Modeling Companion B
Measures of well-being and inequality

LEARNING OBJECTIVES

- What is the Human Development Index?
- What is affective/evaluative happiness and how do we measure them?
- Measuring inequality—Gini coefficients

MOTIVATION

In 2013, Brazil's GNI per capita was equal to $11,690. The photo below, however, depicts a reality far from the average $11,690 per person: those living in the favelas are certainly getting much less, while those living in the modern building appearing in the background, much more. Indeed, despite the fact that Brazil is classified as an upper-middle income country, about 21.4% of the population lives below the poverty line, and the richest 10% receive 42.9% of the national income. Our relentless use of national income measures seems at odds with good measurement goals as we realize its inability to convey an accurate picture of how it is shared. Furthermore, our focus on GNI or GDP keeps our attention away from other things that dramatically impact the standard of living. For example, what about the provision of piped water or electricity? Are there schools and teachers? Are hospitals, doctors and drugs available to the population? In this chapter, we will explore different ways to measure well-being and inequalities to provide more insight into levels of development.

1.11 Wealth and poverty in Rio de Janeiro

"Rocinha 68860004," matteoo702, Flickr, CC BY 2.0.

A. MEASURING WELL-BEING

GDP per capita is not a comprehensive measure of economic development as there are many other important indicators of wellbeing that it does not precisely capture, including the health and education of the population, for example. High GDP is a valuable goal, but should not be pursued to the point where economic stability is jeopardized, community cohesion is destroyed, the vulnerable are not supported, ethical standards are sacrificed, or the world's climate is put at risk.
In 2008 former French President Nicolas Sarkozy established the Commission on the Measurement of Economic Performance and Social Progress chaired and coordinated by Joseph Stiglitz, Amartya Sen, and Jean-Paul Fitoussi. In 2009 the Commission published a report that included around 30 recommendations on how to improve measures of well-being and progress, without relying solely on the uni-directional GDP measure. This was a major effort to encourage countries to adopt new standards. Learn more about it by reading the report; see the reference given at the end of this companion.

The Stiglitz-Sen-Fitoussi committee was not the first effort to shift from national income accounting to measures centered on people's life. In 1990, the United Nations Development Program launched the Human Development Index (HDI). This index was largely inspired by the concept of 'capabilities' as described by Amartya Sen. You can learn more about Sen's vision of development in the reading indicated at the end of this companion. HDI emphasizes that people and their capabilities should be the ultimate criteria for assessing the development of a country, not economic growth alone.

DEFINITION: HDI   The Human Development Index (HDI) is a measure of the level of development achieved in a country in three dimensions: a long and healthy life (health), access to knowledge (education), and standard of living (logarithm of income).

The HDI uses the logarithm of income to reflect the diminishing importance of income with increasing income. As shown in the diagram below, 4 indicators are used in order to quantify the three dimensions. The scores for the three HDI dimensions are then aggregated into a composite index using the geometric mean of normalized indices for each of the three dimensions. Using a geometric mean allows for poor performance in any dimension to be directly reflected in the HDI score, i.e. a low performance in one dimension cannot be linearly compensated by a high achievement in another dimension. In other words, the geometric mean reduces the level of substitutability between dimensions and ensures that a 1% decline in, say, life expectancy at birth, has the same impact on the HDI as a 1% decline in education or income.
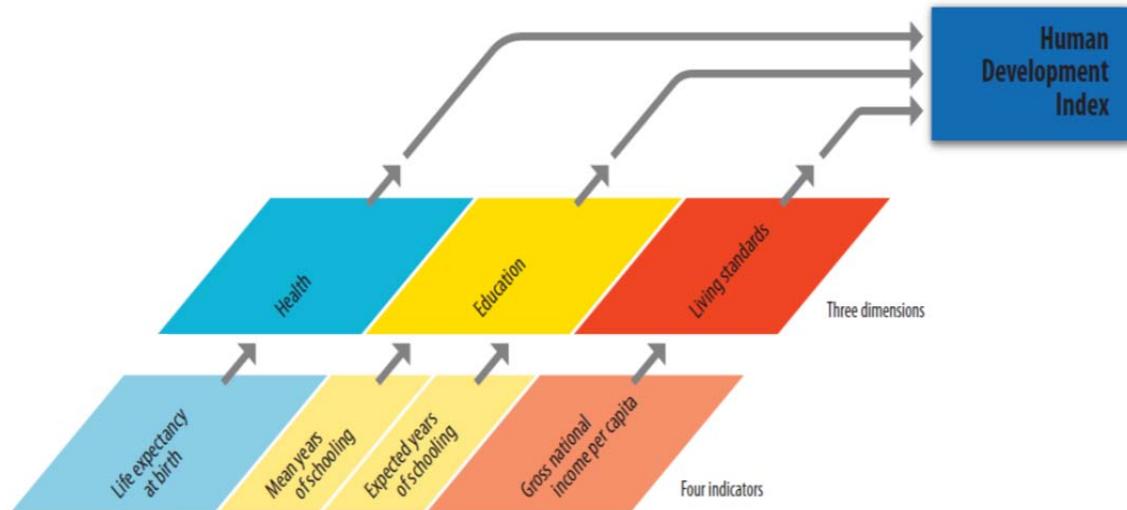
Figure 1. HDI: Three Dimensions and Four Indicators
Source: Human Development Report 2010

EXAMPLE   **Rankings of GDP per capita and HDI in 2013**

Table 2.1 in the book provides interesting examples of countries that have vastly different rankings in terms of GDP per capita and HDI. For example, Equatorial Guinea is ranked 41 in terms of GDP per capita, but 144 in terms of HDI. A difference of 103 ranks! The discovery of oil and gas resources triggered a boom in national income, but did little to improve literacy and life expectancy for the large masses of the population.

Another way to measure well-being is to ask people directly to assess how satisfied or how happy they are. To this aim, some specific questions have been designed to elicit 'evaluative' happiness and 'affective' happiness.

DEFINITION: Affective Happiness   Affective or emotional happiness is a type of happiness that can be elicited by asking 'Did you have a good day yesterday?', 'Were you happy?', 'Did you smile?'

DEFINITION: Evaluative Happiness   Evaluative happiness is a type of happiness that can be elicited by asking about overall life satisfaction using the Cantril ladder.

DEFINITION: Cantril ladder   The Cantril ladder is an imaginary ladder with ten rungs, where the top rung is the best possible life and the bottom rung is the worst. The international survey firm Gallup International asks respondents to imagine such a ladder and say on which of the rungs they feel they stand at this time.

Ranking of Happiness 2010-2014
Source: World Hapinness Report, 2015

The ranking above shows that levels of happiness and income per capita are not totally uncorrelated. The 10 happiest countries happen to all be high income, and the 10 least happy are all low income or LDCs. However, income per capita is not the sole predictor of happiness. The different colors in the bars represent different explanatory factors. The blue color stands for GDP per capita. We see that it is most often present and larger than other factors. The other factor that contributes to happiness by at least as much as income (in light orange) is social support.

Trends in women's and men's life satisfaction

The Gallup World Poll only provides information on life satisfaction for the period since 2005. This is insufficient to identify trends in life satisfaction, which are likely to change only at a slow rate. Recent research has provided evidence of a decline in women's life satisfaction in the United States and across a variety of European countries (with Western Germany being an exception). For instance, Stevenson and Wolfers (2009), using data from the US General Social Survey going back to the early 1970s, found that women have become somewhat less "happy" over time, both absolutely and relative to men. Different explanations have been suggested to explain the declining trend in women's life satisfaction. One possible explanation is grounded in the changes in family structure over the last 40 years, which include a rising share of single mothers, especially among the less educated. Another explanation of the decline in women's subjective well-being reflects the view that today's women have to juggle more complicated lives and many more objectives than in the past. Women may now, more than before, feel a need to be a good wife, a dedicated mother, and to have a career in order to be fulfilled; these multiple goals are competing for women's time and resources. Moreover, it is conceivable that women, as they close the gender gap in labour market achievements, are now deriving their life satisfaction from how well they are doing compared to men (while they used to mainly compare themselves to other women in the past), or that they now have higher standards for what their life should be like. Due to difficulties in interpreting the observed trends in self-reported life satisfaction, alternative sources of data have been used to provide a complementary perspective on how people's happiness has been changing over time. Krueger et al. (2007) combined time use data with information on how individuals affectively experience various activities they engage in. The main finding of their research is that there has been a gradual decline in the proportion of time spent in unpleasant activities among men; while among women, despite a decline in time allocated to household duties, the time spent in unpleasant activities has not changed much. Source: Adapted from Stevenson and Wolfers (2009) and Bertrand (2011).

Source: OECD How's life? 2013 report, Box 4.2.

B. MEASURING INEQUALITY

We saw in the previous sections various attempts at measuring absolute well-being. In this section, we will look at how we can measure relative poverty, or in other words, inequality. Inequality can be measured for any distribution in a population: economic inequality for a distribution of income in the population, or for example, land inequality for a distribution of land ownership in the population. In addition, we shall distinguish two types of inequalities: inequality between persons and inequality between subgroups, such as gender, racial, ethnic, or religious inequalities.

The most common measure of inequality is the Gini coefficient. A Gini coefficient of 0 reflects complete equality, i.e. everyone having the same income, whereas a Gini coefficient of 1 reflects perfect inequality, i.e. one person holding all the income. In practice, these extreme values are never reached. As we explain in more detail below, the Gini coefficient is derived from the Lorenz curve.

DEFINITION: Lorenz curve In economics, the Lorenz curve is a graphical representation of wealth distribution. Precisely, it is the cumulative distribution function of the empirical probability distribution of wealth within a country. It was developed by American economist Max Lorenz in 1905.
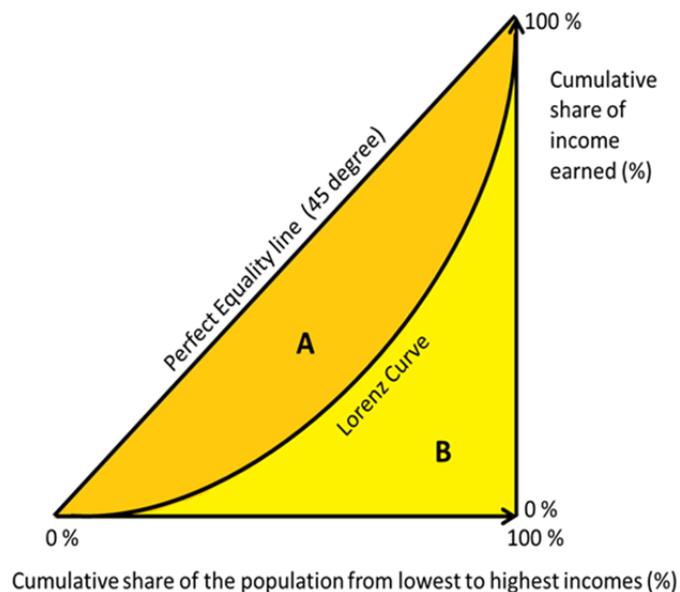

Figure 2

Figure 2 illustrates a hypothetical Lorenz curve. If all individuals are equally wealthy, the Lorenz curve is a straight diagonal line, called the equality line. If there is any inequality in wealth, then the Lorenz curve falls below the equality line. The total amount of inequality can be summarized by the Gini coefficient which is the ratio between the area A, enclosed by the equality line and the Lorenz curve, and the total triangular area under the equality line, A + B.

The Gini coefficient is a measure of inequality derived from the Lorenz curve as follows: $Gini = \frac{A}{A+B}$, where A is the orange area on figure 2 and B is the yellow area.

Note: Both axes are from 0 to 1 (or 0 to 100%). Hence $A + B = 0.5$. As a result, $Gini = 2A$.

EXAMPLE In figure 3 below, two different hypothetical Lorenz curves are drawn. The red curve describes an economy with greater income inequality than the blue curve. Specifically, in the red economy, the 50% poorest individuals own 2% of the wealth. In the blue economy, the poorest half owns 20% of the wealth. In a country with perfect equality, half of the population would own exactly 50% of the wealth.
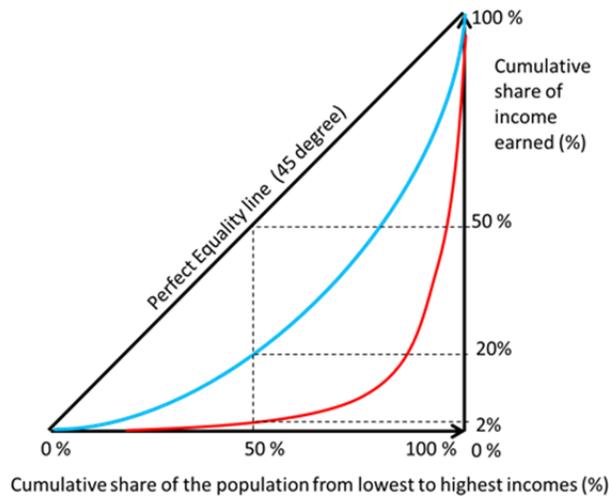

Figure 3

We should note that, given the calculation of the Gini coefficient, different income distributions can yield the same Gini coefficient. Indeed, two different distributions simply need to have the same area under the equality line, but could potentially be very different. See figure 4 below.
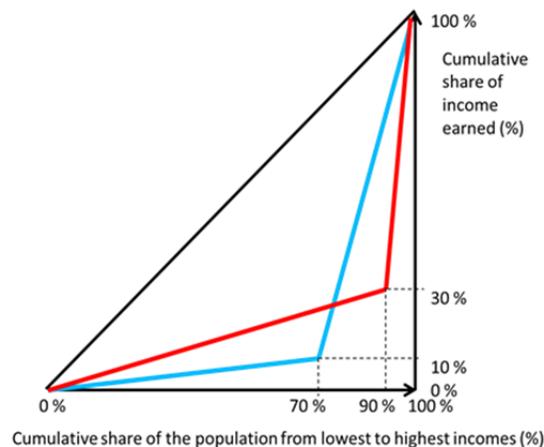

Figure 4

Lorenz Curve and Gini coefficient of the US

Using data from table 2.9 'Distribution of income or consumption' from the World Bank, we learn that in 2010, the US had the following income distribution:

| Deciles or quintiles of population	Lowest 10%	Lowest 20%	Second 20%	Third 20%	Fourth 20%	Highest 20%	Highest 10%
Percentage share of income	1.4	4.7	10.4	15.8	23.1	46.0	29.6

Given this information, we can easily plot the Lorenz curve for the US in 2010, and calculate the Gini coefficient. In this case, the Gini equals 41.1.
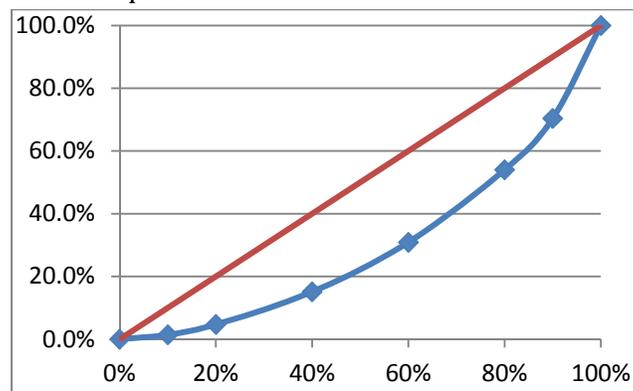
<u>The Gini as a Measure of Well-being?</u>

The Gini coefficient is not a good measure of well-being because it is a relative rather than absolute measure. Indeed, a Gini coefficient might decrease while the poor get poorer. Similarly, a Gini coefficient might be rising but everyone might be getting richer, and therefore better off!

Gini coefficients in developing countries usually increase as the country experiences economic development. However this does not imply that people are worse off than before. Take the example of China. The graph below illustrates the fact that since the economic take-off in the 1980s, the Gini coefficient sharply increased: from around 0.3 in the begining of the 80s to close to 0.5 in the 2000s. However, in the same period, economic growth left millions of people out of poverty.

GINI coefficient in China, 1981-2012
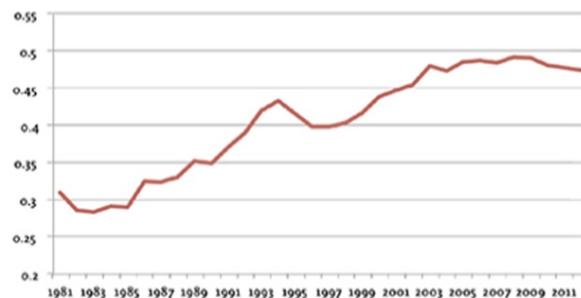
Sources: Gini coefficients for the years 1986–2001 are from Ravallion and Chen (2007), 2002 from Gustafsson et al. (2008), 2003–2012 from the National Bureau of Statistics.

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<u>Wealth vs. Income Inequalities</u>
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The distinction between income and wealth is important. Income is a flow of money received regularly. Wealth is the value of all the assets owned by an individual. This includes the values of homes, various valuables such as automobiles, cash in savings accounts, investments in stocks and bonds, real estate, and retirement accounts. What is usually calculated in the income-Gini is the earnings inequality, in other words the income from work in the form of salaries and wages before tax.

As a result, focusing on income inequalities might be misleading: a country with a low income-Gini coefficient can have a high wealth-Gini coefficient. In addition, one might be more interested in disposable income rather than earnings. Disposable income is the income that a household can spend, i.e. what households have after paying taxes and after receiving monetary transfer such as unemployment insurance or retirement pension. Hence, looking at inequalities in disposable income would better account for potential government policies to reduce inequalities.

Figure 5 below shows how different various Gini measures might be. The wealth-Gini coefficients are always higher than the income-Gini coefficients. We note that Sweden has the biggest gap between the Gini for earnings and the Gini for disposable income. Can you guess why that is?
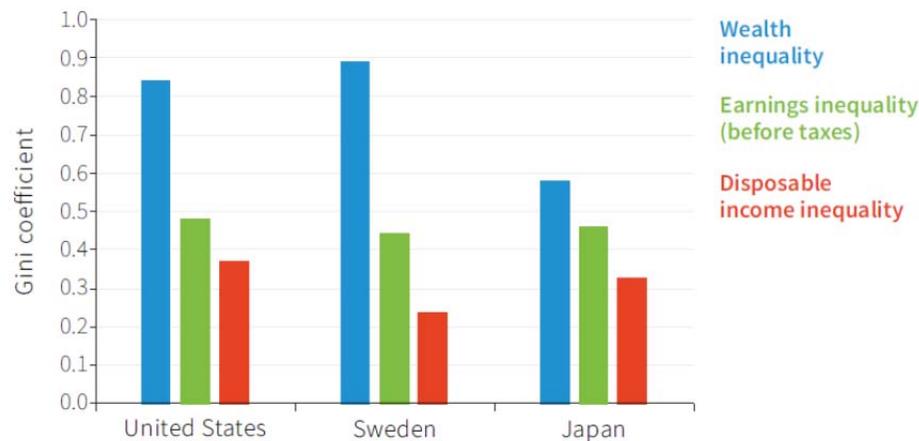

Figure 5. Inequality in wealth, earnings and disposable income: US, Sweden, and Japan.
Source: 'The Economy' by CORE Project, Chapter 19: Economic Inequality, **http://core-econ.org**

FURTHER READING

Amartya Sen (1998). "The Concept of Development," Handbook of Development Economics, Volume 1, Edited by H. Chenery and T.N. Srinivasan, Elsevier Science Publishers.

Stiglitz, Joseph, Amartya Sen, and Jean-Paul Fitoussi. "The measurement of economic performance and social progress revisited." Reflections and overview. Commission on the Measurement of Economic Performance and Social Progress, Paris (2009).