Assessing the impact of COVID-19 on long-term economic growth and poverty for INSERT COUNTRY/REGION





Contents

[Introduction 3](#_Toc45202591)

[International Futures 3](#_Toc45202592)

[Scenarios 5](#_Toc45202593)

[Model Results 5](#_Toc45202594)

[GDP growth 5](#_Toc45202595)

[Overall GDP 6](#_Toc45202596)

[GDP per capita 7](#_Toc45202597)

[Poverty and the achievement of Sustainable Development Goal 1 8](#_Toc45202598)

[Conclusion 9](#_Toc45202599)

[Bibliography 10](#_Toc45202600)

# Introduction

This research note highlights long-term effects of COVID-19 on economic development and achievement of Sustainable Development Goal 1, eliminating extreme poverty, in INSERT COUNTRY/REGION. The report uses the International Futures model, a public and open-source tool that has been widely used by UNDP to analyze development trends and policy-choices over long time-horizons. The scenarios used in this report—described below—involves comparing scenarios using two sets of primary drivers: changing patterns of economic growth and mortality.

The analysis below finds… {insert something very smart and succinct about the findings for your particular country/region}.

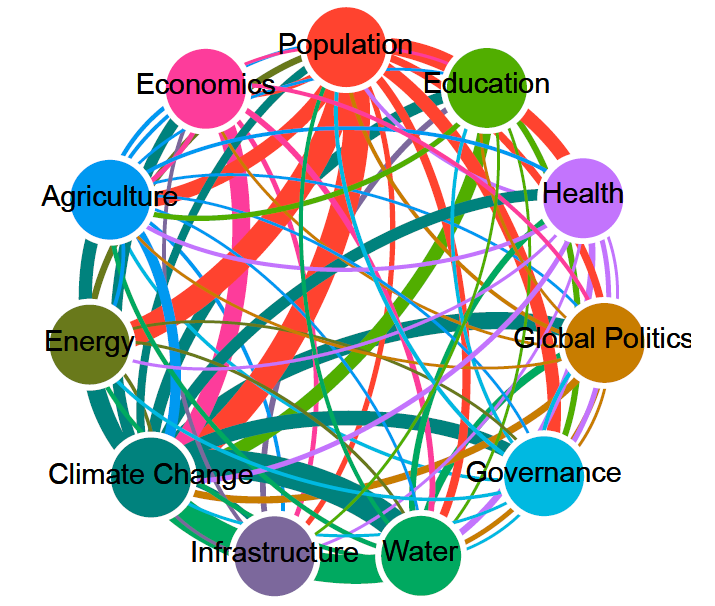
The unfolding events associated with the direct diffusion of COVID-19, the government and market responses that both slow the spread of the disease and stimulate economic activity, and broader spill-over effects remain poorly understood. We remain in the midst of this unfolding pandemic, and much needs to be understood about the variables and dynamics that matter for patterns of long-term sustainable human development.

The utility of quantitative modeling and forecasting tools lies in their ability to help policy-makers better assess unfolding trends through transparent model structures and scenarios that frame uncertainty. Quantitative tools should not be used for single-point predictions that are taken as direct inputs into policy-making process.

The results we present here are part of an unfolding United Nations Development Programme capacity development program that is providing tools to help policy-makers remain focused on the importance of policy-integration in light of this unfolding global pandemic. Over the next months we plan on following this report with others that highlight the impact of COVID-19 on other key dimensions of human development and well-being.

# International Futures

International Futures (IFs) is a large-scale, long-term, integrated global modeling system.[[1]](#footnote-1) The broad purpose of the IFs forecasting system is to serve as a thinking tool for the analysis of near through long-term country-specific, regional, and global futures across multiple issue areas. These interacting issue areas include population, economics, education, health, energy, agriculture, infrastructure, the environment, and socio-political systems. It is a structure-based, agent-class driven, dynamic modeling system. Households, governments and firms are major agent-classes. IFs is a hybrid system that does not fall neatly into econometric, systems dynamics or other model categories. The system draws upon standard approaches to modeling specific issue areas whenever possible, extending those as necessary and integrating them across issue areas. The figure below identifies the major models within the IFs system. It cannot begin to identify all the linkages within or across these models.[[2]](#footnote-2)



Of particular importance to this impact analysis are the demographics, health, and economics sub-modules. The demographic model uses a standard cohort-component representation, portraying demographics in 5-year categories (adequate for most users) but building on underlying 1-year categories to be consistent with its computational time steps. Unlike most demographic forecasting systems, both fertility and mortality are computed endogenously.

The IFs global health model represents a hybrid and integrated approach to forecasting health outcomes. It is hybrid because it uses drivers at both distal (i.e. income, education, and technology) and proximate (e.g. risk factors such as smoking rates and undernutrition levels) levels to produce outcomes and integrated because both drivers and outcomes are situated within the greater IFs system, allowing for the incorporation of forward linkages and feedback loops.

The 6-sector economic model structure is general equilibrium-seeking, in which a Cobb–Douglas formulation drives production and in which multifactor productivity is substantially an endogenous function of human capital, social capital/governance, physical capital (infrastructure and energy) and knowledge capital.[[3]](#footnote-3) A linear expenditure system determines household demand, and a social accounting matrix structures flows across sectors and agent categories, assuring full financial flow consistency.[[4]](#footnote-4)

# Scenarios

Modeling and forecasting exercises are often characterized by uncertainty and therefore benefit from the use of scenarios. Scenarios can be developed to frame uncertainty in a variety of ways, including varying underlying model assumptions to determine how sensitive model results are to inputs or changing variables to reflect alternative policy priorities and explore its effect across time.

In this brief we compare two scenarios, one that reflects a *Base Case* scenario reflecting development for INSERT COUNTRY/REGION across multiple dimensions and variables. This scenario is the cornerstone of the IFs system and reflects an integrated and internally logically consistent quantified development trajectory for a given country.

For this analysis we compare two different *Base Case* scenarios that reflect alternative assumptions related to economic growth and mortality (see *Table 1*).

Table 1: Economic and demographic assumptions

|  |  |  |  |
| --- | --- | --- | --- |
| **Scenario** | **Assumptions** | | |
| COVID Base Case | Economic | Economic growth assumptions for 2020 and 2021 match GDP estimates from IMF's June 2020 World Economic Outlook revisions. Post-2021 growth assumptions are estimated endogenously. |
| Pre-COVID Base Case | Economic | Economic growth assumptions for 2020 and 2021 match GDP estimates from IMF's 2019 World Economic Outlook revisions. Post-2021 growth assumptions are estimated endogenously. |

# Model Results

The effect of COVID-19 diffusion around the world has been devastating for human development and well-being. The disease itself has destroyed lives, causing governments to shut down economies to slow the spread. In doing so, governments have also restricted economic production and consumption patterns, increasing poverty and causing additional mortality not directly driven by the disease.

## GDP growth

The effect of COVID-19 on economic growth has been devastating, reducing global economic output in 2020 to -5.7% relative to a Pre-COVID value of 2.7%. This cumulative 8.4 percentage point change in global growth prospects will have significant ripple effects across other development systems. See *Figure 1* for an example of the GDP growth assumption drawing upon IMF growth rates for 2020-21 for the *Pre-COVID Base* and the *COVID Base* and then the IFs system for projections to 2030.

***Exercise Number 1:*** *Pulling a line graph for global GDP growth for two scenarios.*

*Steps: Flex Display; Geography Options; Using Groups; Select “World”; Select GDP Growth Rate – Percent per year; Select 2030; Select Line Graph; Select Display Format; Select Format Legends Scenario Names; Select Save; Save to Clipboard.*

*Figure 1:* *Global GDP growth rates at Market Exchange Rates (for 2011$) for two scenarios: COVID Base and Pre-COVID Base*.

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*Figure 2: Impact of COVID-19 on GDP for INSERT COUNTRY/REGION*

***Paste it here!***

## Overall GDP

Gross Domestic Product (GDP) is a measure of the overall production and consumption at a country level. Each year the value of GDP starts at zero and builds as countries produce, consume, save, invest, and trade. Long-term patterns of GDP have broad impacts on government revenue generation, spending on social services and transfers, and investing in security.

Changing growth rates directly impacts long-term flows of economic production and consumption. Below, we measure the effect of the changing GDP growth rates above on overall GDP measured at market exchange rates (MER), which captures the value of economic output measured from the perspective of international markets. The measure uses “real” currency (measured in 2011 USD) and therefore controls for inflation.

***Exercise Number 2:*** *Pulling data on GDP at MER from IFs for two scenarios to 2030. Make a Table, choose Comparison Options; Difference Comparison (a-b); Save; Save Normal View; Copy to Clipboard. Then take the copied values from the clipboard and, if you want to format them nicely, use the provided Training Excel Worksheet and paste them in Worksheet 1. This produces the absolute comparison. To produce the relative comparison, choose Comparison Options; Reset; Comparison Options; Percent Comparison (a-b)/b\*100. Copy this in the Training Excel Worksheet in Worksheet 1. These two data series will complete the table.*

***Table 1:*** *Absolute and relative annual difference in GDP between the* Pre-COVID Base *and the* COVID Base for the World*.*

***Paste it here!***

Insert trenchant analysis of the effect of COVID-19 on the country/region you are focused on.

***Table 2:*** *Absolute and relative annual difference in GDP between the* Pre-COVID Base *and the* COVID Base for INSERT COUNTRY/REGION*.*

***Paste it here!***

## GDP per capita

GDP growth can be conceptualized as the “velocity” at which an economy is changing. Overall GDP is a measure of the “mass” or overall volume of production and consumption, or alternatively, the total “value-add” in an economy.

GDP per capita can be conceptualized as measuring the sophistication of an economy and is sometimes referred to as a proxy for “income” or “well-being”. The average economic production per capita can be a useful measure of the overall level of development within a society.

In *Figure 3* we measure the impact of COVID-19 on global patterns of GDP per capita diffusion measured at purchasing power parity (PPP). The PPP measure controls for local costs of production and can be a better measure of how changing economic growth impacts living standards for normal citizens. It is different than the MER measure used above, and less developed countries tend to have higher values of GDP measured at PPP as compared with MER.

***Exercise Number 3:*** *Pulling a line graph for global GDP per capita (at PPP) growth for two scenarios. Steps: Flex Display; Geography Options; Using Groups; Select “World”; Select GDP per capita (PPP) – Thousand dollars; Select 2030; Select Line Graph; Select Display Format; Select Format Legends Scenario Names; Select Save; Save to Clipboard.*

***Figure 3:*** *Global GDP per capita (at purchasing power parity for 2011$ in thousands) for two scenarios: COVID Base and Pre-COVID Base*.

***Paste it here!***

***Figure 4:*** *GDP per capita (at purchasing power parity for 2011$ in thousands) at for INSERT COUNTRY/REGION*

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## Poverty and the achievement of Sustainable Development Goal 1

The first Sustainable Development Goal emphasizes eliminating extreme poverty around the world by 2030. This target is measured as the percent of the population in a given country living on less than $1.90 per day with the goal being reducing this share below 3% of the population.

Historically, much progress has been made to reduce the share of the population living in extreme poverty, though COVID-19 may reduce historical progress by reducing economic activity, lowering household incomes, and generally undermining development progress.

*Figure 5* shows the impact of COVID-19 on extreme poverty on a percentage basis. Prior to COVID-19, the world was not expected to achieve this measure and the effect of COVID-19 has been to erode development on a percentage basis. The “set-back” in development in this indicator is 3-5 years, depending on when it is measured.

*Exercise Number 4: Pulling a line graph for global poverty ($1.90) percent of global population for two scenarios.*

*Steps: Flex Display; Geography Options; Using Groups; Select “World”; Select Poverty <1.90 per day, Log Normal, - Percent of Population; Select 2030; Select Line Graph; Select Display Format; Select Format Legends Scenario Names; Select Save; Save to Clipboard.*

***Figure 5:*** *Global poverty (at purchasing power parity for 2011$ as a share of the population) for two scenarios: COVID Base and Pre-COVID Base*.

***Paste it here!***

***Figure 6:*** *Global poverty (at purchasing power parity for 2011$ as a share of the population) for two scenarios `at for INSERT COUNTRY/REGION*

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The share of the population living on less than $1.90 per day is an important indicator because it is the SDG target value and it reflects the underlying distribution of resources within a society. But equally important is the measurement of poverty as a count of the population. This is true for two reasons. First, the number of people living in extreme poverty is a direct reflection of the individual lives suffering from lack of resources—those fundamentally deprived of the freedom that comes with capabilities. Second, as development deteriorates there are direct effects on the distribution of resources in a society (the share of the population living under a given income threshold) but also on other drivers like the total fertility rate. Worsening development outcomes, *ceteris paribus*, will increase the number of people in a population

*Exercise Number 5: Pulling a line graph for global poverty ($1.90) millions for global population for two scenarios.*

*Steps: Flex Display; Geography Options; Using Groups; Select “World”; Select Poverty <1.90 per day, Log Normal, - Millions; Select 2030; Select Line Graph; Select Display Format; Select Format Legends Scenario Names; Select Save; Save to Clipboard.*

***Figure 6:*** *Global poverty (at purchasing power parity for 2011$ in millions) for two scenarios: COVID Base and Pre-COVID Base*.

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***Figure 7:*** *Global poverty (at purchasing power parity for 2011$ in millions) for two scenarios `at for INSERT COUNTRY/REGION*

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# Conclusion

This research note introduces two scenarios that compare the effect of changing GDP growth rates drawn from the IMF and processed through the International Futures system to explore how global and INSERT COUNTRY/REGION development is likely to be effected through 2030, with a particular focus on poverty. It begins to identify the shapes of the contours of the long-term development impacts of COVID-19 on human well-being. But more work needs to be completed.

Moving forward, we plan on producing additional analyses that explore how COVID-19 will change development outcomes across more dimensions using the International Futures tool and other resources provided by UNDP SDG Integration.

# Bibliography

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Verity, Robert et al. 2020. “Estimates of the Severity of COVID-19 Disease.” *medRxiv*: 2020.03.09.20033357.

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1. For more information see [www.pardee.du.edu](http://www.pardee.du.edu) and Hughes, B.B. (2019) International Futures: Building and Using Global Models. Academic Press (Elsevier Ltd). [↑](#footnote-ref-1)
2. Technical documentation of each sub-module can be found at <https://pardee.du.edu/node/484>. [↑](#footnote-ref-2)
3. Hughes, Barry B. 2005. "Forecasting Productivity and Growth with International Futures (IFs) Part 1: The Productivity Formulation." Working paper 2005.05.24.a. Pardee Center for International Futures, Josef Korbel School of International Studies, University of Denver, Denver, CO. <https://pardee.du.edu/forecasting-productivity-and-growth-international-futures-ifs-part-1-productivity-formulation> [↑](#footnote-ref-3)
4. Hughes, Barry B., and Anwar Hossain. 2004. "Long-Term Socio-Economic Modeling with Universal, Globally-Integrated Social Accounting Matrices (SAMs) in a General Equilibrium Structure." Working paper 2004.05.07. Pardee Center for International Futures, Josef Korbel School of International Studies, University of Denver, Denver, CO. <https://pardee.du.edu/long-term-socio-economic-modeling-universal-globally-integrated-social-accounting-matrices-sams> [↑](#footnote-ref-4)