. FXI in the model offsets the exchange rate shock and removes inflation pressure. A monetary policy and FXI response combined with fiscal stimulus would also limit the deterioration in the output gap. The outcomes for inflation are similar with or without fiscal stimulus, given the stimulus size. However, increasing the fiscal stimulus would result in higher inflation and higher interest rates, crowding out private domestic demand. All else equal, if the exchange rate pass-through has increased, using FXI to stabilize the exchange rate can have a stronger benefit in terms of reducing inflation pressure. These results are also shown in the table below, which reports squared deviations of inflation and output gap, as a measure of variance.

Table 1. Philippines: Sum of Squared Deviations of Output and Core Inflation

<i>Sum of squared deviations from baseline, over 20 quarters</i>	Scenario 1		Scenario 2	
	Output gap	Core Inflation	Output gap	Core Inflation
Interest rate policy only	36.6	14.0	55.0	27.3
Interest rate and fiscal policy	25.0	14.4	41.5	27.4
Interest rate and FXI policy	26.6	6.9	47.9	12.5
Interest rate, FXI and fiscal policy	17.3	7.6	35.4	13.2

16. Staff estimates suggest that government debt remains sustainable when fiscal policy support is deployed in the scenarios. Using the Fund’s DSA framework as a supplement to the IPF model used, we find that increased fiscal expenditure, lower GDP, tax losses (caused by lower nominal GDP applied to the baseline projection tax ratio), and higher interest rates all raise the debt ratio. Valuation changes are also considered, reflecting the effect of the exchange rate depreciation on the peso-denominated value of foreign debt (about 30 percent of the debt stock). The impact on debt from these channels is mitigated by inflation, which is assumed to pass through one-for-one to the GDP deflator, increasing nominal GDP and lowering the debt ratio.¹³ Both scenarios imply a similar increase in the debt ratio relative to the baseline projection, though the debt ratio is lower in scenario 2 largely due to the effect of higher inflation in scenario 2 on the GDP deflator. The results are sensitive to the assumptions used for the analysis. Varying the assumptions can cause debt to peak at higher levels, but debt will eventually decline due to the transitory nature of the shocks and the envisaged size of the fiscal stimulus. Results would be different for example, with larger fiscal stimulus, or if inflation expectations became unanchored.



C. Key Channels

17. The ability of FXI to support monetary policy depends on the effectiveness of FXI, and the exchange rate pass-through to inflation. Most studies of FXI effectiveness use high frequency data to investigate the impact of FXI on the exchange rate. Using data from 2010 to 2015, Guinigundo 2019 finds that BSP’s intervention is mainly in the spot market and has been effective at containing same-day exchange rate volatility, and that larger volumes or sustained central bank interventions are significant in managing large fluctuations in the exchange rate. Using a VAR with a shock to global capital flows, Blanchard, Adler and de Carvalho-Filho 2015 compare estimation

¹³ Nominal GDP in the scenarios does not exceed nominal GDP in the baseline projection.

results for countries that intervene against flexible exchange rate countries that don't intervene and find that a 1 percent of GDP intervention results leads to an appreciation that is 1.5 percent less than it would have otherwise been.

18. The estimate of exchange rate pass-through in scenario 1 is similar to the authorities' estimates and the literature.¹⁴ In scenario 1 a 1 percent real depreciation in the exchange rate leads to approximately 0.06 ppt increase in core inflation. This is broadly consistent with the authorities' estimates and the literature. In response to a 1 percent nominal depreciation, the authorities estimate a 0.06 ppt increase in headline CPI inflation after one year, rising to 0.08 ppt after two years. For a 1 percent nominal depreciation, Forbes et al 2020 estimated a pass-through for the Philippines of slightly below 0.1, which is below their estimate for emerging markets as a group, of 0.23. Guinigundo 2017 finds that the exchange rate pass-through declined after the adoption of inflation targeting in the Philippines and estimated a short-run pass-through of 0.037 for the inflation targeting period, rising to 0.393 for long-run pass-through.

D. Conclusion, Caveats and Future Work

19. The coordinated use of fiscal, monetary, and exchange rate policies may help alleviate policy tradeoffs in downside scenarios. Monetary policy should be the first line of defense against persistent inflationary pressures, and the exchange rate should remain flexible and act as a shock absorber following fundamental shocks. However, in the context of Philippines' relatively shallow FX market, and under a scenario with sharp and volatile exchange rate depreciation where shocks relate to risk-off or disorderly financial conditions, the use of FXI may alleviate inflation and reduce some of the pressure on monetary policy – particularly if exchange rate pass-through to inflation is stronger than expected. A monetary policy response combined with fiscal stimulus would also limit deterioration in the output gap, but at the cost of higher inflation and higher interest rates, crowding out private domestic demand. The justification for additional fiscal support is stronger under scenarios where growth deteriorates significantly.

20. A degree of caution is needed in using the IPF framework and its tools, given the complexity of real-time decision-making. Deployment of IPF policy tools should be guided by a clear framework and an assessment of costs and benefits. The macroeconomic and financial stabilization benefits of IPF policies need to be balanced against potential costs in terms of market development and other possible unintended consequences, such as creating moral hazard risks and encouraging speculation. As noted above, FXI should not be used to support a misaligned exchange rate – as occurred during the Asian Financial Crisis – or as a substitute for warranted monetary and fiscal policy adjustment. Explaining the use of multiple policy instruments to market participants and the public may give rise to communication challenges. Model results should be interpreted with the recognition that the models may not reflect all tradeoffs and sources of uncertainty (e.g., regarding the true nature of economic shocks). In addition, the model will not fully reflect all practical challenges, such as may arise with regard to FXI sterilization.

¹⁴ A survey of the exchange rate pass-through literature can be found in Ha et al 2019, Chapter 5.

21. There are a number of avenues for further work. Analytical work on the IPF will continue to incorporate fiscal considerations, explore multilateral implications of IPF policies (such as the policy responses of trading partners, availability of global financial backstops), and extend analysis of intertemporal tradeoffs.¹⁵ A government debt module and further inclusion of macroprudential policies in the models would greatly facilitate the analysis. The costs of FXI and feasibility of sterilization (particularly under disorderly market conditions and taking account of institutional arrangements) should be explicitly modeled in the IPF to fully reflect policy tradeoffs, and empirical analysis of the exchange rate pass-through and FXI effectiveness is critical to support the calibration of model parameters—as model results rely heavily on the presence of both channels and each is subject to change over time. Further work is also needed to better understand financial and trade frictions, for example, by quantifying the factors that mitigate the effects of DCP.

Table 2. Philippines: Specification of Shocks

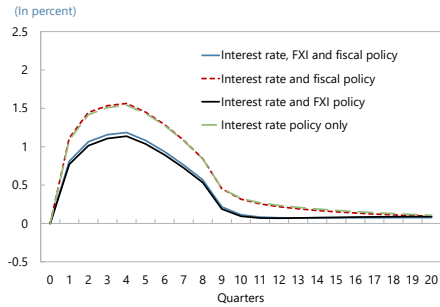
Foreign, Inflation, Domestic Risk Premium Shocks	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 5	Qtr 6	Qtr 7	Qtr 8
Same for scenarios 1 and 2, in quarterly percentage points (ppt):								
Foreign inflation shock	0.30	0.30	0.30	0.30	0.25	0.20	0.15	0.10
Foreign wage inflation shock	0.30	0.30	0.30	0.30	0.25	0.20	0.15	0.10
Foreign interest rate shock	0.13	0.13	0.06	0.06	-	-	-	-
Domestic inflation shock	0.30	0.30	0.30	0.30	0.25	0.20	0.15	0.10
Domestic wage inflation shock	0.30	0.30	0.30	0.30	0.25	0.20	0.15	0.10
Domestic risk premium shock, quarterly ppt	0.50	-	-	-	-	-	-	-
UIP Risk Premium Shocks								
Scenario 1: UIP risk premium shock, percent	-0.875	-0.725	-0.625	-0.450	-0.300	-0.200	-0.100	0.000
Scenario 2: UIP risk premium shock, percent	-0.938	-0.923	-0.933	-0.886	-0.809	-0.770	-0.720	-0.659
Policy Shocks								
Interest Rate Policy								
Scenario 1: Domestic interest rate shock, quarterly ppt	0.0625	0.125	0.125	0.0625	-	-	-	-
Scenario 2: Domestic interest rate shock, quarterly ppt	0.2188	0.1875	0.1875	0.125	-	-	-	-
Interest Rate Policy + FXI								
Scenario 1: Domestic interest rate shock, quarterly ppt	0.125	0.0625	0.0625	0.0625	-	-	-	-
Scenario 2: Domestic interest rate shock, quarterly ppt	0.2813	0.125	0.125	0.125	-	-	-	-
Interest Rate Policy + Fiscal Policy								
Scenario 1: Domestic interest rate shock, quarterly ppt	0.0625	0.125	0.125	0.0625	-	-	-	-
Scenario 2: Domestic interest rate shock, quarterly ppt	0.2188	0.1875	0.1875	0.125	-	-	-	-
Same for scenarios 1 and 2: Govt. spending shock, percent	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
Interest Rate Policy + FXI + Fiscal Policy								
Scenario 1: Domestic interest rate shock, quarterly ppt	0.125	0.0625	0.0625	0.0625	-	-	-	-
Scenario 2: Domestic interest rate shock, quarterly ppt	0.2813	0.125	0.125	0.125	-	-	-	-
Same for scenarios 1 and 2: Govt. spending shock, percent	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6

Note: The behavior of the foreign economy is the same under both scenarios.

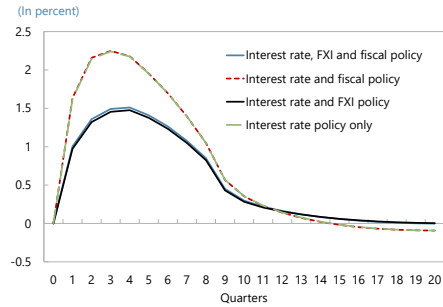
¹⁵ IMF 2020, page 3.

Figure 1. Downside Risk and Policy Scenarios

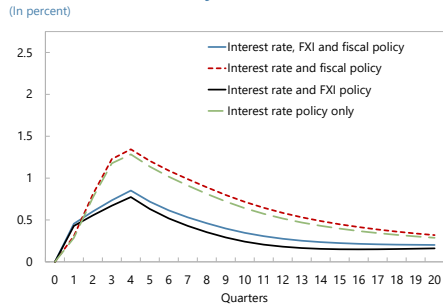
Scenario 1: Domestic Core Inflation



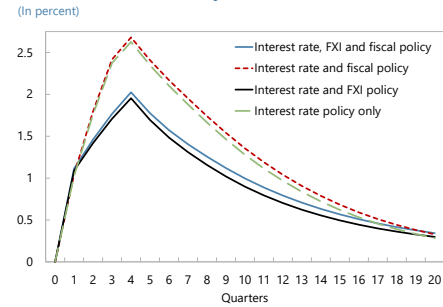
Scenario 2: Domestic Core Inflation



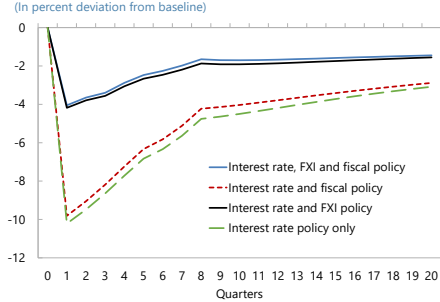
Scenario 1: Nominal Policy Interest Rate



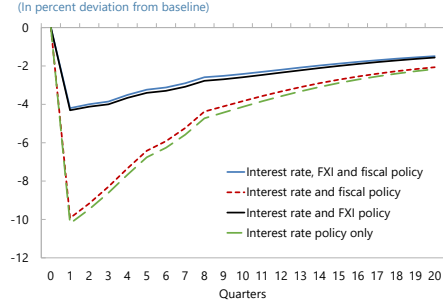
Scenario 2: Nominal Policy Interest Rate



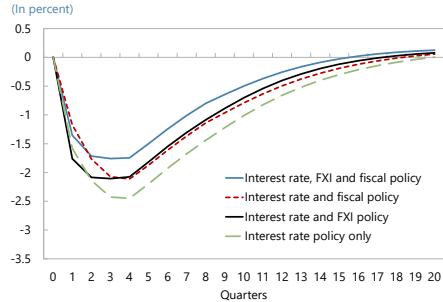
Scenario 1: Nominal Exchange Rate



Scenario 2: Nominal Exchange Rate



Scenario 1: Output Gap



Scenario 2: Output Gap

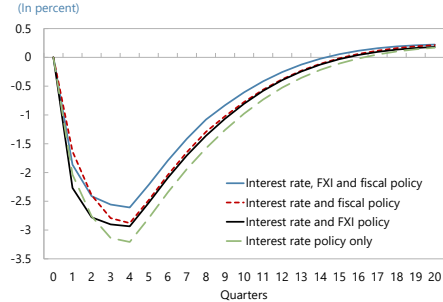
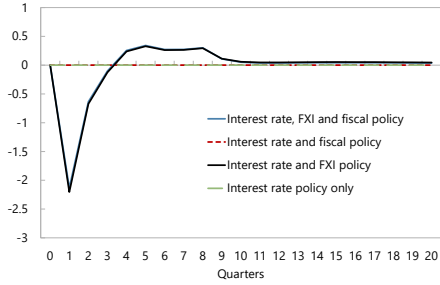


Figure 1. Downside Risk and Policy Scenarios (Concluded)

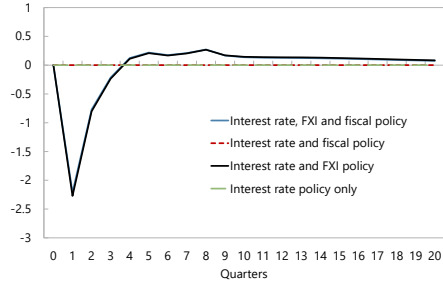
Scenario 1: Foreign Exchange Intervention

(In percent of GDP)



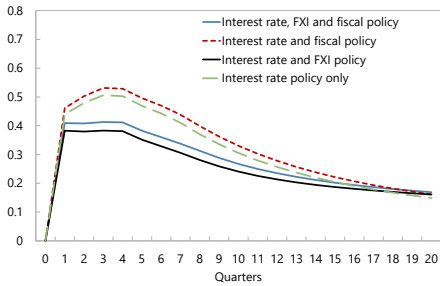
Scenario 2: Foreign Exchange Intervention

(In percent of GDP)



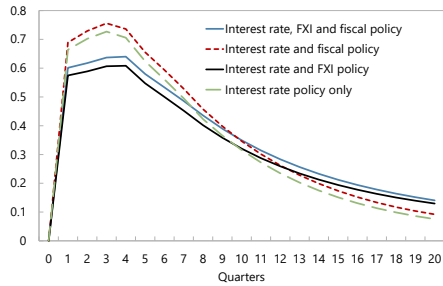
Scenario 1: Long Term Interest Rate

(In percent)



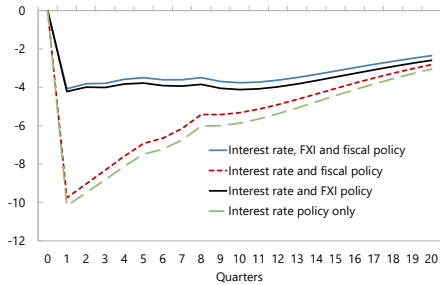
Scenario 2: Long Term Interest Rate

(In percent)



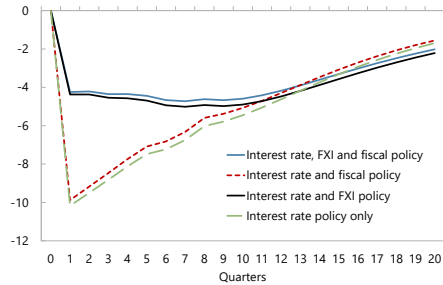
Scenario 1: Real Exchange Rate

(In percent deviation from baseline)



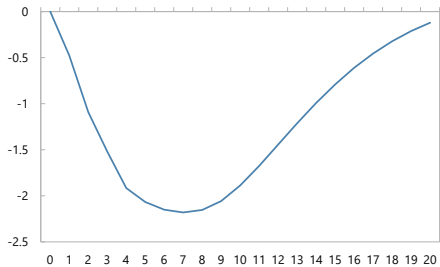
Scenario 2: Real Exchange Rate

(In percent deviation from baseline)



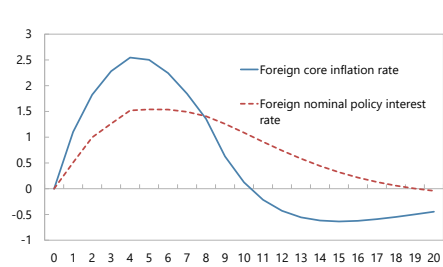
Foreign Output Gap

(In percent)



Foreign Core Inflation Rate and Policy Interest Rate

(In percent)



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REVENUE MOBILIZATION IN THE PHILIPPINES¹

While the Philippines has improved its tax-to-GDP ratio over the past decade, its tax revenue collection remains modest compared to its level of development. In 2018, the Philippines initiated a Comprehensive Tax Reform Program (CTRP) to provide a more sustainable stream of revenues, but progress has been limited due to offsetting measures included in subsequent packages. The narrowing of the fiscal space due to the COVID-19 pandemic has also added to the urgency of identifying new tax revenue measures. This paper shows that the Philippines has the scope to increase revenue collection from all major categories of taxes, including VAT, PIT and CIT. It also discusses specific tax measures that could mobilize revenues in the near-to-medium term to help secure resources for the authorities' development plans.

A. Overview of Tax Revenue Performance

1. The Philippine authorities are committed to undertaking fiscal consolidation to rebuild fiscal space and bring debt below their indicative threshold of 60 percent of GDP. Boosting tax revenue would be an important part of this medium-term fiscal strategy without having to reduce productive infrastructure investment and expenditure on priority development areas. While the national government tax-to-GDP ratio has significantly improved over the last decade—by almost 3 percentage points of GDP in 2010–19 to 14 percent in 2020 and 14.1 percent in 2021—it remains below the average for the Asia-Pacific countries and lower middle-income countries. Its tax effort is estimated to be only 75 percent as of 2021, among the lowest in Southeast Asia.² There is room for the Philippines to increase its tax-to-GDP ratio by at least 3 percentage points in the near to medium-term to realize its tax potential.³ In the medium to long term the Philippines should work towards raising at least 20 percent of GDP through taxes to meet the UN Social Development Goals by 2030.⁴

2. The Philippines has undertaken several important reforms through the Comprehensive Tax Reform Program (CTRP). Those that are most notable include: 1) restoring the efficiency of excise taxation through higher tax rates on alcohol, tobacco and fuels (including coal), revamping the taxation of passenger cars and new taxes on sugar-sweetened beverages; 2) reducing the labor income tax while improving its progressivity due to a higher threshold (basic personal allowance) and revised tax rates schedule; 3) increasing the taxation of capital income; 4) reducing the CIT rate

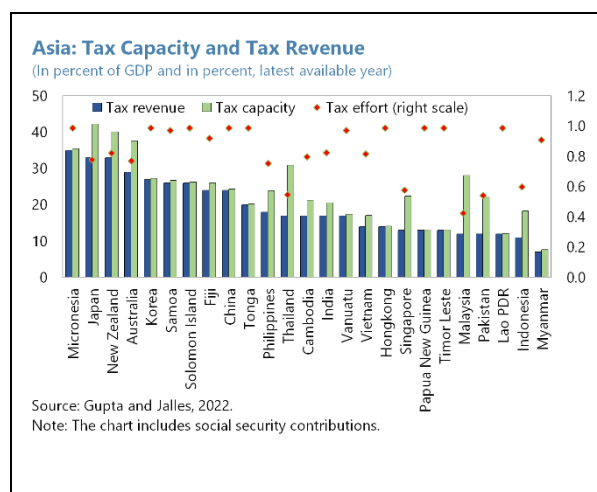
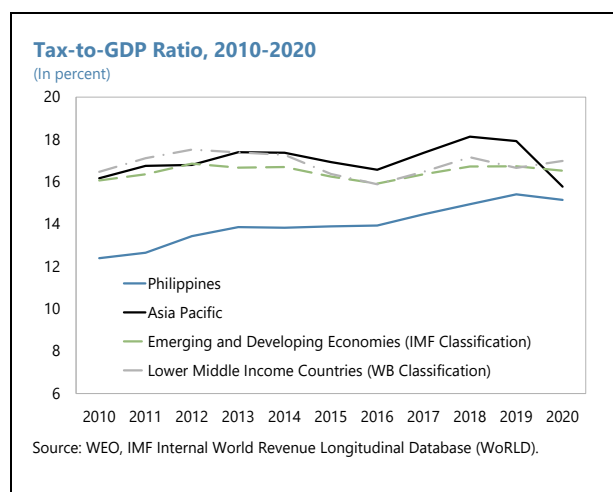
¹ Prepared by Sarwat Jahan and Artur Swistak. We would like to thank the Philippine authorities for their constructive comments.

² Tax effort is the actual tax revenue collections as a share of tax capacity, which is the maximum theoretical level of tax revenues that a country can mobilize given its structural characteristics. This is also known as the tax frontier. Tax effort and tax capacity calculations in this SIP include social security contributions. In the Philippines, social security contributions account for around 2.6 percent of GDP (2019-2021 average). For further details of revenue collection composition please see Table 3 in the Staff Report.

³ See Gupta and Jalles (2022), also Fenochietto and Pessino (2013).

⁴ Gaspar et al. (2019) find that emerging market economies will require, on average, an additional 4 percentage points of GDP in spending to achieve SDGs. In this context, they note that for many countries an ambitious but reasonable target would be to increase the tax to GDP ratio by 5 percentage points of GDP in the next decade.

and improving the governance of investment tax incentives; and 5) improving the VAT design, importantly through allowing for immediate crediting of input tax on capital goods and some base broadening.



3. The first three CTRP packages were aimed at improving the Philippines' tax revenue efficiency, and had a marginal impact on revenue mobilization.⁵ The first package, TRAIN (2018), simplified the personal income tax, broadened the VAT base; the second package, TRAIN 2+ (2020) or the sin tax reform laws, increased excise taxes for selected products; and the third package CREATE (2021) reduced the corporate income tax rate from 30 percent to 20 percent for micro, small, and medium enterprises (MSMEs) and to 25 percent for other types of companies. The reduction in tax revenue from CREATE, though having made the Philippines more regionally competitive, has somewhat offset the increase in tax revenue from TRAIN, reducing the efficacy of the CTRP in generating a sustainable revenue stream. Further reforms—focusing on improvements to property taxes and capital income taxation—have been prepared and await parliament's approval and implementation.⁶ The tax yield from these measures is expected to be limited.

B. Room for Revenue Mobilization

4. A thorough assessment of the Philippine tax system will be required to identify further avenues for improving its efficiency, equity, and simplicity. In this respect, an in-depth diagnostic exercise conducted by an IMF Technical Assistance mission could provide guidance on tax reforms measures at a more granular level, including a detailed analysis of measures to improve tax administration and their impacts on revenue collection. While awaiting such analysis, several high-level recommendations to boost revenue mobilization can be made, mostly building on cross-country comparisons. The following section discusses major weaknesses and areas for

⁵ For a detailed description of 2018-21 tax reforms in the Philippines please consult SIP 2021 (Philippines' fiscal space after responding to COVID-19 pandemic), p.19.

⁶ These are the Passive Income and Financial Intermediary Taxation Act (PIFITA), and Real Property Valuation and Assessment Reform Act.

improvement with regards to key components of the Philippine tax system: Personal Income Tax, Corporate Income Tax, Value Added Tax, and excise taxes.⁷

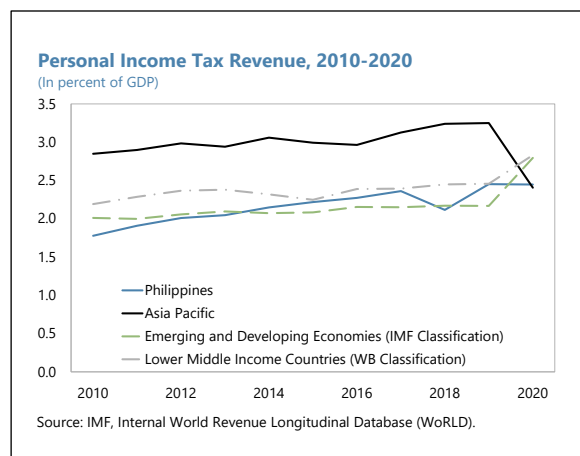
Personal Income Tax

5. The revenue yield from PIT can be enhanced through a further broadening of the tax base and improving compliance. With a top marginal rate of 35 percent, at par with Thailand and Vietnam, the Philippine PIT appears more productive, implying a more progressive rate structure, broader base and/or better compliance and administration.⁸ The PIT base could be further

broadened through the removal of various exemptions including (i) certain emoluments, e.g., bonuses, 13th salary, loyalty awards, in-kind benefits, etc.; (ii) pensions and various social security and health benefits⁹ and, (iii) limiting certain deductions e.g., on donations and credits.¹⁰

Expanding the base of business income, for example through enhanced enforcement of the 8-percent flat tax available to small and micro businesses, would also improve PIT revenue efficiency by ensuring that good anti-avoidance

measures are in place prohibiting movement between different tax regimes. Tax collection of capital income can be improved by harmonizing and reducing the tax rates across all categories of income including dividends, interests, capital gains, rental income, and royalties among others, as planned and awaiting parliamentary approval. Removing unnecessary exemptions (e.g., long term government securities) and reduced rates (e.g., dividends from resident companies) would further boost revenues.



6. While the Philippines has one of the most progressive PIT in ASEAN, there is room for further improvement. The 2018 TRAIN reform reduced the effective PIT rates for individuals (except for those with income exceeding 12 million pesos.)¹¹ Personal allowance and additional exemptions

⁷ These recommendations are neither final nor exhaustive and can be further explored through the technical assistance mission, if requested. Additionally, the Philippines' tax system encompasses a myriad of other taxes (e.g., turnover taxes for small and micro businesses, bank and insurance premium taxes, estate and donors' taxes, etc.) that need further analysis too.

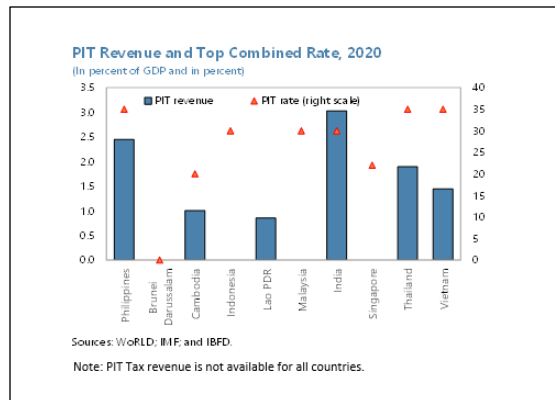
⁸ The 2018 TRAIN reform simplified the PIT rate schedule while increasing the top marginal PIT rate from 32 to 35 percent. Productivity refers to the amount of revenue produced by 1 percentage point of tax.

⁹ The Philippines appears to impose an EEE system, where pensions are not taxed at all—neither at the contribution stage (TEE), nor payment stage (EET). Further analysis is required in this regard.

¹⁰ Credit refers to contributions to Personal Equity and Retirement Account (up to 5 percent of contribution can be taken as PIT credit, i.e., deduction against tax liability).

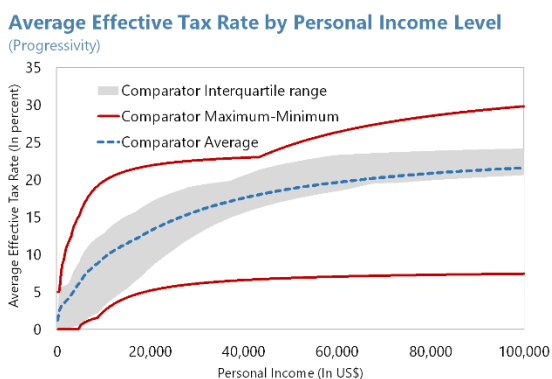
¹¹ The effective PIT rate would reach the pre-TRAIN level only for individuals earning more than 12 million pesos annually. While the statutory top rate—increased from 32 to 35 percent—applies to income exceeding 8 million pesos, the effective rate dropped by 1.6 percentage points (due to much lower taxation of income below the 8 million peso threshold) and reaches pre-TRAIN level only at income level greater than 12 million pesos.

for dependents were also replaced with a zero-rate band for taxable income (deduction method). PIT's progressivity could be further improved by switching its computation from a deduction to a credit method, where the value of the basic exemption (zero-rate band) does not increase with income and remains equal for all taxpayers. Such a switch would be a revenue boosting measure without any need to adjust headline rates.

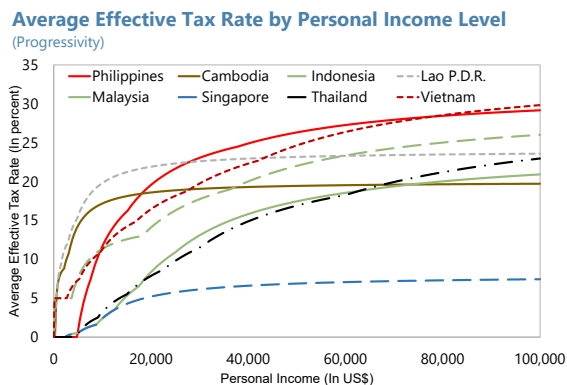


Personal Income Tax: Progressivity

The Philippines performs well compared to its peers on the progressivity of PIT.

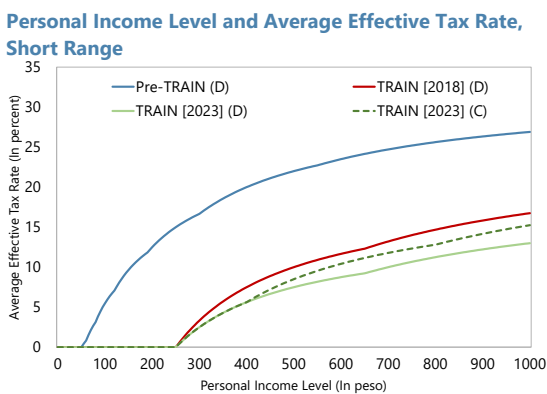


Source: IMF staff estimates using IBFD data.

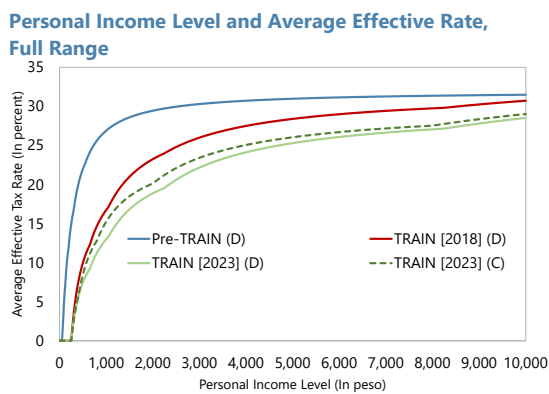


Source: IMF staff estimates using IBFD data.

PIT progressivity can be enhanced further by switching PIT calculation from the deduction (D) to a credit method (C).



Source: IMF staff calculations.

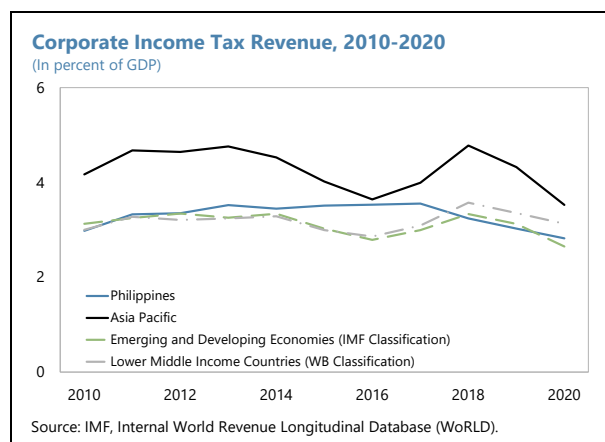
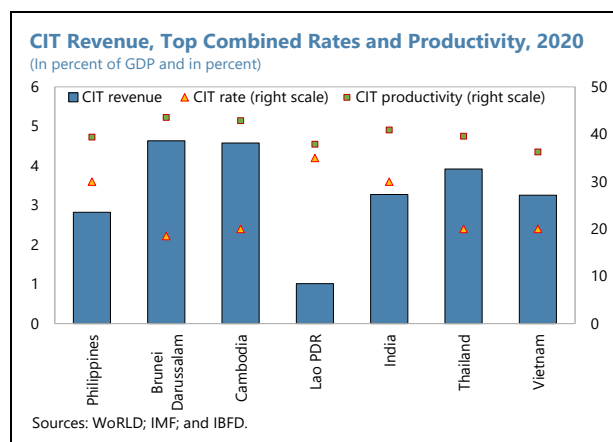


Source: IMF staff calculations.

Corporate Income Tax

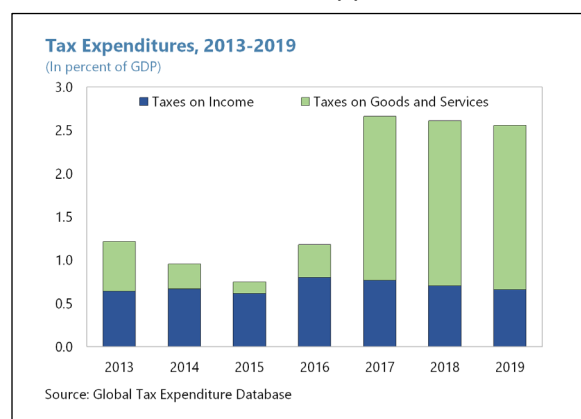
7. The CIT is characterized by low revenue productivity and revenue collection. In 2020, before the CREATE reform package reduced the CIT rate to 20 percent for MSMEs and 25 percent for other types of companies, CIT raised revenues of less than 0.1 percent of GDP per each percentage point of the rate. This level of CIT productivity compares unfavorably with some countries in the

region. The low revenue productivity could be indicative of a relatively narrow tax base and other generous tax incentives. Heightened base erosion and profit shifting practices can be another contributing factor, where enhanced anti-avoidance measures and improved enforcement can further increase the CIT productivity.



8. Rationalizing investment tax incentives will be a critical step towards improving CIT revenue efficiency.

According to the Global Tax Expenditure Database, the Philippines's investment tax incentives (tax holiday) cost on average 0.7 percent of GDP in revenue foregone during 2013-2019. The 2021 CREATE reform improved the overall governance of granting tax incentives (by consolidating the power of granting them to the Fiscal Incentives Review Board chaired by the Department of Finance and Department of Trade and Industry) but more can be done to limit its generosity. In fact, the reform extended the duration of tax holidays from six to seven years. In addition, while the availability of the preferential 5-percent gross income tax (offered after the expiry of tax holidays) was reduced from infinity to ten years, investors were offered enhanced deductions after that period.¹² The reform of tax incentives should focus on abolishing tax holidays and incentivizing investment through cost-based mechanisms, e.g., expensing of capital spending.



9. Improving cross-border tax architecture will be important, too.

The priorities among the list of measures recommended by the Base Erosion and Profit Shifting (BEPS) Final Reports and the Two Pillar Solution include introducing rules that enable the Bureau of Internal Revenue (BIR) to

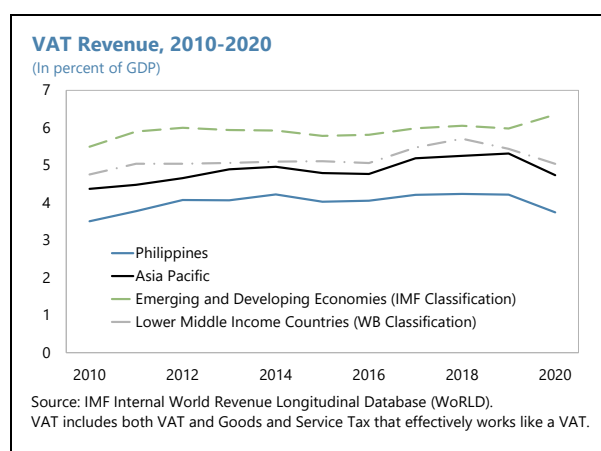
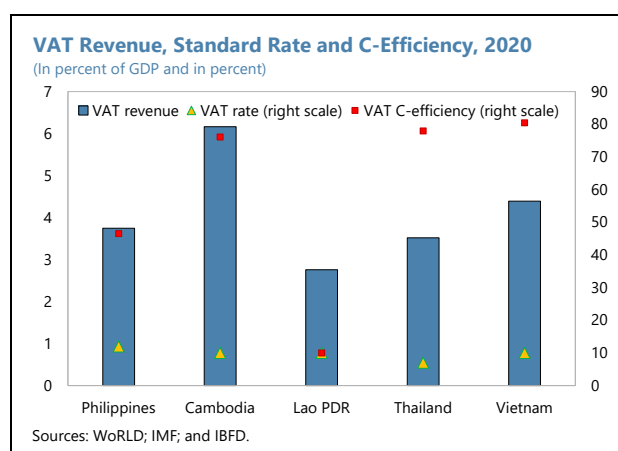
¹² Companies that were granted income tax holiday and 5 percent tax on gross income prior to the implementation of the CREATE law are allowed to continue the tax holiday for the period specified in the terms and conditions for their registration and avail the 5 percent tax incentives for 10 years. After this transitory period, existing companies have the option to reapply for tax incentives (5 percent special tax rate or enhanced deduction), provided that their businesses activity is listed under the Strategic Investment Priority Plan (SIPP), and there is a qualified expansion, entirely new project, or additional investment.

counter base erosion and profit shifting—including through an anti-earning stripping rule and strengthening BIR’s capacity to implement transfer pricing rules—can help deter tax avoidance by multi-national enterprises and improve CIT revenue efficiency.

Value Added Tax

10. There is significant scope to improve revenue collection from VAT as well as increase its efficiency. The Philippines’ revenue collection from VAT remains significantly below averages for emerging market economies and lower middle-income countries. Accounting for the fact that the VAT rate in the Philippines (12 percent) is higher than the ASEAN average (9 percent), points to major weaknesses in the VAT design. It also has one of the lowest C-efficiency in the region, where the C-efficiency denotes, the extent to which final consumption is taxed.¹³ In 2020, the Philippines’ C-efficiency was 0.35 (compared to 0.66 in Cambodia and 0.71 in Thailand), implying that the VAT captures only a third of its potential tax base. Domestic VAT collections are especially weak—while the VAT effective rate on imports is 7.8 percent (65 percent efficiency), little is collected domestically relative to the underlying base.

11. Improving VAT efficiency offers an efficient tool for boosting government revenue. Bringing its C-efficiency to the worldwide average for upper middle-income countries (of around 0.6) would nearly double VAT collections (over 7 percent of GDP). This can be achieved by eliminating widespread exemptions and zero-ratings, including those for businesses, senior citizens, and the public, and extending VAT to new, so far untapped, tax bases: digital goods and services (see section C and Text Table therein), real property, and financial services. Improving the general design of the VAT, including through adopting modern anti-avoidance rules, and enhancing VAT administration and compliance would further improve revenue efficiency. Base-broadening measures should be favored over any rate increases because of their less adverse impact on efficiency and drag on economic growth. In particular, taxing digital goods and services would boost revenue and improve VAT equity.

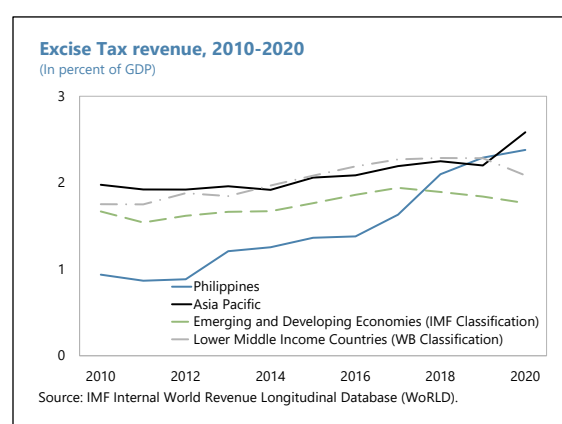


¹³ C-efficiency is calculated as a ratio of actual VAT revenues to the product of the standard VAT rate and final consumption.

12. The high level of remittance flows in the Philippines underlines the need for more reliance on consumption taxes, including VAT. The VAT serves as a proxy tax for taxing otherwise not taxed remittances. It is also an efficient tool in taxing informal consumption¹⁴ A broad-based VAT would greatly serve these goals. Concerns related to its adverse impact on the poor should be addressed through progressive income taxation and expenditure measures (direct transfers). On balance it is a more efficient approach to collect VAT from all consumers and direct a portion of these collections towards social assistance. Any VAT exemption benefits more—in nominal terms—the richer households for they spend more on the exempt goods and services than those worse-off. Strengthening social safety nets will also provide the Philippines the means to subsidize the poor outside the VAT system (see IMF 2019, Chapter I).

Excise Taxation

13. The Philippines has significantly increased its excise tax revenue, in part due to the 2018 TRAIN and 2020 sin tax reform laws. These laws increased the excise tax rates of several products including petroleum, coal, alcohol, tobacco, and cigarettes, and introduced excise taxes on sweetened beverages and electronic cigarettes. As a result, the excise tax collection has reached the Asia-Pacific average in recent years.



14. Despite many commendable reforms under TRAIN, the changes in the taxation of passenger vehicles should be revisited. From 2003 the Philippines moved away from taxing passenger cars based on the engine size (a proxy of negative externalities related to the adverse impact on the environment and roads' wear and tear) towards a tax on the value of cars. While such a tax is more aligned with ability to pay (and thus adding to the overall tax system progressivity), it compromises the main objective of a Pigouvian tax—reducing consumption of goods with negative externalities, and the ease of enforcing an excise tax which is usually based on objective and easily measured criteria (engine size and/or age of car cannot be as easily manipulated as its value, especially for used imported cars). Importantly, cars of low value (typically old cars) might be more damaging to environment, infrastructure, and traffic safety than newer cars. In addition, pick-ups and motorcycles are not taxed under the ad valorem excise tax (see next section on proposed tax measures to remedy this shortcoming). A thorough review of tax treatment of vehicles is warranted. Moving away from a luxury tax (like the long phased out VAT on luxury goods) to an environment tax (one-off registration tax or excise, potentially coupled with recurrent circulation tax, akin to the current motor vehicle road user charge), ideally

¹⁴ Informal consumption refers to Consumers' purchases from informal /non-VAT registered establishments (e.g., various markets, directly from small agriculture producers, etc.)

taking into account both CO₂ emissions and road congestion, should be favored.¹⁵ An assessment, including on the revenue impact of such a policy change, would be needed before implementation.¹⁶

15. The Philippines should also explore options for using excise taxes on telecommunication services. In the absence of any other tax measures that capture excess profits in the telecommunication sector, excise taxes offer a relatively straightforward and efficient mechanism to tap into a large and relatively inelastic tax base to help mobilize additional revenue (Matheson and Petit, 2017).¹⁷

C. Specific Proposals for Revenue Mobilization

16. The authorities have significant scope to raise additional tax revenue through specific measures. The authorities have selected several new tax reform measures for implementation in 2023. They include adjustments to the mining fiscal regime¹⁸, extending the VAT to digital goods and services (text table on design challenges and country experiences), a new excise tax on single use plastic bags, and adjusting the tax on pre-mixed alcoholic beverages—altogether estimated to raise 20.3 bn peso (or 0.08 percent of GDP) annually in additional revenue. The authorities also aim to proceed with the remainder of the CTRP reform (proposals tabled in the Legislature by the previous administration), i.e., streamlining capital income taxation (a single 15-percent tax on passive income) and enhanced valuation rules for property tax purposes.¹⁹ They will also continue implementing measures already enacted under the TRAIN, notably further rate increases of sin taxes (excise taxes on alcohol and tobacco, including heated tobacco and vapor products). They have also taken digitalization and modernization initiatives to raise additional revenues.

17. There are many commendable tax measures proposed by the previous administration that the authorities could consider for implementation. The measures include those related to VAT base broadening, upward adjustment of traditional excises, and potential plans to adopt carbon taxation.²⁰ Further refining of excise taxation, including on energy products, eliminating exemptions

¹⁵ The TRAIN law provides for lower excise tax rates for hybrid and electric vehicles.

¹⁶ See discussion on transportation mitigation measures in Chapter III—Selected Issues Paper on *Addressing Climate Change Mitigation in the Philippines: Role of Carbon Pricing*.

¹⁷ The various fees and charges, imposed on companies operating in telecommunication sector for regulatory reasons, should not be seen as a proxy for taxing rates.

¹⁸ The House of Representatives' Committee approved in August 2022 a bill introducing several changes to the mining tax regime, including: (i) an increase in royalty rate to 5 percent, (ii) a new 10-percent export tax on unprocessed ores, and (iii) ring-fencing by a mining project. The reform package would benefit from further review to ensure efficiency and progressivity of the mining regime, including through more reliance on profit-based instruments and moving away from export taxes.

¹⁹ Both bills have been approved by the House of Representatives and are pending in the Senate. While the revenue impact of streamlining capital income taxation (and phasing out the stock exchange tax and the IPO tax) is expected to be revenue neutral, the enhanced valuation of property is estimated to yield 18-26bn pesos (0.8-0.11 percent of GDP). The latter would accrue to local governments and have no direct impact on the national government revenue. However, it might alleviate pressure on transfers to local governments.

²⁰ See Chapter III—Selected Issues Paper on *Addressing Climate Change Mitigation in the Philippines: Role of Carbon Pricing*—for more details.

on motorcycles, and introducing a recurrent motor vehicle tax are viable options for revenue mobilization and improved efficiency. Improving tax administration and tax compliance, including through enhanced transfer pricing rules, fuel marking and e-receipts, is also a commendable action. Nevertheless, without ensuring a broad VAT base, a meaningful revenue mobilization effort will be difficult to achieve. While the authorities will continue exploring avenues for further revenue mobilization it is important to avoid measures that adversely impact economic efficiency, raise negligible amounts of revenue or are difficult to enforce.

Philippines: Tax Reform Measures		
	PHP billions	Percent of GDP
Baseline: New Measures in 2023	20.1	0.08
Mining Regime	7.9	0.03
VAT on digital services	9.6	0.04
New excise tax on plastic bags	2.4	0.01
Tax on pre-mixed alcoholic beverages	0.4	0.002
Pending CTRP Measures		
Enhanced property valuation (for property tax)	+	+
Streamlined tax on capital income and financial transactions	+	+
Potential Additional Tax Measures 1/		
VAT base broadening (zero-rating and exemptions)	142.5	0.60
PIT base broadening and improved capital income taxation	+	+
CIT streamlined investment incentives	+	+
CIT cross-border taxation	+	+
Motor vehicle user charge	38.3	0.16
Increased excise tax on coal	35.4	0.15
Repeal excise tax exemption for pickups	8.2	0.03
Impose excise tax on motorcycles	+	+
Additional (excise) tax on gaming	13.1	0.06
New excises on cigarettes, e-cigarettes, and SSBs (health tax)	91.0	0.39
Increased excise tax on petroleum	+	+
Excise tax on telecommunication	+	+
Carbon taxation	+	+
Cryptocurrencies (tackling evasion)	+	+
Enhanced transfer-pricing rules	+	+
Tax administration and compliance enhancement	+	+
Total, Potential New Measures	328.5	1.4

1/ The numbers shown in the table are estimates by the previous administration except for the repeal of excise tax exemption for pick-ups which is revised. IMF staff estimate for 2023 GDP is used to calculate the percentage of GDP.

D. Concluding Remarks

18. While the Philippines have implemented commendable reforms under the CTRP, there remains ample scope to enhance revenue mobilization. The national government tax-to-GDP ratio, at 14.1 percent of GDP in 2021, is relatively low, with scope to raise revenues—by at least 3 percentage points in the medium-term—under VAT, corporate and personal income taxes, and excise taxes:

- Reforms under the PIT could include base broadening by removing various exemptions. These measures can be reinforced, as planned, by improving the tax collection of capital income through better harmonizing of tax rates across all categories of income.
- Reforms under CIT include the 2021 CREATE tax package that aimed to improve the overall governance of granting tax incentives. Further reform of investment incentives should focus on abolishing tax holidays, incentivizing investment through cost-based mechanisms, and improving cross-border tax architecture.
- Improving VAT efficiency can be achieved by eliminating widespread exemptions and zero-ratings and extending VAT to new, and so far untapped, tax bases. Base-broadening measures should be favored over any rate increases.
- The TRAIN packages have improved revenue collection from excise taxes. Further reforms could include taxing new products (for example, plastic and telecommunication services) and increasing the breadth of the tax base to avoid unnecessary exemptions. Any reform should exclude policies that are difficult to implement and administer, or that have a negligible revenue impact.

Box 1. VAT on Digital Services: Design Challenges and Country Experiences

The Philippines is considering expanding its VAT base to include taxation of digital services. This is a move in the right direction, and Fund staff — (IMF, 2021) estimate the revenue potential in Asia at around 0.04-0.11 percent of GDP. The overall VAT efficiency improved, ensuring a level playing field between various suppliers and households. Countries around the world, including many in the Asia-Pacific region, have implemented reforms allowing for comprehensive taxation of e-commerce, including digital services by online providers and platforms (see Table below with country experiences in Asia).

While the intention and objectives are clear, it will be of utmost importance for the Philippines to ensure the expanded VAT captures the 'digital' base in a comprehensive way and is easy to administer. While the VAT on digital services does not involve any fundamental change in taxing rights, it requires certain adjustments, typically with respect to the destination principle and the mechanism used to capture services provided by non-residents. In this respect, critical design choices will need to be made, especially with regard to the scope of services subject to VAT and the collection method used (see Brondolo, 2021 for details).

Country/Year of adoption	Threshold	Scope of Services	Collection Method	Reverse Charge for B2B
Australia (2017)	AUS\$75,000	Intangible supplies, anything other than goods or real property	Vendor Collection Model	Yes
Bangladesh (2019)	BDT 30 million	Streaming or download media and web-based services	Collection by local payment provider	Yes
India (2017)	No threshold for nonresidents For Indian residents: INR-10 lakh in annual sales	A service is mediated over the internet or an electronic network and the nature of which renders their supply essentially automated and involving minimal human intervention, and impossible to ensure in the absence of information technology Includes streaming/downloads of music, e-books, films; cloud-based or downloadable software; membership fees to online sites, dating portals; online gambling services; online advertising	Vendor Collection Model	Yes
Indonesia (2020)	Annual revenue 600m IDR, or 50m monthly revenue; and 12,000 users annually/1000 users monthly	Foreign digital service providers and intermediaries included on a government list	Vendor Collection Model	Yes
Japan (2015)	JYP 10 million per annum	E-books, streaming media, apps, cloud-based services and online gaming, services that post online ads; voice and data telephony services are excluded	Vendor Collection Model	Yes
Singapore (2020)	Global annual turnover of at least SDG 1 million, making B2C supplies of digital services to non-GST registered customers in Singapore ex	Supplies of downloadable digital content, subscription-based media, software programs, electronic data management services, support services performed via electronic means to arrange or facilitate transactions, which may not be digital in nature (for example, service or booking fee charged to the suppliers or customers)	Vendor Collection Model	Yes
Thailand (September 2021)	THB 1.8m (more than €60,000) per annum	A service that includes incorporeal property delivered through the internet or other electronic means, where the service is, in essence, performed automatically, and where the service cannot be performed without information technology; focus on streaming services and online games	Vendor Collection Model	Yes
Vietnam (2020)	None	Download or streaming media, apps, e-books and online journals, e-learning, software-as-a-service provisions, gaming, and online gambling	Collection by local payment provider	Yes

Source: IMF (2021).

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ADDRESSING CLIMATE CHANGE MITIGATION IN THE PHILIPPINES: ROLE OF CARBON PRICING¹

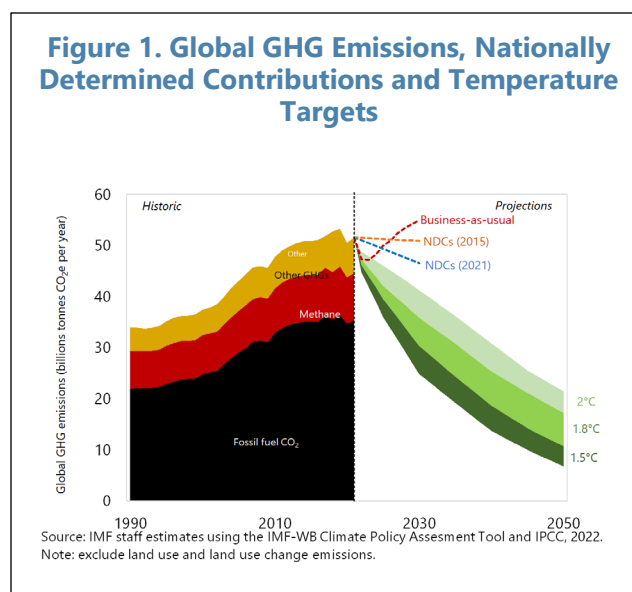
This Selected Issues Paper discusses the potential role of carbon pricing in climate mitigation strategy for the Philippines. The paper provides guidance on the choice between carbon taxes and emissions trading systems (ETSs) and their design. Overall, carbon taxes have significant practical, environmental, and economic advantages due to ease of administration, price certainty which promotes investment, the potential to raise significant revenues, and coverage of broader emissions sources. Carbon pricing schemes are gaining momentum worldwide, including in Asia.

A carbon price rising to US\$50 per tonne in 2030 in the Philippines is modelled for illustration. This policy reduces carbon dioxide emissions 13 percent below baseline levels with half of the reductions coming from the power generation sector. It also raises revenues equivalent to about 1 percent of GDP. Elements of a comprehensive strategy to enhance the effectiveness and acceptability of carbon pricing, as well as alternatives like tradable performance standards, are also briefly discussed.

A. Introduction

1. Limiting global warming to 1.5° to 2°C requires cutting global carbon dioxide (CO₂) and other greenhouse gases (GHGs) 25–50 percent below 2019 levels by 2030, followed by a rapid decline to net zero emissions near the middle of this century (Figure 1). If these emissions reductions are not achieved, it will likely put temperature goals irreversibly beyond reach. For example, under a business as usual (BAU)² scenario to 2030, GHG emissions would need to fall by a (highly unrealistic) 95 percent from 2030 to 2040 for a 1.5°C pathway.

2. Observed global warming to date of 1.2°C is caused by human factors and Philippines is vulnerable to warming given its exposure to natural disasters and long coastline. Warming is already causing a wide range of climate impacts including heatwaves, droughts, floods, hurricanes, higher sea levels, and swings between climate extremes, and the frequency and severity of these impacts will rise as the planet heats up. Moreover, the risks of tipping points in the global



¹ Prepared by Simon Black, Ian Parry, and Karlygash Zhunussova with research assistance from Danielle Minnett. The authors are grateful to Elif Arbatli Saxegaard, Sarwat Jahan, Cheng Hoon Lim, and the Philippine authorities for helpful comments and suggestions.

² BAU refers to a baseline without new, or tightening of existing, mitigation policies.

climate system (e.g., runaway warming from release of methane and carbon in the permafrost, collapse of major ice sheets causing dramatic sea level rises, shutting down of ocean circulatory systems, destruction of the natural world) rise exponentially with warming above 1.5°C.³ Philippines will likely experience a drier dry season, a wetter wet season, and a more prominent northeast monsoon season—typhoons will likely increase in severity and frequency, while sea level rise will put coastal areas at a high risk of flooding and erosion.⁴

3. Philippine’s Nationally Determined Contribution (NDC) currently specifies an unconditional target of cutting GHGs 2.7 percent below baseline levels in 2030 or 75 percent below, conditional on external support. The unconditional target of 2.7 percent is likely to be achieved in the BAU (see below), whereas the 75 percent target is highly ambitious. Hence there is significant uncertainty about the Philippines’ overall objective. Setting a mid-century ‘net zero’ target and then aligning the unconditional target with long-run GHG neutrality would alleviate uncertainty about the Philippines’ mitigation objectives, giving certainty to firms and households on its overall emissions trajectory. In choosing a revised emissions target for 2030, Philippines will need reliable information on: (i) BAU emissions projections at economywide and sectoral level; and (ii) the costs of cutting emissions below BAU levels. Both are sensitive to assumptions about underlying factors (e.g., income elasticities for energy products, future BAU energy prices, fuel price responsiveness). This paper presents analysis based on a spreadsheet tool that is parameterized to the mid-range of the broader energy modelling literature on these factors.⁵

4. Achieving a substantial reduction in emissions will require carbon pricing. Many other countries in the Asian region have either implemented, or are considering, some form of pricing (see below). In the Philippines the Department of Finance is studying the feasibility of pricing, especially a carbon tax, and there is an existing project with the World Bank under the Partnership for Market Readiness on the formulation of an Emission Trading System (ETS). Comprehensive carbon pricing provides across-the-board incentives to reduce energy use and shift to cleaner energy sources and is a critical price signal for redirecting investment to clean technologies. There are many technical issues however in the choice between carbon taxes and ETS. This paper discusses the main issues and how other countries are addressing them and presents an extensive quantitative assessment of the emissions, fiscal, and economic impacts of carbon pricing.

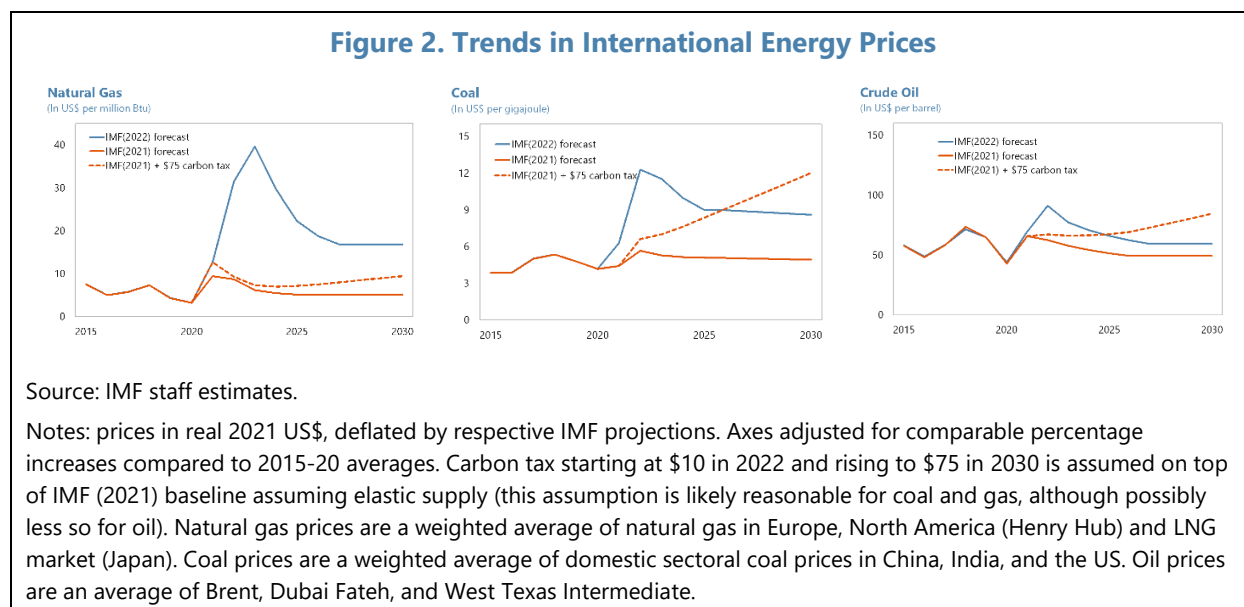
5. Carbon pricing would raise the price of carbon intensive fuels and might be timed to progressively phase in as global energy prices recede from their peak levels. Global gas, coal, and oil prices increased about 700, 180, and 110 percent respectively between mid-2020 and mid-2022 with the recovery in global energy demand, weak energy investment, and disruptions following the Russian invasion of Ukraine. Introducing carbon pricing on top of already high energy prices would be politically very difficult. Projections however suggest that much of the recent price surges will likely be reversed as demand and supply adjust over time. Phasing in a \$75 carbon price on top of these projected (albeit very uncertain) prices would imply 2030 gas and oil prices that are

³ IPCC (2018, 2021).

⁴ WBG (2019).

⁵ Philippines does not at present have sectoral emissions targets.

42 and 12 percent below mid-2022 levels, while coal prices would be 30 percent higher (Figure 2). Indeed, without carbon pricing (or related measures), the impact of higher baseline energy prices is limited, because the price increases are not expected to be permanent and the price of (less CO₂ intensive) gas has increased sharply relative to coal causing switching to the latter.



6. The paper is organized as follows. Section B discusses the rationale for carbon pricing and issues in the design of, and choice between, carbon taxes and ETSs.⁶ Section C provides a quantitative assessment of carbon pricing in the Philippines.

B. Carbon Pricing: Rationale, Instrument Choice, and Design Issues

Rationale

7. Ideally carbon pricing would be the centerpiece of Philippines' mitigation strategy. The most important rationale for carbon pricing is that, if comprehensively applied, it promotes (by reflecting the cost of carbon emissions in the prices of fuels, electricity, and goods) the full range of behavioral responses across households, firms, and sectors for reducing energy use and shifting toward cleaner energy sources. It also ensures the incremental reward for reducing emissions by an extra tonne (the carbon price) is equated across responses, striking a cost-effective balance. In contrast, other mitigation instruments in and of themselves, like emission rate standards and clean technology subsidies, promote a narrower range of behavioral responses. These instruments could be combined in packages that could promote a wider range of responses from pricing—but not all of them (e.g., regulations cannot induce people to drive less). The policy combination would also be more administratively complex and less cost effective (See Box 1).

⁶ This section draws from Parry and others (2022).

Box 1. Behavioral Responses Promoted by Alternative CO₂ Mitigation Policies

Comprehensive carbon pricing promotes the following responses:

- *Power generation*: shifting (both in terms of new investment and the daily dispatch mix) from coal to natural gas, from these fuels to renewables, and perhaps to nuclear and fossil generation with carbon capture and storage;
- *Industry*: reducing CO₂ and electricity intensity (e.g., through alternative heating sources other than coal, enhanced recycling of scrap metal) and output levels;
- *Transportation*: shifting to more efficient internal combustion engine (ICE) vehicles, from ICE vehicles to electric (or other zero emission) vehicles, and reducing vehicle miles travelled; and
- *Buildings*: reducing CO₂ intensity, electricity intensity, and energy demand (e.g., through energy efficient construction, improving the energy efficiency of appliances).

Non-pricing mitigation instruments promote a narrower range of behavioral responses or lagged rather than immediate responses. Even within a sector, these instruments do not promote the full and immediate range of behavioral responses, for example:

- Renewable portfolio standards and feed-in tariffs for renewables only promote shifting from fossil to renewable generation,
- Emission rate regulations, or feebates, for new vehicles reduce emissions from the on-road fleet gradually over time as the fleet turns over (e.g., they do not accelerate retirement of old vehicles) and they do not reduce vehicle miles travelled; and
- Incentives for net zero new buildings reduce emissions from the building stock very gradually (given that typically less than 2 percent of the building stock is replaced each year).

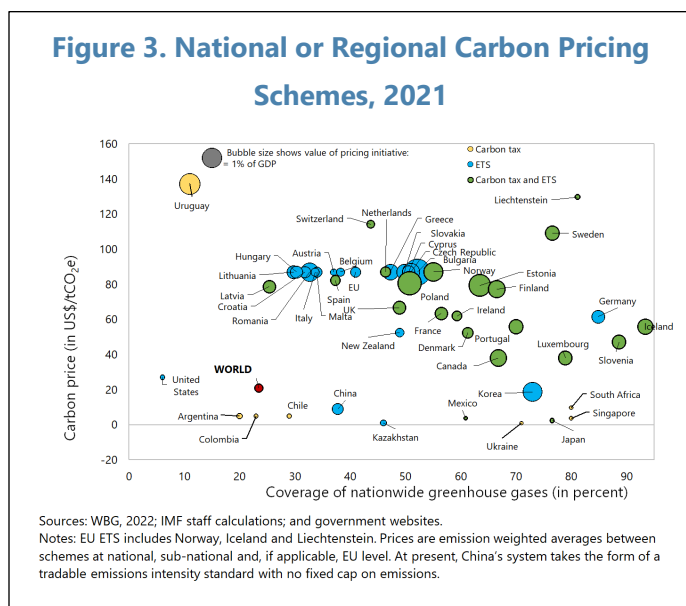
A combination of non-pricing measures across sectors, and across new and existing capital, promotes a wider range of responses. But promoting cost effectiveness can be challenging—for example, regulatory approaches would require deep and liquid credit trading markets across firms, programs, and sectors.

In practice, non-pricing mitigation instruments will be used to complement and reinforce carbon pricing. Although less efficient, non-pricing instruments may have greater acceptability as they avoid significant and politically sensitive increases in energy prices—unlike carbon pricing, they do not involve the pass through of carbon tax revenues or allowance rents into energy prices. Non-pricing instruments like feebates may have a key role in kick-starting de-carbonization of hard-to-abate sectors, particularly transportation and buildings. Policymakers need to strike a balance between carbon pricing (the most efficient but perhaps most politically challenging instrument) and other (less efficient but frequently more acceptable) reinforcing instruments.

8. Carbon pricing has other attractions as it:

- Provides the critical price signal for mobilizing innovation into, and deployment of, clean technologies;
- Mobilizes a valuable source of revenue, which can be used to help meet climate, social, or broader fiscal objectives; and
- Generates domestic environmental co-benefits, such as a reduction in local air pollution mortality (though other mitigation instruments can produce similar benefits).

9. There is increasing momentum for carbon pricing globally and in the Asian region, though there are large cross-country differences in coverage rates and prices. Figure 3 summarizes carbon pricing schemes operating in 45 countries, accounting for national and sub-national pricing initiatives and, for EU countries, the EU ETS—see Annex 1 for further details on pricing schemes. At the national level, 21 carbon taxes and 6 ETSs have been implemented. There are also many sub-national pricing schemes, the largest being California’s ETS. Major pricing initiatives were recently launched in China and Germany, prices in the EU ETS are currently around \$70 per tonne, and Canada has committed to an equivalent US\$140 price by 2030. Other countries in Asia with carbon pricing include Indonesia, Japan, Korea, and Singapore while carbon pricing is under consideration in Thailand and Vietnam. GHG emissions subject to (national and sub-national) carbon pricing however, vary, from below 30 percent in some cases to over 70 percent in others (e.g., Canada, Germany, Korea, Sweden) while economywide average prices in 2021 varied from below \$5 to \$115 per tonne (Sweden). 28 percent of global GHGs are formally subject to pricing and the average price across schemes is \$20 per tonne.



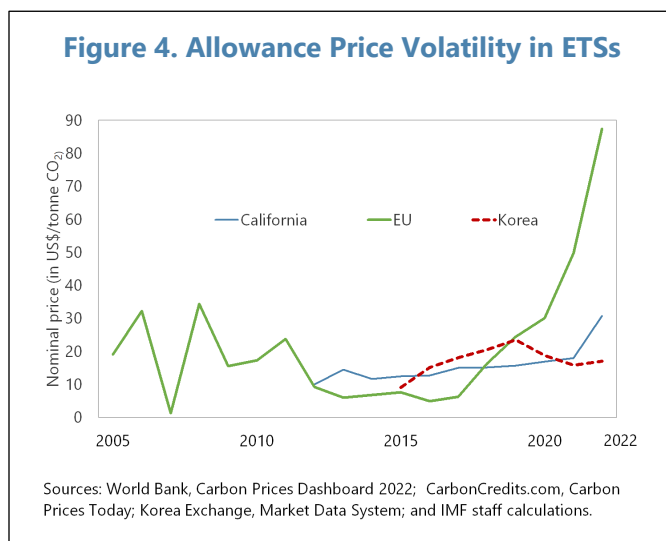
Instrument Choice and Design Issues

10. Carbon taxes (generally under the purview of finance ministries) are easier to administer than ETSs (generally under the purview of environment ministries). Carbon taxes can be integrated midstream (i.e., after fuel refining and processing) into collection procedures for existing fuel taxes and extended to other fossil fuels—fuel taxes are well established in the Philippines (as they are in over 160 countries) and are among the easiest of all taxes to collect. All but one of the 21 existing national carbon taxes are applied midstream (Annex 1). ETSs typically require more sophisticated administration as new capacity is required to monitor both downstream emissions and emissions trading markets. Usually there is a pilot phase to establish emissions measurement, reporting and verification systems, allowances exchange platforms, and to simulate trading. ETSs may have more limited coverage as they have often been applied to large power and industrial firms,⁷ though ETSs can also be applied midstream to transportation and building fuel suppliers (e.g., these sectors are covered in the German and Korean ETSs and are proposed for inclusion in the EU ETS). Although in principle carbon pricing should comprehensively cover CO₂ emissions across all fuels and sectors, in practice pricing emissions from coal, or from the power and

⁷ For administrative reasons, small scale emitters in these sectors are excluded, but their share in emissions is generally modest.

industrial sectors, are usually the biggest priorities as they account for the bulk of emissions reductions under economywide pricing (see below).

11. In their pure forms, carbon taxes provide certainty over emissions prices while emissions are determined by market forces, and vice versa for ETSs. Certainty over emissions is attractive if policymakers want to meet an emissions target in a future year but price uncertainty can deter private innovation in, and adoption of, clean technologies, especially those (e.g., renewables plants) with high upfront costs and long-range emissions reductions. Indeed, allowance prices in ETS schemes in California, the EU, and Korea have shown significant volatility to date (Figure 4). ETSs can however be combined with price stability mechanisms like price floors which can help to provide robust incentives for clean technology investments.⁸ Carbon taxes may need periodic adjustment to maintain progress on emissions goals, so in practice differences between the two approaches may be less pronounced.



12. Revenue raising and using practices may differ across instruments, with carbon tax revenues more likely to be used in general budgets and ETS revenues more likely to be earmarked for environmental purposes. Revenues have been fully used for general purposes in 16 carbon tax schemes and partially or fully earmarked for environmental spending in only five cases (Annex 1). In the early phases of ETSs (e.g., EU, Korea), allowances have been freely allocated to affected firms to help build support for the program and address competitiveness concerns (see below)—however, where free allowances are granted to power generators this can result in large windfall profits as firms may have greater scope for passing allowance prices forward in higher consumer prices.⁹ In other ETS cases (e.g., California, Germany) allowances have been auctioned from the start. Where allowances in ETSs are auctioned, the revenues are more often earmarked for environmental spending—this applies, at least partially, in five of the seven ETS schemes (Annex 1).

13. There is much at stake in terms of economic efficiency in how carbon pricing revenues are used. Productive uses of revenues can produce large gains in economy efficiency which can help to offset the negative effects of higher energy prices on economic activity. For example, using revenues for public investments for Sustainable Development Goals (e.g., in health, education,

⁸ These mechanisms can be implemented, for example, through minimum prices when allowances are auctioned (e.g., in the California ETS there is a reserve price for allowance auctions that rises annually at 5 percent in real terms) (see Flachsland and others (2018) for further discussion of price floor mechanisms).

⁹ Even with free allowances, however, a significant portion of the potential carbon pricing revenues could accrue indirectly to the finance ministry to the extent windfall profits are subject to corporate, and ultimately personal, income taxes.

infrastructure) strengthens the economy. Earmarking revenues for environmental investment can be efficient if such investments are fully integrated in robust public investment management systems. In contrast, returning revenues in universal or targeted lump-sum transfers to households or firms forgoes efficiency benefits (See Annex 2 for further discussion).

14. In principle, a carbon tax and ETS—if applied to the same sectors, with the same price, and prior to allocation of revenues—would impose the same distributional burdens across household income groups. This is because a carbon price generally has the same impact on the price of fuels, electricity, and other consumer goods regardless of whether it takes the form of a tax or an ETS. Distributional burdens, when measured against households' annual consumption, are mildly regressive (i.e., imposing a slightly larger burden relative to consumption on lower income households than wealthier households) in some cases,¹⁰ though the opposite applies, including for the Philippines (see below).

15. An ETS does not provide the same opportunities for addressing efficiency and distributional objectives as carbon taxes if allowances are freely allocated or auction revenues are earmarked. Under carbon tax schemes revenues generally accrue to the general budget (Annex 1). In contrast, under ETSs with free allowance allocations the policy rents are instead reflected in windfall profits for firms receiving those allocations and ultimately the rents may accrue to shareholders and workers in these industries (the former at least are concentrated in higher income households). Revenue from allowance auctions in the German ETS are used for transition assistance to vulnerable households, workers, and regions which largely forgoes efficiency benefits but has helped to enhance the overall acceptability of the ETS.

16. Political economy is a major factor in determining the choice between carbon pricing instruments and their respective designs. ETSs may be more feasible politically than taxes, especially where permits are freely allocated to affected firms. Such firms may wield significant political power due to effective coordination and lobbying of policymakers. Some jurisdictions have progressively reduced free allocations (e.g., 30 percent of allowances in the EU ETS were freely allocated in 2020 compared with 80 percent in 2013). To some degree, carbon taxes can be designed to mimic the effect of free allocation by using revenues for targeted relief to firms.

17. As with all taxes, carbon taxes can be politically challenging to implement, though revenue recycling, communications strategies, and identification of key stakeholders can build support. While carbon taxes (and broader reforms of energy prices) have sometimes faced political backlash from affected firms and citizens, the same can be said for many other reforms to fiscal systems. Additionally, ETSs are not necessarily more or less popular politically with households (e.g., Australia's ETS was repealed in 2014 in response to opposition). However, what does appear to be important for ensuring the durability of carbon tax is effective and inclusive communication alongside pragmatic use of revenues. The anticipation of negative distributional outcomes may create public opposition to carbon pricing and makes the design of targeted support measures (e.g.,

¹⁰ Parry and others (2022), Figure 8.

for low-income households) critical, underscoring the need for thorough analysis (e.g., to quantify the targeted measures required).

18. Under a carbon tax, the government can align the price trajectory with emissions targets, while alignment can be automatic under an ETS. Carbon tax trajectories can be set equal to price paths needed to bring emissions in line with mitigation targets, which can be inferred with some confidence for the near to medium term from estimates of future BAU emissions and the responsiveness of emissions to pricing.¹¹ Periodic forward-looking adjustment of tax rates can maintain alignment with emissions goals. For an ETS, price alignment is automatic if the emissions cap is set to meet a country's mitigation commitment (e.g., the EU ETS cap is reduced by 2.2 percent a year in line with 2030 emissions targets for the power/industrial sector).

19. Carbon taxes are more compatible with reinforcing mitigation instruments and variants of them may be more practical for other sectors beyond energy. Overlapping instruments (e.g., feebates) that reinforce some of the mitigation responses of pricing will be needed for hard-to-abate sectors like transportation and buildings. When combined with a carbon tax, these instruments reduce emissions without affecting the tax rate. In contrast, under a pure ETS with emissions fixed by the cap, overlapping instruments reduce the emissions price without affecting emissions. As discussed in Annex 3, carbon tax variants can also be extended to broader emissions sources like forestry.

20. ETS may have their own appeal, however. ETSs help achieve emissions targets with more certainty, are a more natural instrument where mitigation policy is under the purview of environment ministries, and free allowance allocation may help to garner industry support.

21. In principle, ETSs and carbon taxes exist on a continuum and can theoretically be designed to replicate each other. For example, an ETS with a price floor and/or a price ceiling makes the ETS look more like a carbon tax, loosening the quantity restriction on emissions (and hence the emissions certainty) to enhance price certainty within the system. However, in practice, the choice between ETSs and carbon taxes remains substantive, with the choice usually determining key design choices of the carbon price instrument (e.g., whether it is midstream or downstream, raises revenues, or fixes emissions quantities or prices). Table 1 provides a summary comparison of carbon taxes and ETSs.

22. Under a hybrid approach, an ETS could address emissions from the power and industry sector and the carbon tax could address emissions from the transportation and building sectors. These hybrid approaches have been used elsewhere—for example, in the EU power and industry sectors, emissions are covered by the EU-wide ETS while several member states (e.g., Denmark, Finland, France, Ireland, Portugal, Sweden) have applied national carbon taxes to the transportation and building sectors. Cost effectiveness would require aligning carbon prices across tax rates and ETSs, for example by setting a trajectory of price floors under the ETS equal to the

¹¹ Emissions projections boil down to assumptions about future GDP growth, income elasticities for energy products, rates of technological change (e.g., that improves energy efficiency or the productivity of renewables), and future energy prices.

trajectory of carbon tax rates. It would generally not make sense to apply a carbon tax and ETS to the same emissions base as this would duplicate administration and the tax may simply lower the price of emissions allowances without affecting emissions (if they are fixed by the cap).

Table 1. Philippines: Summary Comparison of Carbon Taxes and ETSs

Design Issue	Instrument	
	Carbon Tax	ETS
Administration	Administration is more straightforward (for example, as extension of fuel taxes)	May not be practical for capacity constrained countries
Uncertainty: price	Price certainty can promote clean technology innovation and adoption	Price volatility can be problematic; price floors, and cap adjustments can limit price volatility
Uncertainty: emissions	Emissions uncertain but tax rate can be periodically adjusted	Certainty over emissions levels
Revenue: efficiency	Revenue usually accrues to finance ministry for general purposes (for example, cutting other taxes, general investment)	Free permit allocation may help with acceptability but lowers revenue; tendency for auctioned revenues to be earmarked
Revenue: distribution	Revenues can be recycled to make overall policy distribution neutral or progressive	Free allowance allocation or earmarking may limit opportunity for desirable distributional outcomes
Political economy	Can be politically challenging to implement new taxes; use of revenues and communications critical	Can be more politically acceptable than taxes, especially under free allocation
Competitiveness	Border carbon adjustment more robust than other measures (for example, threshold exemptions, output-based rebates)	Free allowances effective at modest abatement level; border adjustments (especially export rebate) subject to greater legal uncertainty
Price level and emissions alignment	Need to be estimated and adjusted periodically to align with emissions goals	Alignment of prices with targets is automatic if emissions caps consistent with mitigation goals
Compatibility with other instruments	Compatible with overlapping instruments (emissions decrease more with more policies)	Overlapping instruments reduce emissions price without affecting emissions though caps can be set or adjusted accordingly
Pricing broader GHGs	Amenable to tax or proxy taxes building off business tax regimes; feebate variants are sometimes appropriate (for example, forestry, maritime)	Less amenable to ETS; incorporating other sectors through offsets may increase emissions and is not cost effective
Global coordination regimes	Most natural instrument for international carbon price floor	Can comply with international price floor; mutually advantageous trades from linking ETSs but does not meet global emissions requirements

Source: IMF staff. Green indicates an advantage of the instrument; orange indicates neither an advantage or disadvantage; red indicates a disadvantage of the instrument.

23. Carbon taxes or ETSs would allow countries to participate in internationally coordinated pricing regimes, for example among Southeast Asian countries. International price coordination facilitates a scaling up of carbon pricing by addressing concerns about competitiveness and policy uncertainties that can deter countries when they act unilaterally. Pricing might be established initially for the power and industry sectors, given that most emissions reductions would come from these sectors. International price coordination requirements would be most naturally met through a carbon tax but ETSs could be accommodated (as they are under the prototype federal pricing requirements in Canada) by underpinning the ETS with a floor price or by setting caps to generate expected domestic emissions prices in line with international pricing requirements.¹²

¹² Regional price coordination could also be built up through linking existing ETSs, but there are downsides. Linking (where permits traded under one ETS are allowable under another) would theoretically promote cost effectiveness at the regional level through harmonizing permit prices across countries. However, linking also perpetuates design characteristics (e.g., a carbon price ceiling in one ETS becomes the price ceiling in the linked ETS), reduces the ability of governments to achieve domestic targets, and can create significant administrative complexity and uncertainty.

Tradable Emission Rate and Feebate Alternatives for Power and Industry

24. A tradeable performance standard (TPS) for the power and industry sectors would not raise revenue but would address competitiveness concerns and promote many of the behavioral responses of carbon pricing. Under this approach, the government could set a required CO₂ emission rate per unit of output for each major industry, and power generation, and all firms within the industry are required to meet the industry standard—though firms can fall short of required standards if they buy sufficient credits from other firms that exceed those standards. Indeed, credits could be tradable across the firms in different industries, which will promote a common credit price and equalization of incremental abatement costs across industries. A TPS can promote the same behavioral responses to reduce emissions intensity as under carbon pricing, but it does not promote the same consumer demand response because there is no pass through of carbon tax revenue or allowance rents into higher prices for electricity and industrial products. IMF staff calculations suggest that about 77 percent of the emissions reduction in the power sector under carbon pricing in Philippines would come from reductions in emissions intensity and 23 percent from a reduction in electricity demand. Canada has successfully implemented a federal TPS (applying for the industrial sector and where provincial/territorial polices for industrial emissions are not applied.)¹³

25. Feebates are the fiscal analogue of a TPS. Feebates apply a sliding scale of fees on firms in an industry with emission rates above a pivot point emission rate for the industry and a sliding scale of rebates for firms with emission rates below the pivot point.¹⁴ If the pivot point—which is determined by the government—is set equal to the industry average emission rate, and updated over time, the feebate will be approximately revenue neutral. Feebates automatically promote cost effectiveness within an industry without the need for trading markets as all firms face the same incremental reward for reducing emissions—the emissions price in the feebate. Furthermore, emission prices can be harmonized across different feebate schemes to promote cost-effectiveness across industries. Like TPSs, feebates do not charge the average firm for their remaining emissions and therefore do not promote consumer demand responses.

26. The pros and cons of feebates versus TPSs are mostly analogous to those for downstream taxes and ETSs. Feebates:

- Provide certainty over the emissions price, while regulations provide certainty over the industry-wide average emissions rate;

¹³ See www.canada.ca/en/services/environment/weather/climatechange/climate-action/pricing-carbon-pollution/output-based-pricing-system.html.

¹⁴ Specifically, firms in an industry would be subject to a fee equal to a CO₂ price, times the difference between their CO₂ per unit of output and the industry wide pivot point CO₂ per unit of output, times the firm's production level. Elements of feebates are common in vehicle tax systems to promote penetration of cleaner vehicles. See Parry (2021) for a broad discussion of feebates.

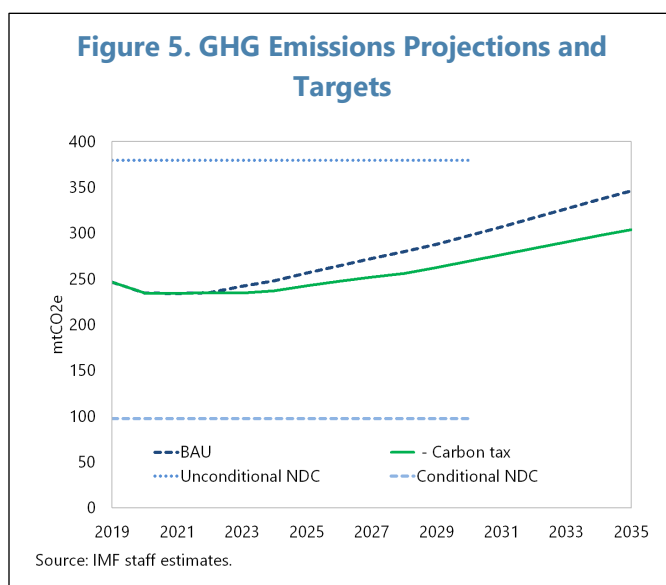
- Are automatically cost effective across firms within industries and across industries (if feebate prices across schemes are harmonized), while tradable emission rate standards require liquid credit trading markets with a significant number of market traders to be cost effective;
- Are compatible with overlapping policies as they provide ongoing incentives for all firms (regardless of whether they are paying fees or receiving rebates) to cut emissions.

Again, however, TPSs can be made more feebate-like by combining them with out-of-compliance fees, and subsidies for going beyond standards, and for firms not participating in credit trading.

C. Quantitative Assessment of Carbon Pricing in the Philippines

27. The quantitative assessment of carbon pricing is based on the Climate Policy Assessment Tool (CPAT). CPAT is a spreadsheet-based model providing projections of fuel use and GHG emissions for the major energy sectors in 188 countries. The impacts of carbon pricing and other mitigation policies depend on their proportionate impacts on future fuel prices and the price responsiveness of fuel use in different sectors. The former is based off international energy price forecasts (Figure 2) while the latter is parameterized to the mid-range of existing modelling literature and empirical evidence on fuel price elasticities. The model is linked to input-output tables and household expenditure surveys¹⁵ to infer impacts on production costs in different industries, consumer prices, and burdens on household income groups. CPAT, which was developed jointly by IMF and World Bank staff, is widely used in IMF surveillance, cross-country, and technical assistance reports (see Annex 4 for more details). The analysis here is focused on CO₂ emissions from fossil fuel use in the power, industry, transport, and building sectors.

28. According to BAU projections, Philippines will meet its unconditional GHG target in 2030 but fall well short of its conditional target. IMF staff project GHG emissions will increase 27 percent from 234 million tonnes in 2021 to 297 million tonnes in 2030 (i.e., 32 percent lower than the authorities' projection). The emissions increase is driven by a large projected increase in GDP (75 percent) over the period, though there is some offsetting decline in the energy and agricultural intensity of GDP.¹⁶ The unconditional and conditional NDC targets are 380 and 97 million tonnes CO₂ equivalent for GHGs



¹⁵ For Philippines, the input output tables is from Aguiar and others (2019) while the latest household survey (for 2018) is used.

¹⁶ This reflects improvements in energy efficiency as new (more efficient) capital gradually replaces older capital and a (standard) assumption that energy and agricultural demand grows by less than in proportion to GDP.

respectively. These are inferred from the authorities' projections of BAU GHG emissions in 2030 reduced by 2.71 and 75 percent respectively. If Philippines were to follow most other countries and adopt a net zero emission target by mid-century,¹⁷ a 2030 target aligned with this long run goal would be in the order of 180 million tonnes of GHG.¹⁸

29. The analysis here focuses on pricing limited to CO₂ emissions from the power, industry, transport, and building sectors. The model cannot price emissions from the agricultural sector (the main source of GHGs beyond the energy sector) because methane and nitrogen oxide emissions from the sector are not directly monitored, new capacity would be required to implement charges on (larger) farms, and competitiveness concerns are severe for this sector. An illustrative carbon price starting at \$20 per tonne in 2023 and rising \$4.3 per year to reach \$50 per tonne in 2030 is considered—this price is broadly in the middle of the price range of existing carbon pricing schemes (Figure 3). The policy could either represent a carbon tax, which would add a charge in proportion to carbon content to existing fuel excises and apply similar carbon charges to other fuels. Or it could represent an ETS which is imposed on top of existing fuel taxes, encompassing firms in the power and industry sectors and suppliers of fuels for other sectors.

30. The illustrative carbon price would reduce CO₂ emissions in 2030 to 144 million tonnes (13 percent below IMF staff projections of BAU CO₂ emissions) with more than half of the reduction in the power sector. Power, transportation, industry, and buildings account for 52, 17, 19 and 12 percent of the emission reductions respectively. Within the power sector, reductions in output account for one third of the emission reductions and switching from fossil fuels, primarily coal to renewables, accounts for two-thirds of the reduction (Figure 6)¹⁹. Indeed, the reform would raise the renewable share in electricity generation to more than 40 percent in 2030—well above the authorities' current target of 30 percent and the current renewable share of 21 percent.

31. A \$50 carbon price could potentially raise revenues of 1.05 percent of GDP (\$7.0 billion) in 2030 (accounting for the base erosion of pre-existing fuel taxes). About 44 and 37 percent of the revenue would come from new charges on road fuels and coal respectively (Figure 7).

¹⁷ 136 countries, representing 88 percent of global GHGs, have announced (or intend to announce) net zero targets to be achieved by between 2035 (Finland) to 2070 (India) (see www.climatewatchdata.org/net-zero-tracker).

¹⁸ For example, cutting emissions by 60 million tonnes per decade over the next four decades would achieve net zero by 2060 and imply 2030 emissions of about 180 million tonnes.

¹⁹ For comparison, coal would account for 39 percent of all fossil fuel CO₂ emissions in the Philippines in 2030 in the BAU, natural gas – for another 11 percent.

Figure 6. Contribution of Sectors and Power Generation Fuels to CO₂ Reductions Under Carbon Pricing, 2030

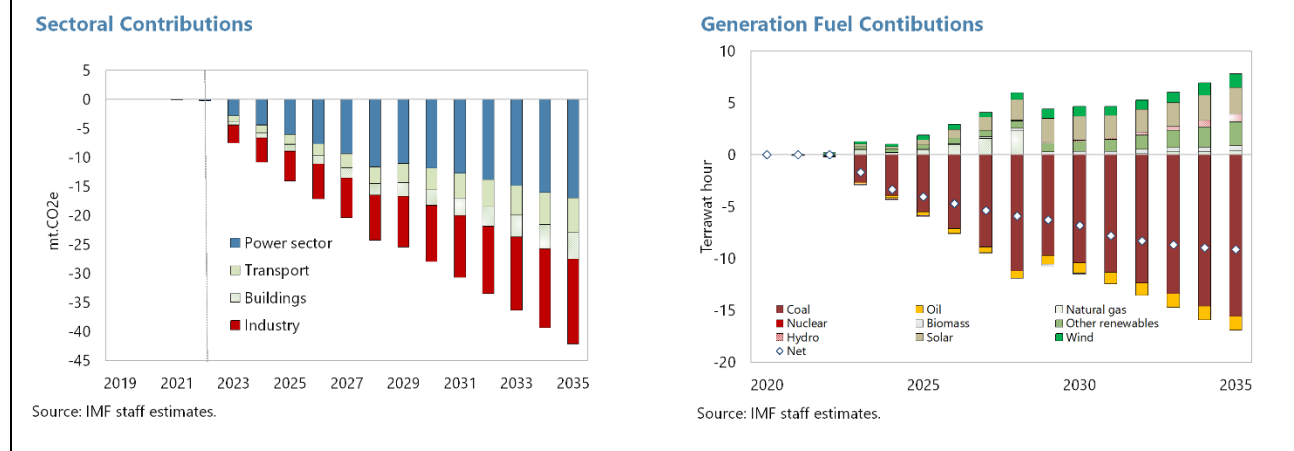


Figure 7. Projected Fiscal Revenues

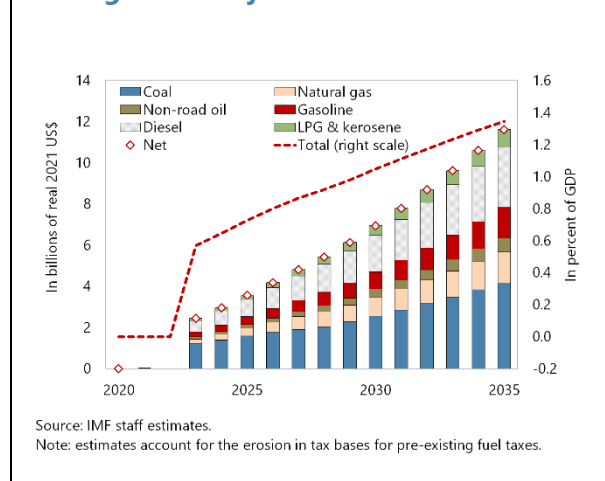
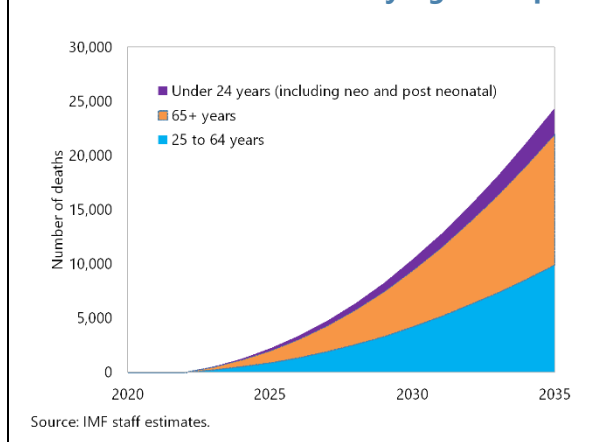


Figure 8. Cumulative Averted Deaths from Reduced Air Pollution by Age Group



32. Cumulated over 2023–30, the carbon price would save 10,400 premature fatalities from local air pollution exposure (Figure 8). About half of the avoided deaths are people over the age of 65 years (who are more likely to have pre-existing conditions).

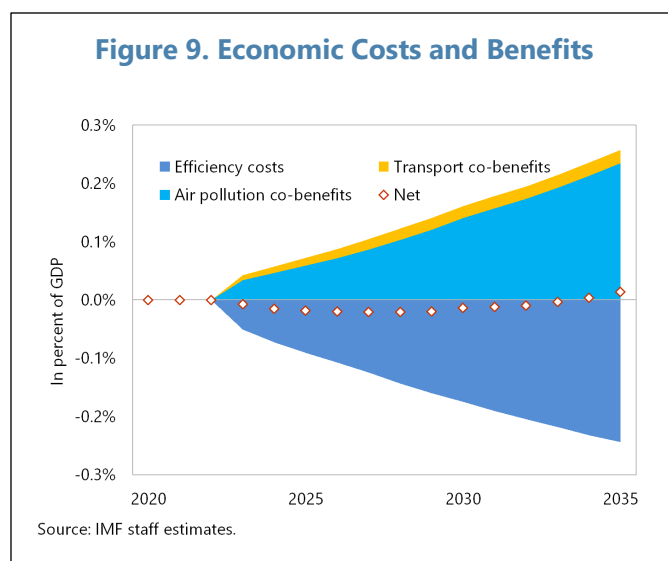
33. The carbon tax would impose a modest economic cost on the Philippines, equivalent to about 0.2 of GDP in 2030 but half of these costs would be offset by domestic environmental co-benefits (Figure 9). Economic costs reflect pure mitigation costs, primarily the annualized costs of using cleaner but more expensive technologies instead of fossil-based technologies (net of any savings in lifetime energy costs).²⁰ Some 87 percent of the domestic environmental co-benefits reflect lower local air pollution deaths and a 13 percent reduction in

²⁰ Estimation of economic costs is made under specific assumptions on emissions projections and responsiveness of emissions to carbon pricing (reflecting marginal abatement cost curves) (see Black and others (2022) on the cost methodology). A rough approximation for costs is the integral under the economy-wide marginal abatement cost schedule or one-half the product of the emissions price and the emissions reduction.

traffic congestion and accident externalities.²¹ The negative impact of carbon taxation on GDP can be offset by revenue recycling. For example, the impact on GDP growth in 2030 is about negative 0.4 percent of GDP, and more than offset by using 75 percent of revenues on public investment, bringing the net impact to positive 0.1 percent. The estimate of the impacts on GDP depends on the fiscal multiplier used.

34. A \$50 carbon price has the most impact on coal and natural gas prices and moderate impact on prices for electricity and road fuels.

Coal and natural gas prices increase by 59 and 21 percent above BAU levels in 2030, while electricity and gasoline prices increase by 4 and 13 percent respectively.²² Coal, however (and to some extent natural gas), is an intermediate input used by firms rather than directly consumed by households. Broadly speaking, price increases for the Philippines from a \$50 carbon price would be in line with those of comparator countries (Table 2).



²¹ See Parry and others (2014) on methodologies for quantifying the broad range of environmental impacts of fossil fuel use on a country-by-country basis.

²² Price increases would be 50 percent smaller, and 50 percent larger, under \$25 and \$75 carbon prices respectively.

Table 2. Philippines: Impact of a \$50 Carbon Price on Energy Prices in Selected Countries, 2030

Country	Coal		Natural gas		Electricity		Gasoline	
	BAU price (US\$/GJ)	Increase (percent)	BAU price (US\$/GJ)	Increase (percent)	BAU price (US\$/kWh)	Increase (percent)	BAU price (US \$/liter)	Increase (percent)
Australia	4.9	97.3	29.5	9.6	0.3	5.7	1.0	12.8
Bangladesh	13.6	34.7	9.7	48.9	0.1	18.2	1.1	12.5
Bhutan	7.5	0.0	31.6	8.8	0.0	102.3	1.1	11.7
Brunei Darussalam	13.6	34.8	9.5	31.1	0.1	44.4	0.3	78.0
Cambodia	13.8	34.2	31.6	8.8	0.2	13.2	0.9	14.7
China	8.9	53.0	28.5	10.2	0.1	16.1	1.0	13.7
India	6.9	68.7	18.7	25.9	0.1	26.9	1.1	12.4
Indonesia	4.7	108.4	20.3	14.4	0.1	51.7	0.4	29.4
Japan	11.7	47.0	38.6	7.2	0.2	11.8	1.2	10.6
Korea	11.8	40.1	36.4	8.3	0.2	15.7	1.3	8.6
Lao P.D.R.	4.5	105.1	31.6	8.8	0.1	12.8	1.0	12.9
Malaysia	12.5	37.6	12.6	22.1	0.1	23.1	0.5	23.2
Mongolia	4.8	101.6	31.6	8.8	0.1	78.4	0.6	20.4
Myanmar	7.2	66.5	10.6	26.4	0.1	42.1	0.6	18.6
New Zealand	10.5	45.0	15.5	18.9	0.2	-1.2	1.4	8.9
Philippines	8.6	58.5	13.6	20.6	0.2	4.1	1.0	12.8
Sri Lanka	13.6	34.6	31.6	8.8	0.1	30.9	0.7	17.7
Thailand	12.4	38.5	17.5	15.9	0.2	27.4	0.6	22.6
Vietnam	5.2	90.0	11.1	25.1	0.1	22.5	0.7	17.8

Source: IMF staff estimates.

Note: baseline energy prices are projected based on international energy price forecasts shown in Figure 2 and on an assumption that current taxation (excise, VAT, other taxes) are not expanding. Carbon tax is assumed on top of existing taxation.

35. Pre-existing fuel taxes in Philippines are equivalent to carbon charges of 1, 45, and 154 per tonne of CO₂ on coal, natural gas, and gasoline respectively in 2030. A \$50 carbon tax would add additional carbon charges equivalent to \$4.7/GJ for coal, \$2.8/GJ for natural gas, and \$0.11/liter for gasoline on top of existing taxes. Historically, pre-existing fuel taxes were imposed for fiscal and local environmental reasons, rather than climate mitigation, and ideally should not be scaled back as a carbon tax is phased in as this would undermine the emissions impact of the carbon tax. Or put another way, BAU emissions projections account for current fuel taxes so additional taxation is needed to reduce emissions below BAU levels. Nonetheless, the introduction of carbon pricing provides an opportune time to reform the system of pre-existing fuel taxes to better align tax rates (inclusive of carbon pricing) with the carbon and local environmental costs of fuel use, thereby achieving environmental goals at lowest cost.

36. Carbon pricing increases industrial production costs which may raise competitiveness concerns, especially for energy-intensive, trade-exposed (EITE) industries. Production cost increases have three components. First, industrial firms will incur a direct tax payment, or allowance purchase requirement, for emissions they continue to emit directly. Second, firms will incur abatement costs to the extent they cut emissions, for example, by switching to cleaner (but costlier) technologies and fuels. Third, they incur an indirect payment for carbon charges on emissions embodied in their inputs, especially electricity. At more modest abatement levels, the direct tax

payment would be expected to be much higher than the abatement costs. Overall (Figure 10), a \$50 carbon price in 2030 would increase production costs for non-metallic industries (most notably cement), iron and steel, and chemicals by 8, 4 and 3 percent, respectively (relative to BAU costs in 2030). More generally, energy costs will increase beyond the energy sector, for example, in the agricultural and fishery sectors.

37. Policymakers may wish to consider measures to address competitiveness concerns.

In the absence of international coordination (see above), there are several unilateral possibilities for competitiveness assistance measures. One is to only impose carbon charges on firms' emissions above a threshold level (as in South Africa), though this partial exemption effectively lowers the average carbon charge, which undermines mitigation incentives. Another possibility is to return revenues collected from EITE industries in the form of output-based rebates to those industries—operationally, this scheme acts like a TPS or feebate approach discussed above. A further possibility, under an ETS not a carbon tax, is to provide free allowance allocations to EITE industries. One drawback from all these approaches is that they reduce the potential government revenue raised from carbon pricing.

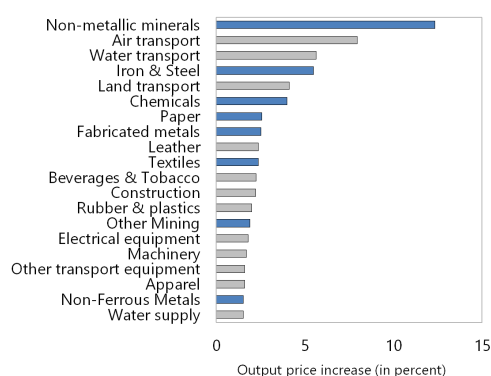
38. The illustrative carbon price imposes a burden on the average household of 1.5 percent of their consumption, though burdens relative to consumption are lower for lower income groups.

On average about half of the burden comes indirectly from increases in the price of general consumption goods and these impacts are evenly distributed across households. In contrast, the relative burden from higher electricity prices is higher for higher income groups, for reflecting their greater use of space cooling (Figure 11, panel 1). These estimates overstate the net burden of carbon pricing on households in two regards. First, they ignore partially offsetting domestic environmental benefits, especially local air pollution mortality (information is not available however on the distribution of these benefits). Second, they ignore the benefits from recycling carbon pricing revenues.

39. Using revenues for targeted transfers and public investment could make the policy both pro-poor and pro-equity.

In principle, fully compensating the bottom 10, 20, and 30 percent of the income distribution would use 7, 11 and 20 percent of the carbon pricing revenues (though actual revenue needs would be larger if social protections involve significant leakage to higher income groups) and using a larger proportion could help achieve poverty and equity objectives. For example, using 25 percent of the revenues for a targeted, unconditional cash transfer aimed at the

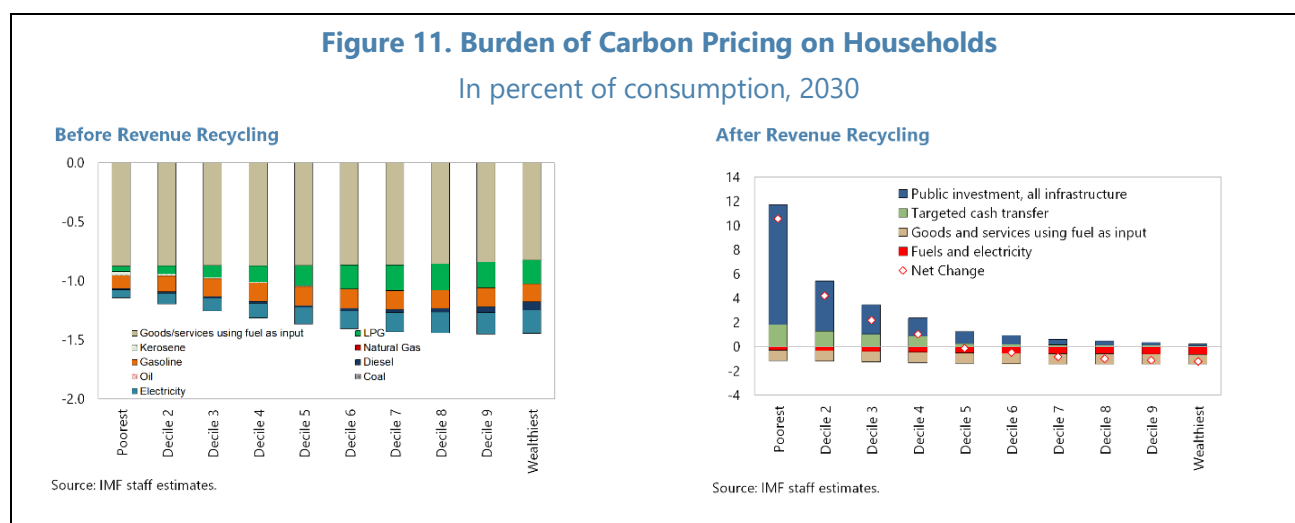
Figure 10. Percent Change in Output Prices for \$50 Carbon Tax in 2030



Source: IMF staff estimates.

Note: EITE (Energy Intensive Trade Exposed) industries are highlighted in blue.

bottom four consumption deciles²³ and using 75 percent of the revenues for public investment (with benefits assumed proportional to household income) would make the reform both pro-poor and equity-enhancing. On net, the bottom two deciles are significantly better off from the reform with net benefits amounting to about 5-10 percent of consumption while the top three deciles are worse off on net by about 1 percent of consumption (Figure 11, panel 2). Further studies and extensive consultations with relevant stakeholders and development partners should be done to ensure that the social and economic costs are fully taken into account in the design of carbon pricing schemes.



D. Conclusion: Moving Reform Forward

40. Prospects for an effective and politically acceptable mitigation strategy with carbon pricing as the centerpiece can be enhanced by a comprehensive approach with several key elements. These include:

- A balance between carbon pricing and other mitigation instruments—especially feebates or TPSs—at the sectoral level that are less efficient than pricing but likely have greater acceptability;
- Recycling of carbon pricing revenues in ways that boost the economy (e.g., through lowering taxes on work effort or funding socially productive investments), making sure that benefits are equitably distributed across households;
- Public investments in clean technology infrastructure networks (e.g., grid updates to accommodate renewables) that would not be provided privately;
- Market reforms to enhance competition and investment in the main energy sectors;

²³ Assumes coverage rate (proportion of targeted that receive the transfer) of 75 percent and leakage rate (proportion of non-targeted wealthier households that erroneously receive the transfer) of 25 percent. Targeted transfers could however be inefficient if it is prone to mismanagement especially or if the system for local government units is not yet in place.

- Just transition measures to assist vulnerable groups, such as stronger social safety nets or tax reliefs for low-income households, assistance programs for displaced workers and at-risk regions;
- Measures to limit impacts of carbon pricing on industrial competitiveness;
- Pricing or similar schemes for GHG emissions beyond the energy sector; and
- Financial sector support for the low-carbon transition.²⁴

Extensive upfront consultations with stakeholders and information campaigns to inform the public of the rationale for reform (including programs at the Department of Energy to promote renewables, energy efficiency and conservation) can help build political support. Reforms should also be phased in progressively to give households and firms time to adjust. Recent increases in fossil fuel prices, while likely transitory in nature, are at least to some extent another reminder of the need for low-carbon energy transition to shield the economy from recurrent fuel price shocks, but they also underscore the importance of a comprehensive and inclusive approach to reform to protect the vulnerable and gain social and political support.

²⁴ See the 2020 *Sustainable Finance Framework* and 2021 *Environmental and Social Risk Management Framework*.

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Annex I. Further Details on Carbon Pricing Schemes

Table A1. Further Details on National, Subnational and Regional Level Carbon Pricing Schemes in Operation

Country/ Region	Year Introduced	Coverage of Energy Sectors				Coverage Rate, all GHGs	Price, \$/tonne	Revenue/ Rent, % GDP	Point of Tax/ Regulation	Revenue Use
		Power	Industry	Transport	Buildings					
Carbon Taxes										
Argentina	2018	✓	✓	✓		20	5	0.070	Midstream	General budget
Colombia	2017	✓	✓	✓	✓	23	5	0.04	Midstream	Environmental spending
Chile	2017	✓	✓			29	5	0.05	Downstream	General budget
Indonesia	2022	✓				26	2	0.05	Midstream	General budget
Singapore	2019	✓	✓			80	4	0.04	Midstream	General budget
South Africa	2019	✓	✓	✓	✓	80	10	0.04	Midstream	General budget
Ukraine	2011	✓	✓		✓	71	1	0.05	Midstream	General budget
Uruguay	2022		✓	✓		11	127	1.15	Midstream	General budget, environmental spending
ETSs										
EU	2005	✓	✓			41	87	0.26	Downstream	General budget, environmental spending
Austria	2005	✓	✓			37	87	0.11	Downstream	General budget, environmental spending
Belgium	2005	✓	✓			38	87	0.19	Downstream	General budget, environmental spending
Bulgaria	2005	✓	✓			52	87	1.82	Downstream	General budget, environmental spending
Croatia	2005	✓	✓			32	87	0.33	Downstream	General budget, environmental spending
Cyprus	2005	✓	✓			51	87	0.43	Downstream	General budget, environmental spending
China	2013, 2014, 2016, 2021	✓				38	9	0.32	Downstream	Environmental spending proposal
Czech Republic	2005	✓	✓			51	87	0.78	Downstream	General budget, environmental spending
Germany	2005, 2021	✓	✓	✓	✓	85	62	0.44	Mid & Downstream	Environmental spending
Greece	2005	✓	✓			47	87	0.66	Downstream	General budget, environmental spending
Hungary	2005	✓	✓			30	87	0.39	Downstream	General budget, environmental spending
Italy	2005	✓	✓			34	87	0.18	Downstream	General budget, environmental spending
Kazakhstan	2013	✓	✓		✓	46	1	0.10	Downstream	General budget
Korea	2015	✓	✓	✓	✓	73	19	0.99	Downstream	Environmental spending
Lithuania	2005	✓	✓			30	87	0.44	Downstream	General budget, environmental spending
Malta	2005	✓	✓			34	87	0.28	Downstream	General budget, environmental spending
New Zealand	2008	✓	✓	✓		49	53	0.20	Downstream	General budget, environmental spending
Romania	2005	✓	✓			33	87	0.89	Downstream	General budget, environmental spending
Slovakia	2005	✓	✓			50	87	0.64	Downstream	General budget, environmental spending
US	2009, 2012, 2018, 2021	✓	✓	✓	✓	7	24	0.05	Up & Midstream	General budget, direct transfers, environmental spending
Hybrid										
Canada	2019	✓	✓	✓	✓	67	38	0.16	Downstream	Tax cuts, environmental spending
Denmark	1992, 2005	✓	✓	✓	✓	62	52	0.29	Mid & Downstream	General budget
Estonia	2000, 2005	✓	✓			63	79	1.26	Mid & Downstream	General budget
Finland	1990, 2005	✓	✓	✓	✓	67	77	0.76	Mid & Downstream	General budget, tax cuts
France	2005, 2014	✓	✓	✓	✓	56	64	0.41	Mid & Downstream	General budget, environmental spending
Iceland	2005, 2010	✓	✓	✓	✓	93	56	0.62	Mid & Downstream	General budget
Ireland	2005, 2010	✓	✓	✓	✓	59	62	0.23	Mid & Downstream	General budget, direct transfers, environmental spending
Mexico	2014, 2020	✓	✓	✓	✓	61	4	0.02	Midstream	General budget
Japan	2010, 2011, 2012	✓	✓	✓	✓	77	2	0.05	Midstream	Environmental spending
Latvia	2004, 2005	✓	✓			25.4	79	0.39	Midstream	General budget
Liechtenstein	2005, 2008	✓	✓	✓	✓	81	130	0.60	Mid & Downstream	General budget
Luxembourg	2005, 2021	✓	✓	✓	✓	79	38	0.048	Mid & Downstream	General budget
Netherlands	2005, 2021	✓	✓			46	87	0.270	Mid & Downstream	General budget
Norway	1991, 2005	✓	✓	✓	✓	55	87	0.94	Mid & Downstream	General budget
Poland	1990, 2005	✓	✓	✓	✓	51	81	1.45	Mid & Downstream	Environmental spending
Portugal	2015, 2005	✓	✓	✓	✓	70	56	0.52	Mid & Downstream	General budget, environmental spending
Slovenia	1996, 2005	✓	✓	✓	✓	89	47	0.48	Mid & Downstream	General budget
Spain	2005, 2014	✓	✓		✓	37	82	0.25	Mid & Downstream	General budget, environmental spending
Sweden	1991, 2005	✓	✓	✓	✓	77	109	0.52	Mid & Downstream	General budget
UK	2013, 2021	✓	✓			49	67	0.42	Downstream	General budget, tax cuts
Switzerland	2008	✓	✓		✓	44	114	0.16	Midstream	Tax cuts, direct transfers, environmental spending

Sources: Parry and others (2022).

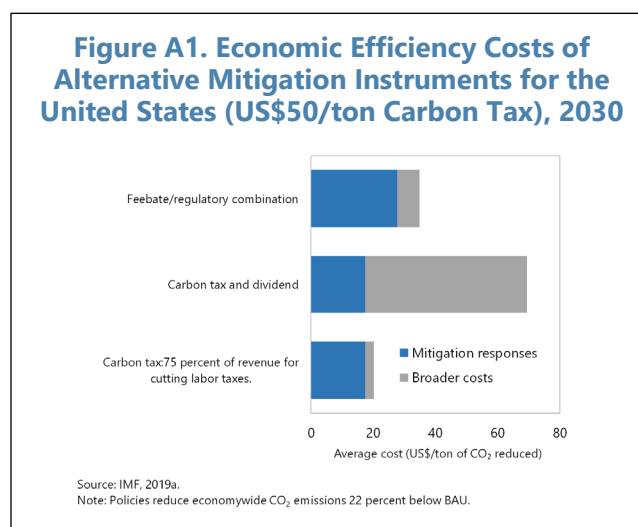
Note: Revenue/rent excludes revenue loss from erosion of prior fuel tax bases. Values combine national, subnational and regional pricing. Mexico does not include subnational pricing schemes due to lack of coverage data.

Annex II. The Economic Importance of Using Carbon Pricing Revenues Productively

1. Carbon pricing imposes two sources of cost on the economy. First is the cost of the mitigation responses themselves, for example, firms producing with cleaner but more expensive technologies or households using less fuel than they would otherwise prefer.

Second is the broader macroeconomic costs. Higher energy prices tend to slightly contract overall economic activity as they increase the general price level, which in turn reduces the real returns to work effort and investment, compounding distortions in factor markets created by taxes on labor and capital income. These costs can be largely offset (or perhaps more than offset in some cases) by using carbon pricing revenues to increase economic efficiency, for example by lowering taxes on work effort or funding productive investments.¹

2. A recent assessment for the United States (Figure A1) suggests that an ETS with free allowance allocation and emissions price of \$50 per tonne, or the equivalent carbon tax with revenues returned in lump-sum dividends to households² is about twice as costly—for a given nationwide emission reduction—as a combination of feebates to reduce emission rates. This is because feebates have much smaller impacts on energy prices and therefore have much smaller macroeconomic costs. The most cost-effective policy however is an ETS with allowance auctions, or a carbon tax, with the bulk of revenues used to cut distortionary taxes on labor and business income and increase economic efficiency.



3. Table A1 provides more discussion of alternative options for the use of carbon pricing revenues in terms of implications for economic efficiency, distributional incidence, administrative burdens, and political acceptability.

¹ A substantial analytical literature has explored these interactions (see, for example, Goulder and others, 1999, and Parry and Williams, 2012).

² Dividends have no efficiency benefits as they do not increase the real return to work effort or investment.

Table A1. Options for Using Carbon Tax Revenues

Instrument	Metric				
	Impact on Economic Efficiency	Impacts on Income Distribution	Administrative Burden	Political Feasibility	
General Revenue Uses	Public investment	Potentially significant (high fiscal multipliers, especially for low-carbon investments)	Can disproportionately benefit low-income households (for example, if provides basic education, health, infrastructure), but depends on implementation	Modest; requires strong public investment management	Can be popular, with green investment especially favored in climate-concerned countries
	Tax reductions	Can improve incentives for work effort and investment and reduce incentives for the black economy and tax evasion	Can be designed to be progressive (for example, via increases in personal income tax thresholds)	Minimal	Popular with beneficiaries (for example, households for personal cuts, firms for corporate income tax cuts)
	Deficit reduction	Lowers future tax burdens and macro-financial risk	Depends on country circumstances	Minimal	Does not garner political support
Assistance to Households	Universal lump-sum transfers	Forgoes efficiency benefits (for example, no enhanced incentive for work effort)	Progressive (disproportionately benefits the poor)	New capacity may be needed (but should be manageable)	Mixed, with some households/firms favouring or disliking lump-sum transfers
	Means-tested cash transfers or social assistance	Forgoes efficiency benefits, but typically requires only a small share of revenues	Effective at helping low-income groups if transfers are well targeted or if social safety nets are comprehensive	Low if builds on existing capacity, otherwise significant	Generally popular
	Direct assistance for household energy bills	Forgoes efficiency benefits; reduction in environmental effectiveness depending on design	Provides partial relief for households (but does not help with indirect pricing burden)	Low if builds on existing capacity, otherwise significant	Generally popular

Source: IMF staff.

Note: Green, orange, and red indicate an advantage, neither an advantage or disadvantage, and a disadvantage of the revenue use, respectively.

Annex III. Pricing Schemes for Broader Sources of GHGs

Forestry

1. Ideally, forestry and land use policies would promote the main channels for increasing carbon storage including reducing deforestation, afforestation, and enhancing forest management (e.g., planting larger trees, increasing rotation lengths). To the extent forest coverage is expanded this can, moreover, generate other environmental co-benefits beyond carbon storage such as reduced risks of water loss, floods, soil erosion, and river siltation.

2. A national feebate program could cost-effectively promote all responses for increasing carbon storage without a fiscal cost to the government. The policy would apply to landowners—most importantly those at the agricultural/forestry boundary—a fee given by:

[CO₂ rental price] × [carbon storage on their land in a baseline period – stored carbon in the current period]

3. This scheme would reward all three channels for enhancing carbon storage, either through reduced fees or increased subsidies. Periods here could be defined as averages over multiple years given that carbon storage might be lumpy during years when harvesting occurs. Feebates can be designed—through appropriate scaling of the baseline over time¹—to be revenue-neutral in expected terms. And a feebate could be administered based on the registry of landowners used for business tax collection.²

4. Feebates could involve rental payments, rather than large upfront payments for tree planting, given that changes in carbon storage may not be permanent. The problem with one-off, upfront payments is that afforestation may be reversed—for example, a new tree farm receiving an upfront rebate may be subsequently harvested or destroyed (by fires, pests, windstorms), requiring complex, ex-post re-payment procedures to provide adequate incentives for maintaining the land-use change. Feebates have become more practical with advances in monitoring technologies. Forest carbon inventories are estimated through a combination of satellite monitoring, aerial photography, and on-the-ground tree sampling.³

Agriculture

5. Around fourth fifths of methane emissions in the Philippines are from the agricultural sector and these emissions account for about 70 percent of total GHGs from agriculture. Two

¹ See Parry (2020) for details.

² Feebates bear some resemblance to environmental services payments programs that were first introduced in Costa Rica (see www.fonafifo.go.cr/en). Costa Rica's scheme involves payments to develop and maintain forests but does not apply fees for reductions in forest coverage.

³ See www.forestcarbonpartnership.org.

thirds of agricultural methane emissions are from rice cultivation⁴ and one-third from livestock operations. The other main GHG from agriculture is nitrous oxide, primarily from soils.

6. Emissions reductions should be balanced by the need to enhance food production and food security, especially in the face of a global food supply shock. The main channel for reducing rice paddy emissions is to reduce water intensity through, for example, periodic draining. Increasing livestock productivity (e.g., through breed switching), and shifting to alternative feed (e.g., with seaweed additive) can reduce methane releases from enteric fermentation and methane/nitrous oxide emissions from manure.

7. Pricing of agricultural GHGs is trickier but could be based on farm-level output or input data, default emissions factors,⁵ and rebates for farmers demonstrating mitigation actions (e.g., drainage of rice paddies). Revenues from the fee might be recycled to the sector to help address competitiveness concerns.

Waste

8. There is a limited range of behavioral responses to reduce methane emissions from the waste sector. At landfill sites these include collection and flaring of methane leaks and at the consumer/industrial level, they include reducing the demand for packaging and food, enhanced recycling, and composting of organic waste. The case for pricing methane from waste is less compelling than for pricing GHGs from other sectors. For one thing, it is more practical to mimic the effects of a tax with regulation given the very limited number of (readily observable) mitigation responses. In addition, downstream methane taxes would not promote reductions in the supply of waste—these require fiscal or regulatory incentives at the household and industrial level. And the 389 waste sites in the Philippines are publicly managed and it is more natural to set standards, rather than apply taxes, to public enterprises.

⁴ Methane is released when flooded fields prevent oxygen from penetrating the soil, creating conditions for methane-emitting bacteria.

⁵ See IPCC (2019).

Annex IV. Climate Policy Assessment Tool

1. CPAT provides, on a country-by-country basis for 200 countries, projections of fuel use and CO₂ emissions by major energy sector.¹ This tool starts with use of fossil fuels and other fuels by the power, industrial, transport, and residential sectors² and then projects fuel use forward in a baseline case using:

- GDP projections;³
- Assumptions about the income elasticity of demand and own-price elasticity of demand for electricity and other fuel products;
- Assumptions about the rate of technological change that affects energy efficiency and the productivity of different energy sources; and
- Future international energy prices.

2. In these projections, current fuel taxes/subsidies and carbon pricing are held constant in real terms.

3. The impacts of carbon pricing on fuel use and emissions depend on: (i) their proportionate impact on future fuel prices in different sectors; (ii) a simplified model of fuel switching within the power generation sector; and (iii) various own-price elasticities for electricity use and fuel use in other sectors. For the most part, fuel demand curves are based on a constant elasticity specification.

4. The basic model is parameterized using data compiled from the International Energy Agency (IEA) on recent fuel use by country and sector.⁴ GDP projections are from the latest IMF forecasts.⁵ Data on energy taxes, subsidies, and prices by energy product and country is compiled from publicly available and IMF sources, with inputs from proprietary and third-party sources. International energy prices are projected forward using an average of IEA and IMF projections for coal, oil, and natural gas prices. Assumptions for fuel price responsiveness are chosen to be broadly consistent with empirical evidence and results from energy models (fuel price elasticities are typically

¹ CPAT was developed by IMF and World Bank staff and evolved from an earlier IMF tool used, for example, in IMF (2019a and b). For descriptions of the model and its parameterization (see IMF (2019b Appendix III, and Parry and others. 2021), and for further underlying rationale see Heine and Black (2019).

² International aviation and maritime fuels are excluded from the model and from computations of fossil fuel subsidies.

³ GDP projections exclude the negative growth effects of global climate change.

⁴ IEA (2021). Any fuel consumption that could not be explicitly allocated to a specific sector was allocated apportioned based on the relative consumption by sector in a given country.

⁵ A modest adjustment in emissions projections is made to account for partially permanent structural shifts in the economy caused by the pandemic.

between -0.5 and -0.8). Carbon emissions factors by fuel product are from IEA. The domestic environmental costs of fuel use are based on IMF methodologies.⁶

5. One caveat is that the model abstracts from the possibility of mitigation actions (beyond those implicit in recently observed fuel use and price data) in the baseline, which provides a clean comparison of policy reforms to the baseline. Another caveat is that, while the assumed fuel price responses are plausible for modest fuel price changes, they may not be so for dramatic price changes that might drive major technological advances, or rapid adoption of technologies like carbon capture and storage or even direct air capture, though the future viability and costs of these technologies are highly uncertain. The model also does not explicitly account for the possibility of general equilibrium effects (e.g., changes in relative factor prices that might have feedback effects on the energy sector), and changes in international fuel prices that might result from simultaneous climate or energy price reform in large countries. Parameter values in the spreadsheet are, however, chosen such that the results from the model are broadly consistent with those from far more detailed energy models that, to varying degrees, account for these sorts of factors.

⁶ See Parry, Black and Vernon (2021).