

Module 10: Microinsurance and Economic Development

MODULE 10: MICROINSURANCE AND ECONOMIC DEVELOPMENT

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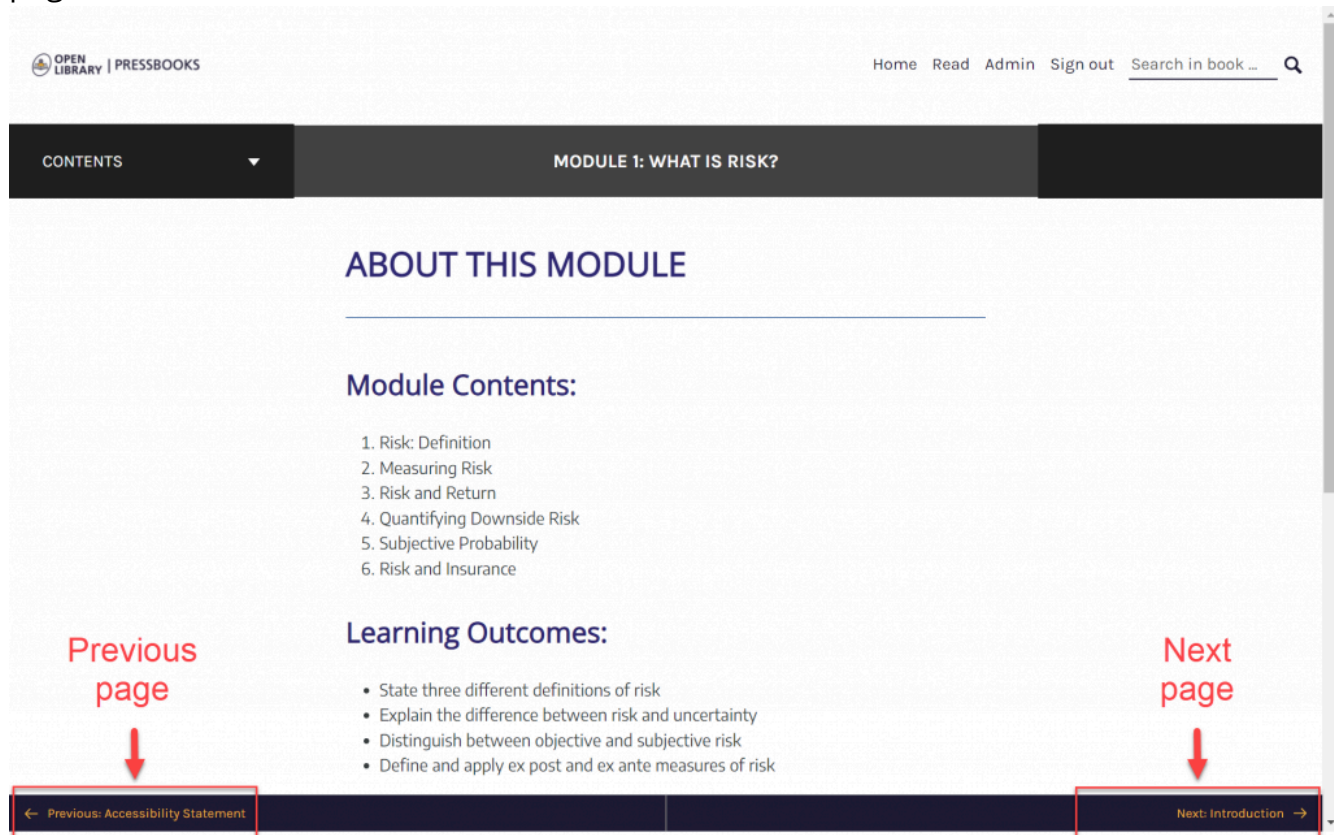
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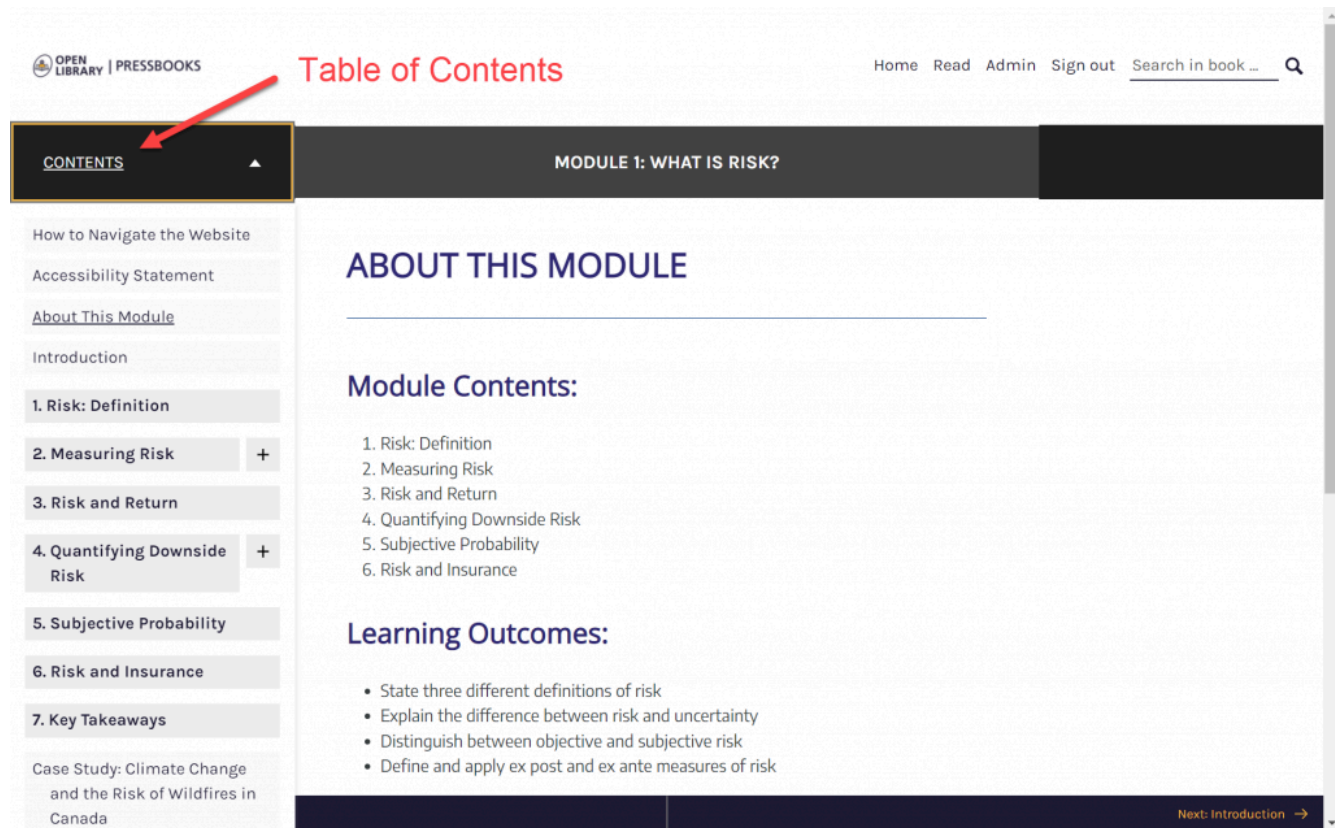
HOW TO NAVIGATE THE WEBBOOK

The web version of this module contains topics that can be viewed in two ways:

1. Select the links at the bottom of the browser window to go to the Next or Previous web page.



2. Select the Contents menu (on left side of web page) and choose the topic to view.



The screenshot displays the Open Library Pressbooks interface. At the top left, the logo reads "OPEN LIBRARY | PRESSBOOKS". To the right, navigation links include "Home", "Read", "Admin", "Sign out", and a search bar labeled "Search in book ...". A red arrow points to the "CONTENTS" link in the left sidebar, with the text "Table of Contents" written in red above it. The sidebar also lists other navigation options: "How to Navigate the Website", "Accessibility Statement", "About This Module", "Introduction", and a list of module topics from "1. Risk: Definition" to "7. Key Takeaways", with "2. Measuring Risk" and "4. Quantifying Downside Risk" expanded. A case study, "Case Study: Climate Change and the Risk of Wildfires in Canada", is listed at the bottom of the sidebar. The main content area is titled "MODULE 1: WHAT IS RISK?" and features a section "ABOUT THIS MODULE". Below this, the "Module Contents:" list includes: "1. Risk: Definition", "2. Measuring Risk", "3. Risk and Return", "4. Quantifying Downside Risk", "5. Subjective Probability", and "6. Risk and Insurance". The "Learning Outcomes:" section lists four bullet points: "State three different definitions of risk", "Explain the difference between risk and uncertainty", "Distinguish between objective and subjective risk", and "Define and apply ex post and ex ante measures of risk". At the bottom right, a navigation bar shows "Next: Introduction →".

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[About This Module](#)

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1. Risk: Definition

2. Measuring Risk +

3. Risk and Return

4. Quantifying Downside Risk +

5. Subjective Probability

6. Risk and Insurance

7. Key Takeaways

Case Study: Climate Change and the Risk of Wildfires in Canada

MODULE 1: WHAT IS RISK?

ABOUT THIS MODULE

Module Contents:

1. Risk: Definition
2. Measuring Risk
3. Risk and Return
4. Quantifying Downside Risk
5. Subjective Probability
6. Risk and Insurance

Learning Outcomes:

- State three different definitions of risk
- Explain the difference between risk and uncertainty
- Distinguish between objective and subjective risk
- Define and apply ex post and ex ante measures of risk

Next: Introduction →

ACCESSIBILITY STATEMENT

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Accessibility Features

The web version of this module has been designed with accessibility in mind by following the guidelines detailed in this [Accessibility Checklist](#). It incorporates the following features:

- It has been optimized for people who use screen-reader technology.
 - all content can be navigated using a keyboard
 - links, headings, and tables use proper markup
 - all images and figures have text descriptions
 - Simple equations use symbols that will be correctly interpreted by screen readers (for example, minus signs and not hyphens).
 - Complex equations are written in MathML or written in such a way they can be translated into MathML (for example, written in LaTeX and rendered with MathJax).
- Information is not conveyed by colour alone.

Conformance Status

The [Web Content Accessibility Guidelines \(WCAG\)](#) defines requirements for designers and developers to improve accessibility for people with disabilities. It defines three levels of conformance: Level A, Level AA, and Level AAA. This website follows accessibility guidelines for WCAG 2.0, Level AA.

Feedback

We welcome your feedback on the accessibility of the website. Please let us know if you encounter accessibility barriers:

- Contact: Risk and Insurance Studies Centre (RISC)
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ABOUT THIS MODULE

Module Contents:

1. The Art of Making Meaningful Comparisons
2. Rich and Poor
3. Sources of Economic Growth
4. What is Microinsurance?
5. Microinsurance and Economic Growth
6. Key Takeaways

Learning Outcomes:

- Define the economic measure of well-being and demonstrate understanding of its limitations
- Demonstrate the ability to make meaningful comparisons between countries and within a country over time
- Discuss the major sources of economic growth
- Define microinsurance and describe its major characteristics
- Explain major channels through which microinsurance can foster economic development

INTRODUCTION



You are an eleven-year-old girl living with your mother, grandmother and four younger siblings in Freetown, the capital of Sierra Leone. Both the Atlantic Ocean and the city centre are just a short walk away from your home through your bustling neighbourhood, and you can catch a glimpse of the largest natural harbour of the African continent from your home.

You might have been led to believe that you live in a luxurious coastal community but in fact, you live in a two-room shack with a dirt floor and a bucket to collect the water pouring through a hole in the roof during the long rainy season. There is no garbage collection or sanitation, and the water that you help your mother fetch from the only water tap in your neighbourhood is so contaminated that you are sick most of the time. Many days you feel dizzy and tired because there is not enough food for you and your siblings.

It has not always been like that. Your father had a good job that supported the family and you lived in a nice house on the rolling hills of Freetown. But he died in the Ebola crisis a few years ago and after his death, your family had to move to this shantytown to make

ends meet. Your hopes to keep going to school after you complete your primary education in a few months have vanished as your mother needs your help to support the family.

You may not realize it, but you are not alone. In 2015, 9.2% of the global population or 744 million people lived below the international poverty line of \$1.90 a day. Prior to the pandemic, the World Bank had projected a fall in that number to 635 million in 2020 and 613 million in 2021 but the actual numbers were 732 million and 711 million, respectively. According to the World Bank, the COVID-19 pandemic compounded by the effects of conflict and climate change reversed a 20-year downward trend in global poverty rates. Global poverty is concentrated geographically with almost half of the poor living in just five countries in Sub-Saharan Africa: Nigeria, DR Congo, Tanzania, Ethiopia, and Madagascar. The demography of these countries is such that four out of five people live in rural areas, half of the poor being children, and women representing the majority of the poor in most regions.



In this module, we will examine the underpinnings of economic prosperity. Why are

some countries richer than others? How large are the gaps in economic prosperity across countries? Are these gaps narrowing or widening over time? We will start by thinking about human well-being and how our measures of economic prosperity relate to things that we value such as poverty reduction and education. Then, we will revisit the underpinnings of economic well-being that you are familiar with from your introductory macroeconomics course. We will conclude by examining the long-term role of insurance in fostering economic prosperity in developing countries, and how this can be used to support low-income individuals – like the family of the girl in our example – to weather downturns in fortune.

“Averages are no consolation to those who have been left behind.”

Angus Deaton

2015 Nobel Prize in Economic Sciences

1. THE ART OF MAKING MEANINGFUL COMPARISONS

[1.1 Nominal vs Real GDP](#)

- **Nominal GDP**
- **Real GDP**

[1.2 Real GDP per Capita](#)

[1.3 GDP and Welfare](#)

[1.4 Economic Growth](#)

[1.5 The Rule of 70](#)

1.1 NOMINAL VS REAL GDP

Why do some countries have higher standards of living than others? This is a major question addressed by macroeconomics, one of the two subfields in economics. While **microeconomics** examines the decision making of individuals and firms and how they interact in markets, **macroeconomics** focuses on the economy as a whole and how it interacts with the rest of the world.

What is GDP?

A key measure of the standard of living in economics is the real gross domestic product per capita. The **gross domestic product** (GDP) is the market value of all final goods and services produced within a country during a specific period, typically a year. GDP is a measure of the size of a nation's economy.

Measuring GDP involves finding the market value of each of the millions of goods and services that an economy produces, from bread and haircuts to computers and airplanes; GDP is then calculated by aggregating these market values into one total dollar value. In theory, the task appears straightforward – start by taking the quantity of each good or service produced, then multiply the quantity by the price at which it sold to find its dollar value. Then, add up these dollar values for all goods and services the economy produced in a given year to find the total market value or **nominal GDP**.

In reality, the complexity of modern economies renders the measurement and aggregation across different goods and services a very challenging task. Furthermore, while the output of material goods in an economy is relatively easy to compute, this is not so for services. For example, it is challenging to value the output of an insurance company or a bank.

Example 1: Nominal GDP and Welfare

Canada's GDP was CAD 1.1 trillion in 2000 and CAD 2.2 trillion in 2020. Are we twice as well off in 2020 as we were 20 years before? Not necessarily. There are three possible reasons behind this increase:

1. either the quantity of goods and services that we produce has increased or
2. the prices have risen or
3. a combination of these two.

If, for example, we produce the same quantity of goods and services in 2020 but their prices have doubled thus doubling GDP in 2020 compared to 2000, our standard of living would not have improved at all.

We are made better off only if the economy produces more goods and services in year 2020 compared to 2000.

A change in the nominal GDP reflects both changing quantities and changing prices. In economics, we rely on **real variables**, variables that adjust for changes in the price level over time, to make intertemporal comparisons. Nominal values are measured in terms of dollars while real values are measured in terms of quantities. In other words, real values account for the effect of **inflation**, the rate of increase in the average level of prices. Real GDP is a more appropriate measure of welfare than nominal GDP because a change in the real GDP unequivocally indicates a change in the quantities produced or the size of the economy.

While nominal GDP measures output in terms of current market prices, **real GDP** measures output in terms of constant prices, that is, it measures the value of production in a given year using the prices in a base year. To convert the nominal GDP in real terms, we need to “deflate” it by some measure of the aggregate price level such as the Consumer Price Index, which tracks movements in the average price level in an economy. The relationship between real and nominal GDP is as follows:

$$\text{Real GDP} = \frac{\text{Nominal GDP}}{\text{Price Index}} \quad (1)$$

The **Consumer Price Index** (CPI) compares the cost of a fixed basket of goods and services bought by the “typical” household in a given period relative to the cost of that basket in a base period. The fixed basket used to compute Canada’s CPI contains thousands of goods and services, produced both domestically and imported from abroad, divided into 8 major categories: food; shelter; household operations, furnishings, and equipment; clothing and footwear; transportation; health and personal care; recreation, education and reading; and alcoholic beverages, tobacco products and recreational cannabis.

As the composition of the basket does not change over time, a rise in the cost of the basket reflects a rise in the average price level. The choice of base period is arbitrary – any year in our data can be designated as a base year. The CPI compares the cost of the basket in any other period to the cost of the basket in the base year. Conventionally, the value of the index is set equal to 100 in the base period to allow for easy comparisons between years. However, you must be mindful of that when converting nominal variables into real terms – see Examples 2 and 3.

Example 2: How Do We Interpret a Change in the CPI?

Canada’s CPI for 2020 was 112.6 with a base year of 2012. The implication is that prices increased by 12.6% between 2012 and 2020. Every \$100 in 2012 has the same purchasing power as \$112.6 in 2020. Alternatively, a dollar in 2012 has the same purchasing power as $112.6/100 = \$1.126$ in 2020. If, for example, your income was \$20,000 in 2012, you would need $20,000 (112.6/100) = \$22,520$ in 2020 to have the same purchasing power as in 2012.

Example 3: Computing Real GDP

[Table 1](#) below shows Canada's nominal GDP and CPI for the period 2010 – 2020. Use the table to compute Canada's real GDP.

Table 1: Canada's nominal GDP and CPI, 2010 – 2020

Year	Nominal GDP (in millions)	CPI (2012 = 100)	Annual inflation rate (%)	Real GDP (in millions)
2010	\$1,666,048	95.7		$= \frac{1,666,048}{\left(\frac{95.7}{100}\right)}$ $= \$1,740,907$
2011	1,774,063	98.5	$= \frac{98.5 - 95.7}{95.7} \times 100$ $= 2.84\%$	$= \frac{1,774,063}{\left(\frac{98.5}{100}\right)}$ $= \$1,801,079$
2012	1,827,201	100.0	1.50%	1,827,201
2013	1,902,247	100.9	0.89%	1,885,279
2014	1,994,898	102.9	1.94%	1,938,676
2015	1,990,441	104.0	1.06%	1,913,886
2016	2,025,535	105.5	1.42%	1,919,938
2017	2,140,641	107.1	1.49%	1,998,731
2018	2,235,675	109.6	2.28%	2,039,849
2019	2,311,294	111.8	1.97%	2,067,347
2020	2,206,764	112.6	0.71%	1,959,826

Data Source: Statistics Canada

Have a look at the second column of [Table 1](#). Notice the dramatic impact of the COVID-19 pandemic on the Canadian economy – in nominal terms, GDP in 2019 was higher compared to year 2020. Column 3 shows the steady rise in the aggregate price level over the period. To compute the annual inflation rate in Column 4, we find the percentage change in CPI between two consecutive years. Notice that the inflation rate varies in a very

narrow range, between 0.71% and 2.28% during this 10-year period. This is expected as the Bank of Canada has targeted inflation since 1991. The Bank aims at keeping total CPI inflation at 2% – the midpoint of a target range of 1 to 3%.

To compute real GDP in Column 5 of [Table 1](#), we first need to divide the CPI index by 100, which will enable us to compare the purchasing power of \$1 in 2012, the base year, to any other year. For example, dividing the CPI in 2015 by 100 yields $104/100 = 1.04$. Thus, \$1 in 2012 has the same purchasing power as \$1.04 in 2015. After that, we divide the real GDP by the CPI expressed as a decimal. The real GDP for any year in Column 5 is now deflated and expressed in 2012 dollars enabling us to make meaningful comparisons of the economy's physical output over time. Notice also that the nominal and real GDP in the base year, 2012, are the same, which is always the case.

Drag and Drop Activity

Click and drag the numbers in the table below to assemble the correct equation for calculating Real GDP.



An interactive H5P element has been excluded from this version of the text. You can view it online here:

<https://ecampusontario.pressbooks.pub/econmod10/?p=133#h5p-16>

1.2 REAL GDP PER CAPITA

The table in Example 3 (Table 1) suggests that indeed, between 2000 and 2020 Canada's real GDP has risen from about \$1.7 trillion to about \$2 trillion. Therefore, we can conclude that the size of the Canadian economy has increased over these 20 years. But is the average Canadian in year 2020 better off compared to year 2000? This question may appear peculiar but consider, for example, a situation whereby the Canadian population has expanded dramatically, so that even though the size of the economic pie is larger in 2020, it is now shared among a much larger number of consumers. Real GDP per capita, which accounts for population growth, is one of the most important measures of living standard in economics. Real GDP per capita for a country or region can be computed as follows:

$$\text{Real GDP per capita} = \frac{\text{Real GDP}}{\text{Population}} \quad (2)$$

Example 4: Computing Real GDP per Capita

[Table 2](#) below shows Canada's nominal GDP, the real GDP we computed in Example 3, and population for the period 2010 – 2020. We will practise computing Canada's real per capita GDP for each year in our sample.

To compute the real GDP per capita, you need to divide the real GDP by the size of the population for each year. Always take care to note the unit in which a variable is measured. The real GDP per capita you will obtain will be measured in millions of 2012 dollars, the unit of measurement of real GDP. We multiply this ratio by 1 million to convert real GDP per capita into 2012 dollars in the last column of [Table 2](#).

Table 2: Canada's nominal GDP, real GDP, and population, 2010 – 2020

Year	Nominal GDP (in millions)	Real GDP (in millions)	Population	Real GDP per capita
2010	\$1,666,048	\$1,740,907	34,004,889	$= \frac{\$1,740,907}{34,004,889} \times 1,000,000$ $= \$51,195.79$
2011	1,774,063	1,801,079	34,339,328	$= \frac{\$1,801,079}{34,339,328} \times 1,000,000$ $= \$52,449.46$
2012	1,827,201	1,827,201	34,714,222	52,636
2013	1,902,247	1,885,279	35,082,954	53,738
2014	1,994,898	1,938,676	35,437,435	54,707
2015	1,990,441	1,913,886	35,702,908	53,606
2016	2,025,535	1,919,938	36,109,487	53,170
2017	2,140,641	1,998,731	36,545,236	54,692
2018	2,235,675	2,039,849	37,065,084	55,034
2019	2,311,294	2,067,347	37,601,230	54,981
2020	2,206,764	1,959,826	38,037,204	51,524

Data source: Statistics Canada

Drag and Drop Activity

Click and drag the numbers in the table below to assemble the correct equation for calculating Real GDP per capita.



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<https://ecampusontario.pressbooks.pub/econmod10/?p=28#h5p-17>

GDP counts all goods and services produced in the territory of a country by both domestic and foreign nationals. While GDP focuses on the *location* of production and ignores ownership of factors of production, a closely related concept, **Gross National Product** (GNP), focuses on the *ownership* of factors of production and ignores its location. GNP is a measure of the total market value of all final goods and services produced during a specific period by a nation's factors of production regardless of their location. For example, a student from China working part-time in Canada will contribute both to Canada's GDP and China's GNP. Similarly, the value of output produced by a U.S.-owned company operating in Ontario will be counted in the U.S. GNP and Canada's GDP.

The relationship between GDP and GNP is given by:

$$\text{GNP} = \text{GDP} + \text{net factor payments from abroad}$$

where net factor payments from abroad = (factor payments **from** abroad) – (factor payments **to** abroad).

GDP and GNP are typically very similar and widely used for comparisons. However, GNP (or Gross National Income, GNI), is conventionally used for international comparisons by organizations such as the World Bank. International comparisons are further complicated by the fact that currencies differ across countries and for meaningful cross-country comparisons, GDP must be expressed in a common currency.

1.3 GDP AND WELFARE

Even conceptually, real GDP is an imperfect measure of the performance of an economy. First, it measures the value of only market activities, i.e., goods and services exchanged in legal market transactions. But there are plenty of goods and services we produce for ourselves in the household such as dinners and childcare that are not counted in the GDP. If you buy a take-out dinner that costs \$20, this will add \$20 to Canada's GDP. However, if you cook an equivalent dinner for yourself, it will not be accounted for in the GDP. More significantly, the time and effort it takes to raise a child at home, time and effort caretakers do not get paid for, are not counted in a country's GDP. In general, **household production**, goods, and services that household members produce using their labour and capital for their own consumption, are not counted in the GDP. This is a significant shortcoming when we make international comparisons. A significant share of goods and services produced in developing countries are not exchanged in market transactions and therefore, not counted in the GDP. While adjustments are made to reflect such nonmarket activities, these adjustments are inevitably imprecise.

GDP does not account for the **underground economy** or black market where cash and barter transactions are not reported to the government. In some cases, these transactions serve the purpose of avoiding taxes such as unreported tips while in others, they are related to illegal activities such as trade in illegal drugs or guns. Because of its very nature, the size of the underground economy is impossible to calculate. Its share in a country's GDP will vary across countries and the larger that share, the more the country's GDP will underestimate the size of the economy.

In contrast, negative by-products of production such as pollution, climate change, resource depletion, and environmental degradation are not subtracted from GDP. However, when we expend efforts to correct for these harms or "bads" as they are known in economics, our spending is counted in the GDP. Example 5 illustrates the issue. Most economists would agree that **negative externalities** should be subtracted from GDP and "goods" or benefits such as life expectancy should be added but there is no agreement on how to value them.

Example 5: Deepwater Horizon Oil Spill

The largest marine oil spill in history was triggered by a massive explosion on the Deepwater Horizon drilling rig off the coast of the U.S. state of Louisiana in April 2010. Eleven workers lost their lives in the explosion and many more were hurt. By the time the oil well was capped three months later, more than 3 million barrels of oil were leaked into the Gulf of Mexico. According to the U.S. National Oceanic and Atmospheric Administration, the oil spill covered more than 159,000 square kilometers of the Gulf of Mexico and coated more than 2,000 km of shoreline with oil and tar.¹ The impact of the disaster was felt by the local economies of all Gulf Coast states, Louisiana, Alabama, Mississippi, Texas and Florida, as commercial fishing, offshore drilling, and tourism took a direct hit. It took BP, the owner of the well, several years to remove most of the oil from the Gulf beaches, wetlands, and estuaries but studies suggest that it will take some ecosystems several decades to recover.

In 2010, the Wall Street Journal ran an article suggesting that even though the spill was expected to have a negative effect on the economies of the affected southern states, it might end up increasing the U.S. GDP marginally because of the enormous clean-up efforts. While estimating the exact amount this large industrial disaster has added to the U.S. GDP is not possible, wages and salaries of clean-up workers, services of vessels skimming the spilled oil from the water surface as well as the cost of dispersants, chemicals used to prevent large oil slicks, were all counted for in the GDP.²



GulfCorps monitoring restored oyster reefs.

Finally, real GDP per capita is a measure of living standard for the average or typical person in an economy. However, it does not account for the distribution of income and income inequality. As Angus Deaton, the winner of the 2015 Nobel Prize in Economic Sciences states, “[a]verages are no consolation to those who have been left behind.” Professor William Easterly, a leading development economist, notes that life during growth does get better, on average,³ but some are left behind and the benefits of growth can accrue only to a select few. It is little consolation for a poor person in a rich country that the average person in the country enjoys a high standard of living.

In summary, increasing human wellbeing maybe the ultimate goal of policy makers. But human wellbeing is difficult to define and measure. In economics, we use the real GDP per capita as a measure of economic development. As Robert Lucas, winner of the 1995 Nobel Memorial Prize in Economic Sciences, states “[t]his may seem too narrow a definition, and perhaps it is, but thinking about income patterns will necessarily involve us in thinking about many other aspects of societies too.”⁴

Flashcard Activity



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<https://ecampusontario.pressbooks.pub/econmod10/?p=145#h5p-18>

Notes

1. National Oceanic and Atmospheric Administration (NOAA). 2020. "Deepwater Horizon 10 Years Later: 10 Questions." April 13. <https://www.fisheries.noaa.gov/news/deepwater-horizon-10-years-later-10-questions>
2. Di Leo, Luca. 2010. "Oil Spill May End Up Lifting GDP Slightly." Wall Street Journal. June 15. <https://www.wsj.com/articles/BL-REB-10524>
3. Easterly (1999)
4. Lucas (1988, p. 3)

1.4 ECONOMIC GROWTH

So far, we know how to measure the standard of living, how to make meaningful comparisons between countries and within a country over time. But how do we measure changes in the living standard over time? **Real GDP per capita growth** is the best measure of changes in economic well-being. The simplest way to measure economic growth is by taking the percentage change in real per capita GDP between two consecutive periods. If we denote real GDP per capita in year t as Y_t , then the growth in real per capita GDP, g , between any two years, t and $t - 1$, expressed as a decimal is given by:

$$g_t = \frac{Y_t - Y_{t-1}}{Y_{t-1}} \quad (3)$$

From Equation (3), we can express Y_t in terms of Y_{t-1} and the growth rate:

$$Y_t = (1 + g_t)Y_{t-1} \quad (4)$$

Take the natural logarithm (the logarithm to the base e), \ln , of both sides of equation (4):

$$\ln(Y_t) = \ln[(1 + g_t)Y_{t-1}] \quad (5)$$

A useful Maclaurin expansion-based approximation is that for any small positive number, a ,

$$\ln(1 + a) \approx a \quad (6)$$

Three useful properties of logarithms are the product rule, Equation (7), quotient rule, Equation (8), and power rule, Equation (9):

$$\ln(ab) = \ln(a) + \ln(b) \quad (7)$$

$$\ln\left(\frac{a}{b}\right) = \ln(a) - \ln(b) \quad (8)$$

$$\ln(a^b) = b \ln(a) \quad (9)$$

where b is a positive number. Applying first Equation (7) and then Equation (6) to Equation (5) yields:

$$\ln(Y_t) = \ln(1 + g_t) + \ln(Y_{t-1})$$

$$\ln(Y_t) \approx g_t + \ln(Y_{t-1})$$

$$g_t \approx \ln(Y_t) - \ln(Y_{t-1}) \quad (10)$$

Equation (10) is a useful approximation for computing growth rates that is commonly used by economists.

Example 6: Computing Real GDP per Capita Growth

[Table 3](#) below shows Canada's real per capita GDP which we computed in Example 4. Compute the annual growth rate in real GDP per capita.

We use Equation (3) to compute the annual growth rate in Canada's GDP in the third column of [Table 3](#). We leave it as an exercise to you to compute the growth rate using the approximation in Equation (10). Notice the large variation in the growth rate of the Canadian economy from one year to another; these are transient cyclical changes. While **business cycle** fluctuations are a very important macroeconomic concept, our focus here is not on the short run but the long run. It is trends that drive the standard of living over

time and differences in long-run growth rates determine differences in standards of living across countries.

Table 3: The growth rate in Canada's real per capita GDP, 2010-2020

Year	Real GDP per capita	Real GDP per capita growth
2010	\$51,196	
2011	52,449	$= \frac{\$52,449.46 - \$51,195.79}{\$51,195.79}$ $= 0.0245 \text{ or } 2.45\%$
2012	52,636	0.35%
2013	53,738	2.09%
2014	54,707	1.80%
2015	53,606	-2.01%
2016	53,170	-0.81%
2017	54,692	2.86%
2018	55,034	0.63%
2019	54,981	-0.10%
2020	51,524	-6.29%

Data source: Statistics Canada



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<https://ecampusontario.pressbooks.pub/econmod10/?p=147#h5p-21>

1.5 THE RULE OF 70

How many years would it take the GDP to double if it grows at a constant rate of g ? If we denote with Y_0 the starting level of output, then we are looking for T , the number of years, such that

$$Y_T = 2Y_0 \quad (11)$$

As the economy grows at a constant rate of g , the relationship between the initial output at $t = 0$ and the output at $t = T$ is given by:

$$Y_T = (1 + g)^T Y_0 \quad (12)$$

Substituting Equation (12) into Equation (11) yields:

$$(1 + g)^T = 2 \quad (13)$$

To solve for T in Equation (13), take the logarithm of both sides of the equation and apply the power rule of logarithms to obtain:

$$\ln[(1 + g)^T] = \ln(2)$$

$$T \ln(1 + g) \approx 0.7$$

$$T \times g \approx 0.7$$

$$T \approx \frac{70}{100g} \quad (14)$$

Equation (14) is the “Rule of 70,” a useful approximation used by economists to make quick comparisons, where g is expressed in decimals. [Table 4](#) shows the doubling time at several different growth rates.

Table 4: The Rule of 70

Annual growth rate of GDP	Doubling time (in years)
0.5%	140
1%	70
2%	35
3%	23
4%	18
5%	14

The average annual growth rate in per capita real GDP for a developed economy is typically 2 to 3%. A developing economy can grow much faster because it can adopt technology, production practices, and institutions from developed economies. Using the rule of 70, a developed economy will double its output every 25 to 35 years. In contrast, China, a developing economy, has grown at a spectacular average rate of about 7% per year over the last 40 years, thus witnessing a doubling in its standard of living every decade.

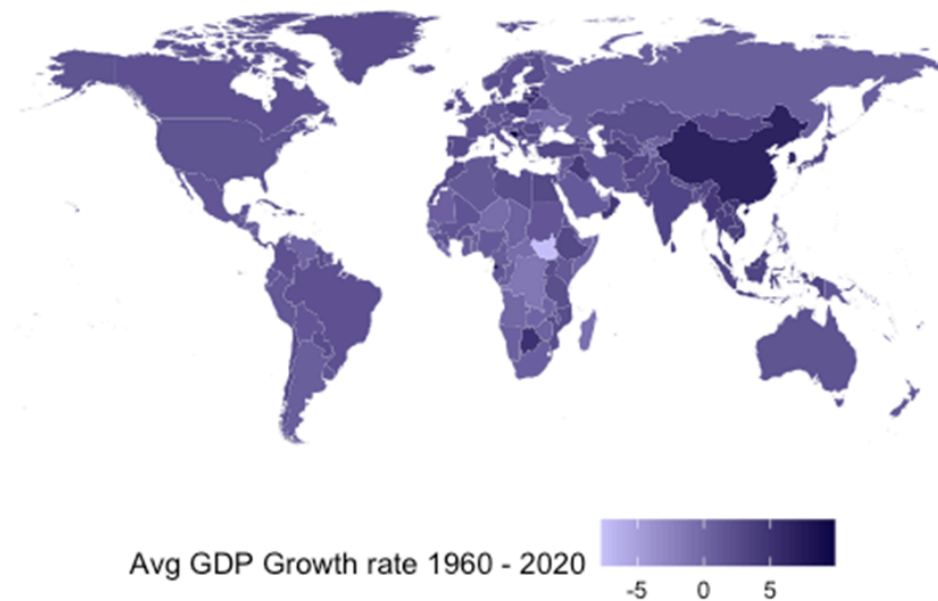


Figure 1:
Cross-country
differences in
average real GDP
per capita growth
rate
over the period
1960 – 2020.
Data source:
World Bank

[Figure 1](#) shows the average growth rate over the post-World War II period around the globe. The darker the colour, the higher the growth rate. China’s “growth miracle” is an exception, even among developing countries. There are poor countries like Niger and Madagascar with negative average real growth rates over this 60-year period.

Economic growth is important for both rich and poor countries. Over time, small differences in growth rates accumulate to large differences in the standard of living because of the power of compound growth, which works very much the same way as compound interest. Thus, if policy makers can increase growth even by a tiny amount, this would translate into large differences in living standards over the long run.



An interactive H5P element has been excluded from this version of the text. You can view it online here:

<https://ecampusontario.pressbooks.pub/econmod10/?p=413#h5p-22>

2. RICH AND POOR

The World Bank divides the world's economies into 4 groups – low income, lower-middle income, upper-middle income, and high income – based on their GNI per capita measured in current USD. The income classification thresholds are denoted in nominal terms but kept constant in real terms by annual adjustments for inflation.

The first two columns of [Table 5](#) show the income levels the World Bank classifications are based upon for 2021. Notice the large difference between the threshold levels for low- and high-income economies, which signals the large disparities between rich and poor in the world. In 2021, 27 countries fell into the low-income group, most of them in Africa. African and South Asian economies are also highly represented in the lower-middle income group. A diverse group of economies falls into the upper-middle income group, from large economies such as Russia, China, and Brazil to the poorest two members of the European Union, Bulgaria and Romania, and the oil rich Equatorial Guinea in Central Africa. The high-income group is the most populous, with 80 countries falling into that category in 2021. However, only one of these countries, Seychelles, is in Africa.

Table 5: Indicators of Welfare for Four Groups of Countries, 2019

Income classification*	GNI per capita (current USD)	Life expectancy at birth, total (years)	Mortality rate, under-5 (per 1,000 live births)	Primary school completion rate
Low income	< 1,046	64	68	66
Lower-middle income	1,046 – 4,095	49	49	90
Upper-middle income	4,096 – 12,695	72	35	92
High income	> 12,695	81	5	98

* Income classification is based on data for 2021

Low income (27 countries): for example, most sub-Saharan Africa, North Korea, Syria, Yemen, and Afghanistan

Lower-middle income (55 countries): for example, many in Africa, former Soviet Union, Caribbean, Middle East, most of South Asia

Upper-middle income (55 countries): for example, Brazil, Mexico, China, Russia, South Africa, Turkey, Bulgaria, and Thailand

High income (80 countries): for example, United States, Canada, most of Europe, Japan, Korea, Chile, Saudi Arabia, and Israel; only one, Seychelles, in Africa

Data Source: World Bank

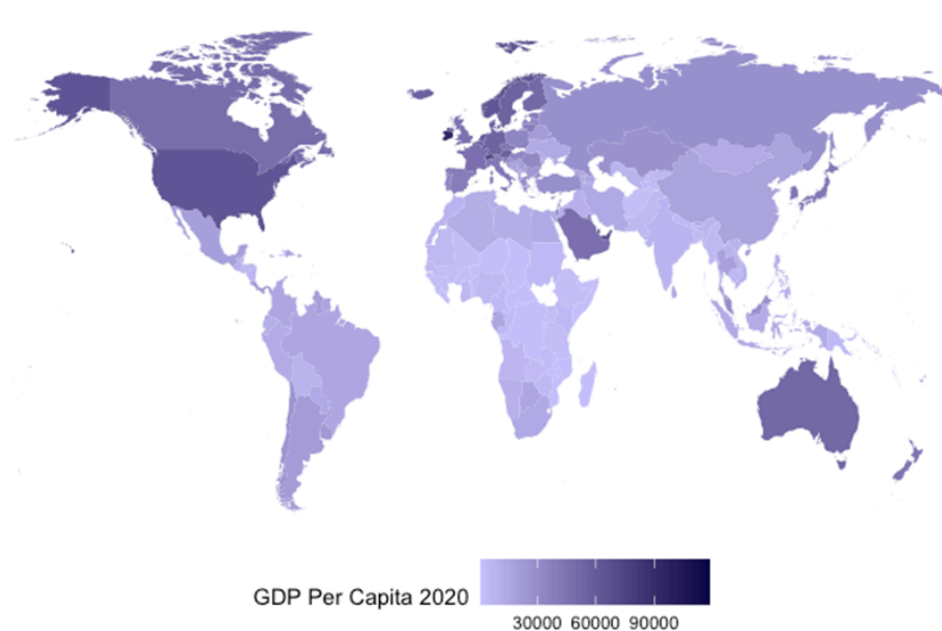


Figure 2:
Cross-country
differences in
real GDP per
capita. **Data
source:** World
Bank

The stark disparities between rich and poor are easy to spot on the map in [Figure 2](#), which depicts real GDP per capita around the world. The darker the purple colour, the higher the average standard of living in the country. For example, the average person in Canada in 2020 enjoyed a standard of living five times higher than that of the average person in the Philippines, a developing country. In general, there are large inequalities in the standard of living across the world.

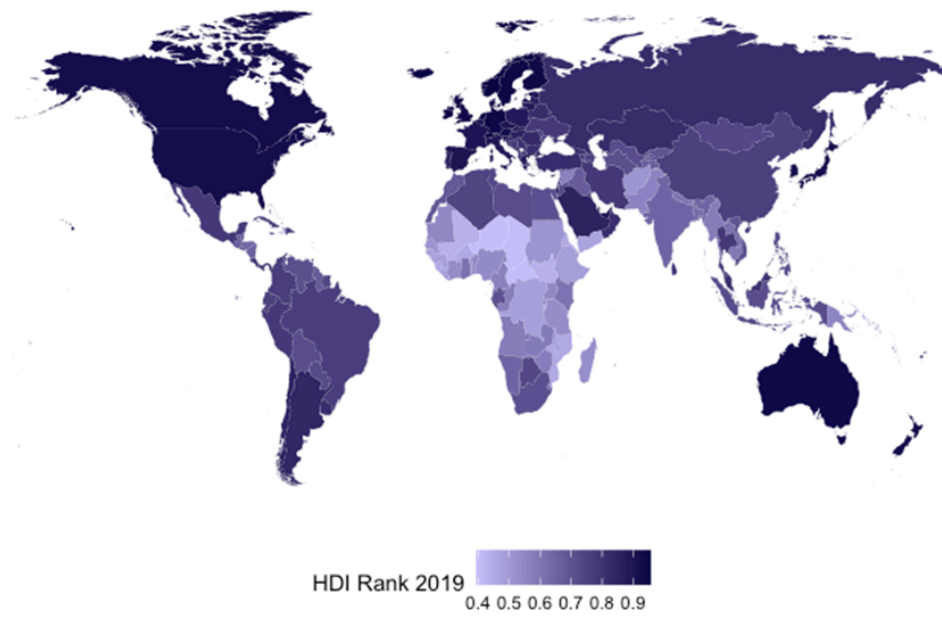


Figure 3: Human Development Index (HDI) rank, 2019. **Data source:** UNDP

Compare [Figure 2](#) to [Figure 3](#), which depicts the **Human Development Index (HDI)** around the world. As before, the higher the HDI, the deeper the purple colour on the map. Computed by the United Nations Development Programme, HDI is intended as a broader measure of human well-being than real per capita GDP. HDI is a summary measure of average achievement in three key dimensions of human development: a long and healthy life, being knowledgeable, and having a decent standard of living. Notice the high correlation in the HDI/GDP data used for the two maps – richer countries tend to have higher HDI. While real GDP is not a perfect measure of well-being, it is positively correlated with a broad range of indicators of quality of life across nations. Live during growth does tend to be better – people in richer countries tend to enjoy longer and healthier lives and more and better quality of education. However, the correlation is not perfect reflecting national policy choices. For example, Greece has the same HDI in 2019 as the United Arab Emirates (UAE), but its real income per capita is less than half that of the UAE. Equatorial Guinea has real per capita income comparable to that of Serbia in 2019. However, Equatorial Guinea’s 2019 HDI index positions the country in the medium human development category while Serbia falls in the very high human development category (ranked 145 and 64, respectively, of 189 countries).

Compare the Maps

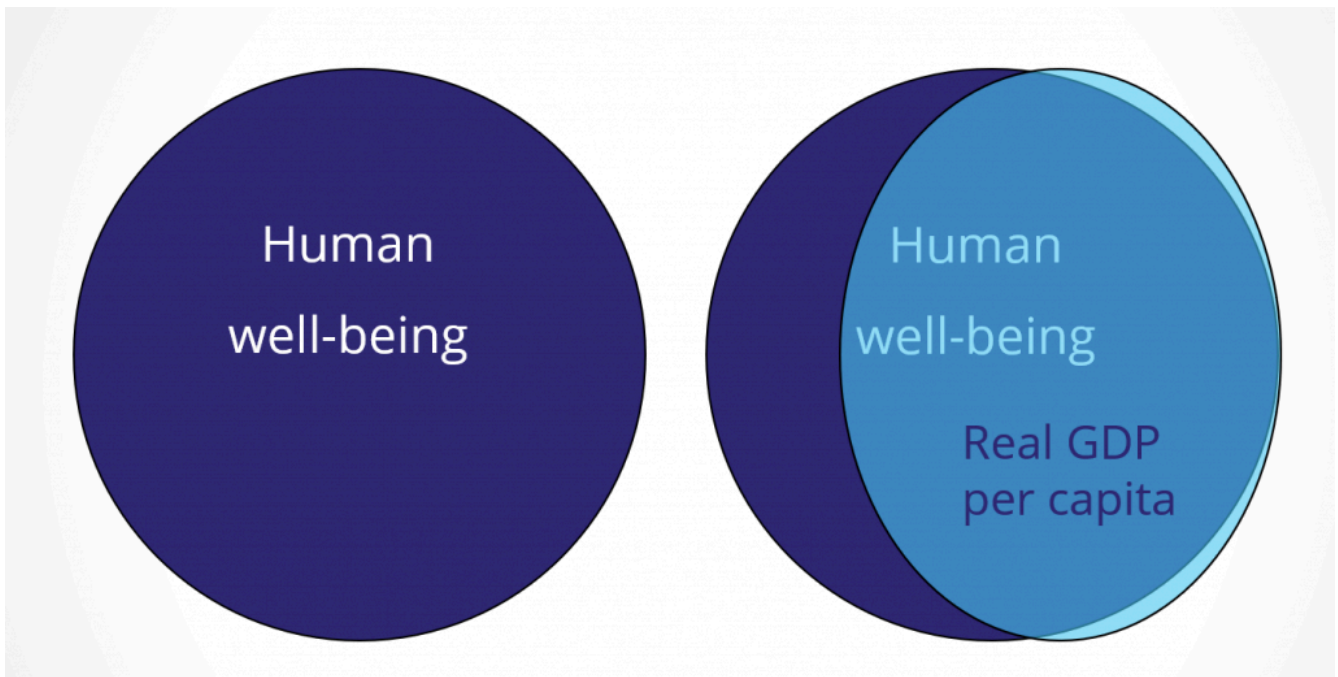


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<https://ecampusontario.pressbooks.pub/econmod10/?p=149#h5p-9>

As the target date for achieving the **Millennium Development Goals (MDG)** loomed in 2015, 17 **Sustainable Development Goals (SDGs)** were formally adopted by the United Nations General Assembly to govern the international development agenda until 2030. These goals, such as eradication of poverty and hunger, good health and well-being, quality of education, gender equality, reduced income inequalities, and climate action, are aspects of human well-being, which are relevant for both developed and developing nations. SDG 8 is about decent work and fostering sustained, inclusive, and sustainable economic growth, which, as we learned, is a reliable albeit imperfect indicator of welfare.

In conclusion, real GDP is an imperfect measure of economic and human well-being. Therefore, economic growth per se should not be the sole goal for an economy. However, GDP correlates with measures of prosperity that we value, and its growth is the engine for improvements in the standard of living over time. We dedicate the next section on understanding the major factors that foster economic growth.



Real GDP is an imperfect measure of economic and human well-being

3. SOURCES OF ECONOMIC GROWTH

In this section, we review the main factors that foster **economic growth**, physical and human capital accumulation, technology, and institutions. Economic growth is the process through which the economy's **potential output** is increased. Potential or "full employment" output is the level of output that the economy can produce sustainably if it employs all its factors of production fully and efficiently. Potential output is not the same as the maximum possible output an economy can produce. The economy can produce more than its potential if people work longer hours or extra production shifts. However, overusing resources to produce beyond the economy's capacity is not sustainable and it puts upward pressure on prices. Actual GDP growth exhibits large cyclical patterns – it speeds up in expansions and slows down in recessions. Growth theory instead focuses on the long run, the period of time when wages and prices are fully flexible.

Recall the four factors of production in economics: **labor**, **land**, **capital**, and **entrepreneurship**. Basic economic models of growth ignore land and focus on the remaining three factors of production. We distinguish between physical capital and human capital. **Physical capital** includes the stock of buildings, machines, tools, and equipment that firms use to produce goods and services as well roads and other infrastructure. **Human capital** is the knowledge and skills we possess and acquire through education, training, and experience that make us more productive. Distinguish human capital from labour. **Labour** is the physical effort we exert in the production process. **Entrepreneurship**, which is also defined as technological knowledge in growth models, is not just technology used in the production process but knowledge about the best ways to produce goods and services. Thus, differences between the accumulation of factors of production, and the inability to organize production efficiently can explain differences in standards of living across countries that we observe.

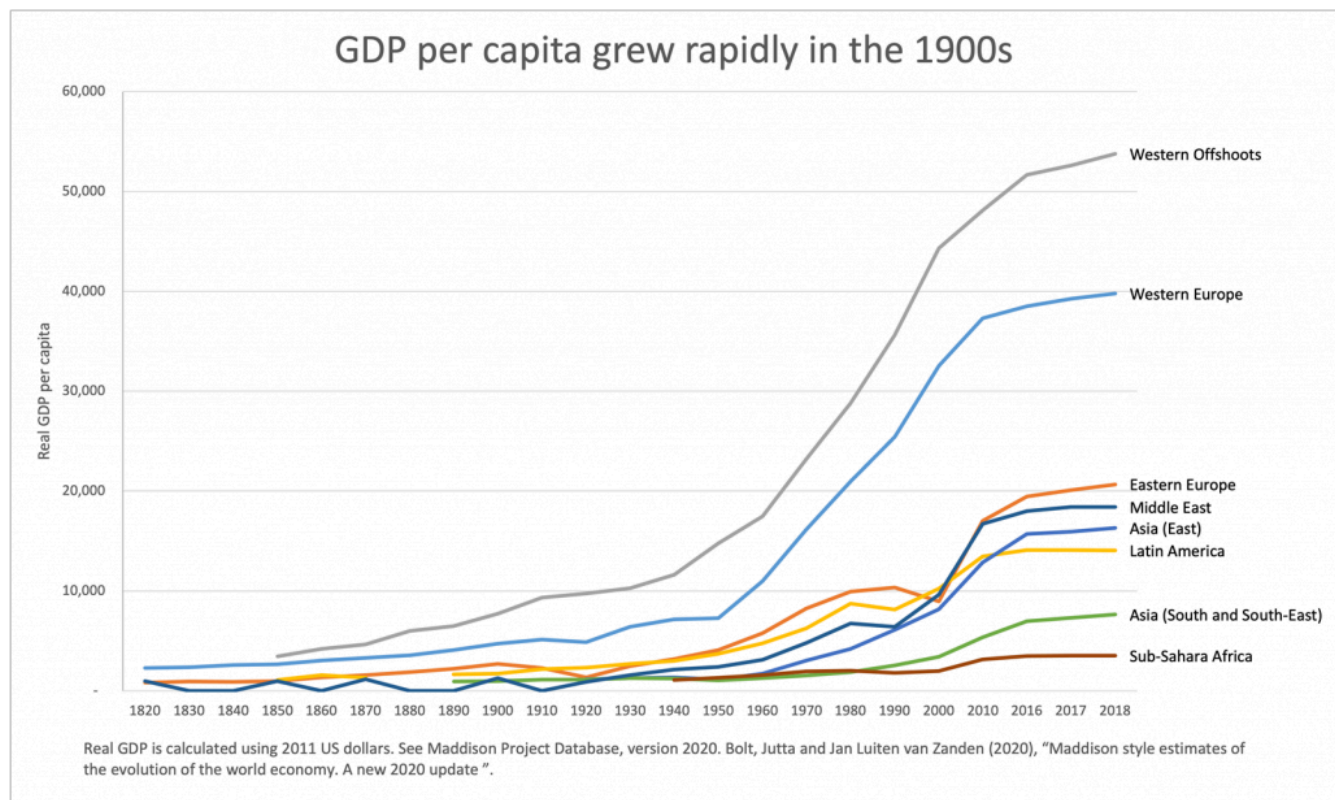


Figure 4: Growth over the last 200 years in selected regions.

Have a look at [Figure 4](#), which depicts the historical growth in per capita GDP in selected regions of the world over the past 200 years. Prior to the Industrial Revolution, every generation, in every corner of the world, lived pretty much the same way as the previous one with little progress made in living standards since the dawn of civilization. As Thomas Hobbes, a 17th century English philosopher put it, life was “poor, nasty, brutish, and short.” Some estimates suggest that between 1 CE and 1820, a span of nearly 2,000 years, living standards in Western Europe and the United States doubled, from around \$600 per person to around \$1,200 per person¹. During the next 200 years, however, between 1820 and 2018, living standards in the West rose by a factor of more than 20. In contrast, other regions of the world have lingered behind. This naturally leads to the question of why some countries have accumulated more physical and human capital and technology over the past 200 years than others.

A key determinant of economic growth ignored in basic economic models is **institutions**. Institutions can be broadly defined as the “rules of the game” that shape economic, political, and social interactions. Economic institutions include **property rights** and their enforcement by the government or the rule of law, competitive markets, political stability,

and honest government. Institutions are key in shaping incentives and encouraging investment in technology, physical and human capital that drive economic growth.



Figure 5: The Koreas at Night, 2014. Data source: Earth Science & Remote Sensing Unity, NASA.

Perhaps the most dramatic illustration of the importance of institutions in fostering prosperity is a picture of the Korean Peninsula at night (see [Figure 5](#)). The capital of North Korea, Pyongyang, with a population of about 3 million at the time this picture was taken, is a small island of light in a sea of darkness. Prior to their split in 1953, the two Koreas shared the same history, population, culture, government, and institutions. Some even consider that the North was more industrially developed than the South prior to the separation. However, after the separation, the two Koreas embarked on drastically different paths, governed by very different policies and institutions, and the result in terms of prosperity, 60 years later, is visible even from space.



An interactive H5P element has been excluded from this version of the text. You can view it online here:

<https://ecampusontario.pressbooks.pub/econmod10/?p=222#h5p-8>

Notes

1. Jones (2016)

4. WHAT IS MICROINSURANCE?

[4.1 Definition](#)

[4.2 Key Characteristics](#)

[4.3 Take-up Rates for Microinsurance](#)

4.1 DEFINITION

Microinsurance or **inclusive insurance** can be defined as the provision of insurance coverage to low-income individuals in developing countries. What is known as “microinsurance” today originates in the practice of microfinance organizations offering **credit-life insurance**, which covers the outstanding debt in the event of a borrower’s death, to their clients. However, microinsurance has taken on a life of its own and for some time it has existed outside the shadows of its better-known cousin, microfinance.

What Is Microinsurance?

“[T]he protection of **low-income people** against specific perils in exchange for regular premium payments proportionate to the likelihood and cost of the risk involved.”

– Craig Churchill (2007)

“Microinsurance is ... managed **based on insurance principles** and funded by premiums.”

– IAIS (2007)

“[M]icroinsurance ... refers to insurance **specifically designed to meet the needs of the poor.**”

– MicroInsurance Centre at Milliman (2018)

Microinsurance is another example of a concept where we stumble on a roadblock if we are looking for a generally agreed upon definition. Perhaps the most widely cited definition is coined by Craig Churchill¹ who defines microinsurance as “the protection of low-income people against specific perils in exchange for regular premium payments proportionate to the likelihood and cost of the risk involved.” To complicate matters further, the distinction between traditional, conventional, or mainstream insurance and microinsurance is somewhat blurred. Crucially, the distinction hinges on the market segment served by the insurer with microinsurance targeted at low-income clients who cannot access conventional insurance.

Notes

1. Churchill (2007, p. 402)

4.2 KEY CHARACTERISTICS

Next, we will look closely at Churchill's definition to identify the key characteristics of microinsurance, which are summarized in [Table 6](#).

Table 6: Key Characteristics of Microinsurance

Target group	Low-income individuals and households
Pricing	Priced based on market principles. However, microinsurance carries premium loads, which reflect the higher administrative and operating costs of the insurers and lack of competition in the market.
Providers	Any organization, for- or not-for-profit, that agrees to take on the risk in return for a commensurate premium
Products	Should be purposefully designed to be simple to reach and serve the needs of clients
Risks	Any insurable risk covered by traditional insurance, such as life, credit life, property, accident, health insurance, and agriculture insurance
Delivery channels	Licensed agents and brokers as well as unlicensed intermediaries

The *target group* of microinsurance are low-income individuals and households. The typical microinsurance client is a woman who lives in a densely populated urban area or in a remote village of a country with little or no social safety net. She is self-employed or working in the informal sector. With limited or no education, she is either a working poor or faces a high risk of slipping back into poverty. She is severely credit-constrained – with limited or no access to financial products, such as savings account, consumer credit, and traditional insurance. She most likely cannot produce the documents required by the insurer for underwriting or claim payment, such as national identity card, birth, or death certificate. However, she is not destitute – she has some purchasing power that enables her to purchase insurance for at least some of the perils she faces. Those who are destitute and cannot afford to purchase microinsurance are in the purview of the government. This leads us to the second major characteristic of microinsurance: microinsurance is priced based on market principles.

We know from Module 4 that the *price* of insurance reflects the insurer's expected loss. We also know from empirical studies that the microinsurance price tends to be higher

compared to traditional insurance, other things equal. Putting together our knowledge from Module 4 with our knowledge of the client base for microinsurance, we can reason that the higher price for microinsurance reflects the higher riskiness of the typical microinsurance buyer. However, microinsurance is rarely sold at an actuarially fair premium. The policies carry a **premium load**, which reflects not only the higher riskiness of the insureds and the limited information the insurance company has on the risk they pose, but also the higher administrative and operating costs such as office building costs, salaries of employees, advertising costs, and commissions to insurance agents and brokers who market the policies to potential clients. Insuring difficult to reach clients, administering small-premium insurance contracts, and making small claim payments is costly for the insurer, which translates into higher premium loads.

Who are the *providers* of microinsurance products? Both formal and informal insurers offer microinsurance products. **Formal insurers** such as commercial insurers, cooperatives and mutual funds are regulated and licensed under the laws of the land. They tend to have a dominant market share, but it is **informal insurers** that dominate the market in number. In Africa, for example, it was commercial insurers who insured about 80% of all lives and properties covered by microinsurance products in 2011.¹ Informal insurers such as community-based organizations and non-governmental organizations (NGOs) are entirely unregulated and unsupervised. While, as we are going to discuss below, these informal insurers serve an important role in the microinsurance market, they tend to have higher insolvency risk than large, regulated insurers, which factors into the premium loading; furthermore, their clients have no consumer protection.

Often, the buyers of microinsurance are unfamiliar with the purpose of insurance and lack the education and financial literacy needed to comprehend its role in risk management as well as the legal jargon and fine print exclusion restrictions in a standard insurance contract. To cater to this specific market niche, microinsurance *products* should be purposefully designed to be simple; however, this is rarely the case. Microinsurance policies tend to include complex legal language and require premium payments on a regular basis while potential clients do not receive a steady stream of income. Academicians and practitioners find that health insurance and agricultural insurance are the most highly valued covers by low-income individuals for risk management. In contrast, life and credit life insurance have dominated the market. As we noted before, we can trace the origin of what is known today as microinsurance to the practice of microfinance institutions of offering credit-life insurance to their clients. However, credit-life insurance serves predominantly the needs of lenders rather than the underwriting needs of low-income individuals.

Flashcard Activity



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<https://ecampusontario.pressbooks.pub/econmod10/?p=294#h5p-19>

Why is there a disconnect between what people want and the products microinsurers offer? Perhaps the key reason is the inability of insurers to estimate the riskiness of low-income people. Underwriting and business decisions are based on the ability of the insurer to estimate the riskiness of an individual and compute the likelihood that a certain event will occur. Insurers rely on historical data to produce mortality, longevity, and morbidity tables. However, such historical data are rarely, if ever, available for the low-income market in developing countries and existing tables must be adapted to reflect the possibly higher riskiness of the potential buyers for microinsurers

While in relative terms, the *perils* covered by a microinsurance product could be major or even catastrophic from the perspective of the insured, in absolute terms they are minuscule from the perspective of commercial insurers. Nevertheless, microinsurance should not be thought of as just a scaled-down version of conventional insurance; the products offered by microinsurers should be specifically designed to meet the needs of low-income individuals. In theory, microinsurance can cover any insurable risk covered by traditional insurance such as life, credit life, accident, property, health, and agriculture insurance. Furthermore, environmental risks are growing in prominence with climate change and low-income individuals are disproportionately affected by natural disasters while lacking effective risk management solutions to cope. In practice, however, life and credit life insurance dominate the market.

Conventional insurance products are sold by licensed agents and brokers. Because of imperfections on both the demand and supply side of the market, microinsurance products are sold by both licensed and unlicensed intermediaries. On the supply side, licensed insurance agents do not have an incentive to serve the low-income market. Agents work on a commission commensurate with the insurance premium and it is more lucrative to serve the more affluent segment of the market. On the demand side, the widespread lack of trust in institutions in developing countries hampers the development of the microinsurance market. Governments and large corporations are viewed with

distrust by those shunned by the formal financial sector. To sell their products, microinsurers often rely on organizations with grassroots knowledge and access to the buyers such as community-based organizations, informal savings and credit groups, and small business associations. Microinsurers have been particularly innovative in identifying non-traditional *delivery channels*, such as selling insurance through cell phone providers, professional associations, and retailers.

Example 7: Is This Microinsurance?

We stated that for a product to qualify as microinsurance it must be intentionally developed to serve its clients. But some traditional insurance products, which are not purposefully designed for the low-income market, are accessible by low-income individuals because they insure small sums at low premiums. In Brazil, for example, the term “popular insurance” is used to denote the insurance of small amounts, which is available and accessible to individuals of all walks of life. Would popular insurance be considered microinsurance? Some would answer affirmatively,² but others would disagree.³ However, from the broader perspective of access to finance and economic development, this finer distinction is not as important. Ultimately, the distinction between microinsurance and conventional insurance would lose its importance as the middle class expands in developing countries and access to finance becomes universal.

While the term “microinsurance” has been coined only recently, the practice of microinsurance has deep historical roots in developing countries. For example, burial societies have long served as a risk-management mechanism in South-West Africa. Burial societies are a type of co-operative with voluntary membership intended to help cover funeral expenses upon the death of a member or a member’s dependant. Originating in ancient Rome, burial societies have existed throughout history in many parts of the world. A burial society is a mechanism for risk transfer from an individual to the pool of members, which aims at mitigating the financial burdens of death and its associated funeral costs. They are the precursor of funeral insurance, which is widely offered by for-profit insurers nowadays.

Notes

1. McCord et al. (2013)
2. Churchill, (2007)
3. IAIS, (2007)

4.3 TAKE-UP RATES FOR MICROINSURANCE

It is hoped that microinsurance will follow in the steps of its closely related cousin, microfinance, and become the next “revolution” in developing countries by enabling low-income individuals to break the poverty trap.¹ In the example given at the beginning of this module, life microinsurance could have offered a safety net to the family of the young girl living in Freetown and prevented it from slipping into poverty after the death of the breadwinner.

Emerging from the shadows of microfinance, microinsurance has witnessed an explosive growth over the last decades. In 2006, microinsurance covered 75 million low-income individuals in developing countries all over the world² while this number increased to 135 million in 2009³ and up to 377 million in 2020.⁴

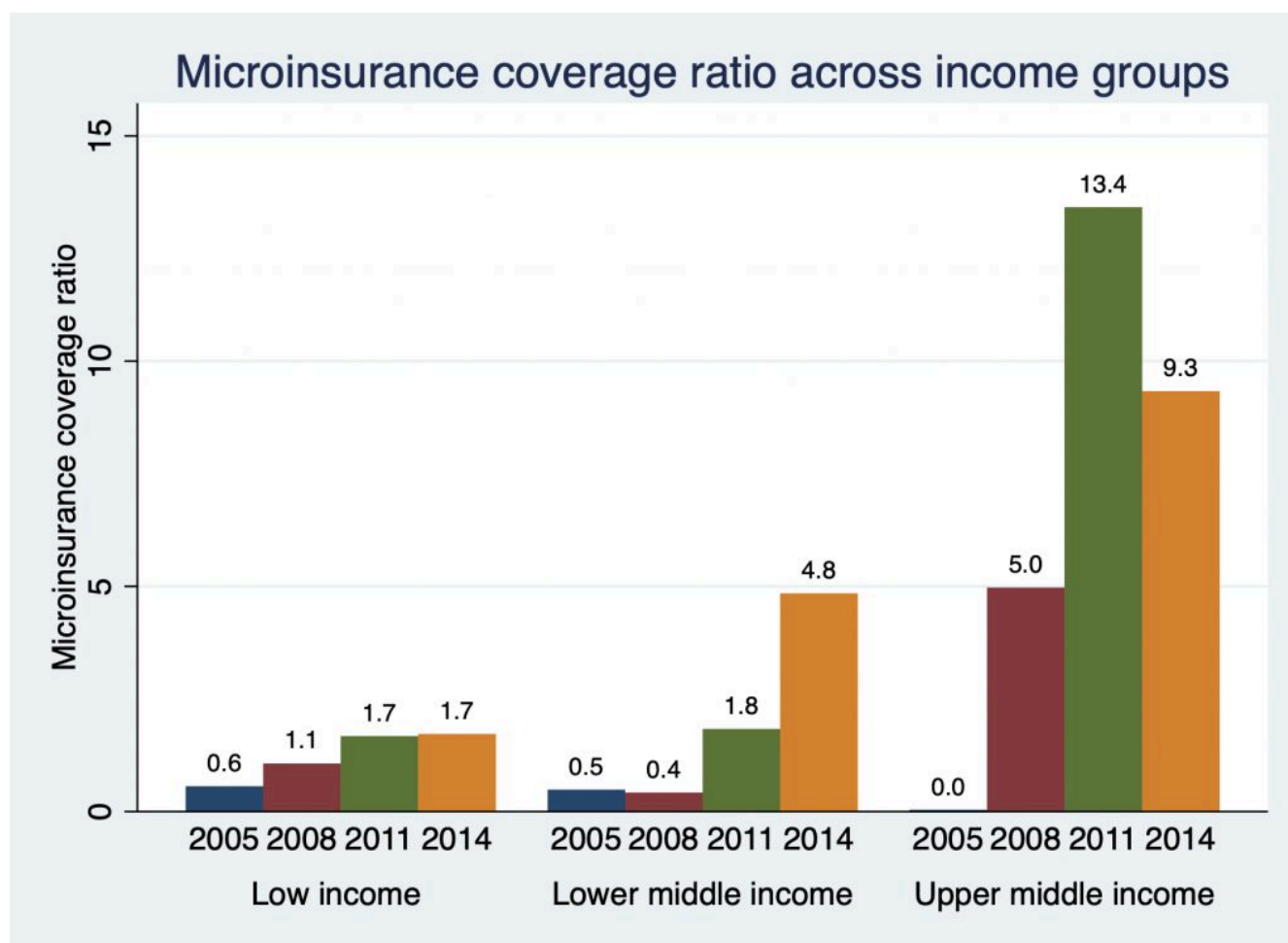


Figure 6: Percentage of population with microinsurance coverage across income groups in Africa
Data source: MicroInsurance Centre at Milliman

In Africa, for example, data collected by the MicroInsurance Centre at Milliman suggest that microinsurance was offered in 20 countries in 2005. This number grew to 32 in 2008 and 36 in 2014. [Figure 6](#) shows the percentage of population with microinsurance coverage or the microinsurance coverage ratio across income groups in Africa for 2005, 2008, 2011, and 2014. Microinsurance is more prevalent in upper-middle income countries (South Africa, which has high microinsurance coverage ratio, was not included in the 2005 sample). While, on average, less than 0.5% of the African population was covered by microinsurance in 2005, this number grew to more than 3.5% in 2011 and reached about 6% in 2014. Microinsurance is still not offered in many countries in the continent. However, in Namibia and South Africa more than 50% of the population purchased microinsurance coverage in 2011. In Namibia, the microinsurance take-up rate grew from 0 in 2005 to 6.7% in 2008 and to a staggering 57.5% of the population in 2011.

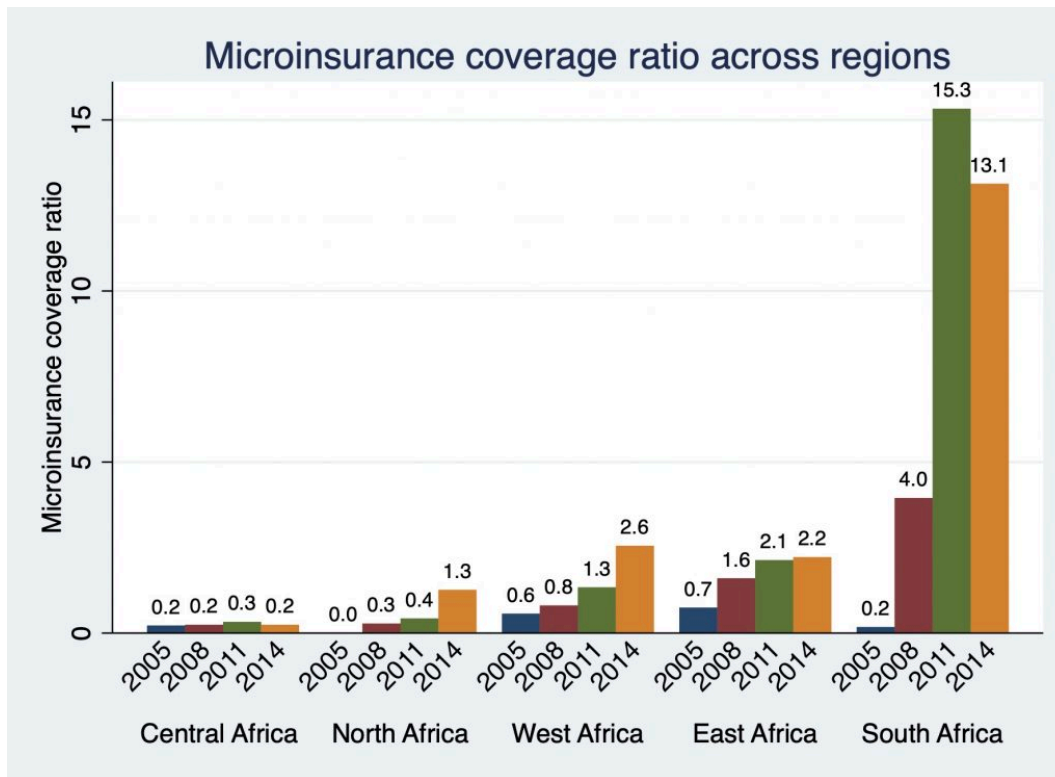


Figure 7:
Percentage of
population with
microinsurance
coverage across
regions in Africa
Data source:
MicroInsurance
Centre at
Milliman

[Figure 7](#) shows the microinsurance coverage ratio across African regions. The microinsurance coverage ratio varies substantially across geographic regions. Microinsurance is less prevalent in North and Central Africa compared to the rest of the continent.

There is a large potential market for microinsurance in developing countries. However, the current outreach of microinsurance is far below its global market potential estimated by Swiss Re at 4 billion people that could generate premium income of \$40 billion.⁵ This modest reach of microinsurance relative to its potential has left academicians, practitioners, and policymakers alike with what we call in economics a “**puzzle**,” observed economic data or empirical findings which are inconsistent with theoretical predictions.

Notes

1. Morduch (2006)
2. Roth et al. (2007)
3. Lloyd’s (2009)
4. Microinsurance Network (2021)
5. Swiss Reinsurance Company (2010)

5. MICROINSURANCE AND ECONOMIC GROWTH

[5.1 The Finance-Growth Nexus: Theory](#)

[5.2 Risk-Mitigation Mechanisms Available to Low-Income Individuals](#)

5.1 THE FINANCE-GROWTH NEXUS: THEORY

Can microinsurance foster economic growth? It is not one of the factors driving the long-term development of the economy that we discussed in [Section 3](#). Yet, as an aspect of **financial inclusion** microinsurance features prominently in the global development agenda. While financial inclusion is not a Sustainable Development Goal (SDG) by itself, according to the UN, it is “positioned prominently as an enabler of other developmental goals” such as eradicating poverty (SDG 1), ending hunger (SDG 2), ensuring healthy lives (SDG 3), achieving gender equality (SDG 5), promoting economic growth (SDG 8), supporting industry, innovation and infrastructure (SDG 9), reducing inequality (SDG 10), and strengthening the global partnership for achieving the SDGs (SDG 17).¹ In this section, we will examine the channels through which microinsurance can foster economic growth.



United Nations poster of 17 Sustainable Development Goals (SDGs)

We start by noting that microinsurance is a financial service and therefore, the broader question is whether there is a link between financial markets and institutions and economic growth. Even though microinsurance and finance more broadly are not among the factors affecting growth directly, microinsurance can impact economic growth

indirectly through its effects on the accumulation of technological knowledge, physical and human capital.

The link between financial markets and institutions and economic growth has been extensively studied both theoretically and empirically. Theorists disagree whether it is financial development that fosters economic growth (**supply-led growth**) or the other way around, economic growth spurs the development of financial markets and institutions (**demand-following growth**). Further, theorists postulate that the finance-growth nexus depends on the economy's level of development. We would expect to observe supply-led growth in low-income economies and demand-following growth in high-income economies. That is, the expansion of financial markets drives real economic growth at early states of economic development while economic growth drives the expansion of financial markets in mature economies.² Thus, as a financial service, microinsurance can play an important role in the economic development of low-income economies. Here, we will focus on the demand side of the market and examine the risk-coping strategies available to the poor in developing countries in the absence of microinsurance to understand the channels through which the purchase of microinsurance coverage can have a lasting impact on the aggregate economy.



Drought, famine, disease, and crop failures – there are myriads of risks faced by the poor in developing countries. Their income is not only low but also very volatile. If they are to consume what they earn, their consumption will be very volatile as well. However, according to the life-cycle theory of consumption developed by Prof. Franco Modigliani, laureate of the 1985 Nobel Memorial Prize in Economics, we prefer a smooth consumption pattern over our lives rather than volatile consumption, which closely tracks our income. **Consumption timing** is one of the most important roles financial markets play in the economy. By borrowing, saving, and **dissaving** at different times in our lives, we can smooth our consumption path and improve our overall satisfaction. However, conventional mechanisms for **consumption smoothing**, such as borrowing and lending in formal financial markets, are not available to the poor to buffer income swings. More often than not, low-income individuals in developing countries either lack access to existing financial markets or such markets simply do not exist.

When households face risks with large potential losses and no access to borrowing, they have a strong **precautionary demand** for liquid savings to prepare for emergency expenditures. However, the accumulation of liquid assets is a difficult undertaking for low-income individuals and most of the world's poor have very low or non-existent savings to mitigate negative **income shocks**. As a result, their consumption more closely tracks their income pattern. A large negative income shock, such as the death of the breadwinner in the introductory example of this module, is typically followed by a large reduction in consumption. This may entail withdrawing children from school, ignoring health needs, reducing calorie intake and dietary quality to a level detrimental to human health and well-being. It may also entail the sale of productive assets, the postponement of required repairs or investment in new assets thus eroding both human and physical capital accumulation in the long run.

Notes

1. United Nations Capital Development Fund (UNCDF). 2022. "Financial Inclusion and SDGs." Accessed December 13, 2021, <https://www.uncdf.org/financial-inclusion-and-the-sdgs>,
2. Patrick (1966)

5.2 RISK-MITIGATION MECHANISMS AVAILABLE TO LOW-INCOME INDIVIDUALS

How do low-income individuals smooth their consumption without access to formal financial markets? We distinguish between two types of risk-mitigation strategies available for consumption-smoothing: **ex ante risk management** and **ex post risk coping strategies**.¹ Ex post mechanisms aim directly at consumption smoothing during a crisis while ex ante risk coping strategies aim at the advanced deployment of strategies to smooth income downturns and therefore, indirectly consumption before a crisis strikes.

In the absence of formal insurance and limited or non-existent public safety net, informal risk-sharing arrangements become vital in ex post risk mitigation. Borrowing, intergenerational or interfamily transfers in the form of loans, cash or in kind can help a household weather a downturn in income. Community-based insurance mechanisms, such as the burial societies discussed in Section 4.1, can help a family smooth consumption in the presence of an **idiosyncratic shock**, i.e., a shock which affects the particular family but not the community in general such as an accident that renders a specific breadwinner unable to work. However, when income shocks are correlated so that the incomes of households in a community move in a tandem over time, community-based risk pooling arrangements are less effective in mitigating risks.

Example 8: Covariate Risk

One well-known example of the limitations of community-based safety nets is the drought and famine in the Northern Wollo region of Ethiopia in the mid 1980s. The rural community tried to use their livestock, a traditional buffer asset, to cope with the disaster. However, the excess supply of livestock coupled with low demand led to a collapse of livestock prices. The crisis was further exacerbated by rising crop prices.

Informal risk-sharing arrangements cannot be considered insurance because they are

typically reciprocal in nature. Unwritten, but well understood customs and traditions dictate that the beneficiary of community support today reciprocates this aid in the future. This reciprocal nature of informal insurance mechanisms creates the possibility of corruption and nepotism if the aid recipient today is in a power position in the future. Corruption stifles investment and therefore, the accumulation of capital, which can have a negative effect on economic growth.

To a large extent, **ex ante risk management strategies** depend on the ex-post risk coping mechanisms available to a household. For example, a large and better socially integrated household with significant asset holdings and access to formal financial markets may feel well insulated against an income downturn. However, even a small income shock can be detrimental for a poor and socially excluded household. Decision-makers in such a household devise strategies ex ante to smooth their income so as to smooth their consumption. This can affect both the choice of occupation as well as savings and investment decisions, ceteris paribus. For example, an empirical study based on western Tanzania in 1990 finds that poorer households derive a larger share of their income from off-farm activities and raising crops compared to more affluent families.² However, these activities tend to have a lower expected return compared to the riskier cattle raising. The author rules out risk aversion and comparative advantage as potential explanations for this behavior but attributes it instead to income risk and the inability of low-income households to borrow when needed to smooth consumption.

Therefore, the purchase of microinsurance coverage, which reduces income uncertainty, has the potential to encourage low-income individuals to take up occupations which are more in line with their comparative advantage and risk tolerance thus accelerating human capital accumulation and possibly, productivity growth. Further, microinsurance can enable credit-constrained entrepreneurs to invest in profitable but risky ventures, such as modernizing their farm production or introducing new production technologies, which require a long learning period, thus channeling assets to their most productive uses, accelerating the rate of physical capital accumulation and, therefore, economic growth.



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Inequality and economic growth are intricately linked. “[T]he conventional textbook approach is that inequality is good for incentives and therefore good for growth.”³ However, there is mounting empirical evidence to the contrary. Ex ante risk management has a perverse effect on the income distribution in a country over time. By investing in low-risk, low-return activities, poorer households perpetuate poverty and widen the gap between the rich and the poor. In contrast, by enabling the poor to enter higher-risk, higher-return occupations, enlarge their existing businesses or start up new businesses, microinsurance may help close the gap between the rich and the poorer, and therefore, accelerate economic growth.

In summary, there are many channels through which microinsurance can impact economic growth. However, capturing the effect of microinsurance on growth in the data is challenging for three major reasons. First, the impact of microinsurance, particularly through human capital accumulation, may take years to be reflected in official growth statistics. Second, many if not most of the poor are not employed in the formal sector and carry out a limited amount of market transactions. Therefore, their contribution to the aggregate output may not be tracked by official government statistics. Finally, data on microinsurance take-up rates are difficult to find.

Flashcard Activity



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Notes

1. Morduch and Sharma (2002)
2. Dercon (1998)
3. Aghion et al. (1999, p. 1615)

6. KEY TAKEAWAYS

- Human well-being is difficult to define and measure. GDP per capita is a reliable albeit imperfect measure of well-being.
- Real GDP can be used to compare a country's economic performance over time. An increase in a country's real GDP indicates that the quantity of goods and services the economy produces is expanding.
- The standard of living of the average person in a country is rising if the country's real GDP per capita increases.
- Real GDP per capita growth measures *changes* in the average standard of living.
- While not an SDG by itself, microinsurance is an aspect of financial inclusion, which is hoped to become a lever for achieving SDGs such as SDG 1, SDG 2, SDG 3, SDG 5, SDG 8, SDG 9, SDG 10, and SDG 17.
- Microinsurance can impact economic growth *indirectly* through its effects on the accumulation of technological knowledge, physical and human capital.

CASE STUDY: THE CONVERGENCE HYPOTHESIS



Per capita growth rates tend to be inversely related to the starting level of development measured by real output per person. Therefore, poor countries grow faster than rich ones. According to the convergence hypothesis, over time poor countries will catch up with the rich ones because of their higher growth rates and the power of compound growth. Thus, we will observe a convergence in the standards of living across countries over time.

The goal of this case study is to examine whether we can find support for the convergence hypothesis in the data.

1. Collect country-level data on

- Real GDP per capita in 1960; and
- Annual data on real GDP per capita growth rate over the period 1960 – 2020.

from the [World Bank Databank](#), [Penn World Table](#), or [Our World in Data](#).

2. Calculate the average real GDP per capita growth rate over the period 1960 – 2020.
3. Plot your data with the average real growth on the vertical axis and the starting GDP per capita on the horizontal axis for a) all countries in your sample; and b) for OECD countries.

Do you find evidence of the convergence hypothesis using your entire sample? Using a sample of the OECD countries? Why or why not?

KEY TERMS

Consumer Price Index (CPI): Measures price changes over time by comparing the cost of a fixed basket of goods and services over time.

Consumption smoothing: The idea that we prefer a smooth consumption pattern over our life rather than consumption that closely tracks our income, which is volatile.

Consumption timing: The concept of borrowing, saving, and investing to change the timing of consumption (e.g., saving your wages now so you can purchase goods when retired).

Credit-life insurance: A type of life insurance which covers the outstanding debt in the event of borrower's death.

Covariate risk: An unexpected or unpredictable event, either positive or negative, that impacts the entire community such as a natural disaster; also called **systemic risk**.

Dissaving: Spending more money than one earns in income in a given period; the opposite of saving.

Ex ante risk management strategies: Strategies used to minimize risk and decrease the severity of potential future losses.

Ex post risk coping strategies: Strategies used to manage ongoing, current shocks.

Financial inclusion: Access of individuals and businesses to affordable financial products and services that meet their needs, such as deposit and savings bank accounts, payments, transactions, credit, and insurance.

Gross Domestic Product (GDP): A measure of economic output or the size of an economy. Calculated as market value of all final goods and services produced within a country during a specific period, typically a year.

Gross National Product (GNP): A measure of the total market value of all final goods and services produced during a specific period by a country's factors of production regardless of their location. Equal to GDP plus net factor payments from abroad.

Household production: Goods and services produced in households (e.g., repairs, babysitting, cooking, elder care, gardening). Household production is not included in GDP.

Idiosyncratic risk: An unexpected or unpredictable event, either positive or negative, that impacts an individual person or family (e.g., the death of a family's breadwinner).

Income shock: A disruption in expected income. Income shocks are often the result of the loss of employment or the death of a breadwinner.

Inflation: The rate of increase in the average level of prices.

Insurers (Formal): These include commercial insurers, cooperatives and mutual funds that are regulated and licensed under the laws of the land. Formal insurers tend to have a dominant market share.

Insurers (Informal): Informal insurers include community-based organizations and non-governmental organizations (NGOs) that provide unregulated insurance. Informal insurers often dominate the market in number but not by market share.

Land: Physical plots of land but also all natural resources such as water, oil, and minerals that are used in the production process.

Long run: In macroeconomics, the period of time when wages and prices are fully flexible.

Macroeconomics: The study of the economy as a whole and how it interacts with the rest of the world.

Microeconomics: The study of the decision making of individuals and firms, and how they interact in markets.

Nominal GDP: GDP calculated using current market prices.

Premium load: The amount included in the insurance premium charged by an insurance company to cover its administrative and maintenance costs.

Puzzle: In economics, observed economic data or empirical findings which are inconsistent with theoretical predictions.

Real GDP: Measures the value of goods and services produced by an economy during a specific period, adjusted for inflation.

Real variable: Real variables are variables that adjust for changes in the price level over time. They are used to make intertemporal comparisons.

Welfare: The state of being happy and content; a synonym of **well-being**.

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PRACTICE QUIZ



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