



Measuring Labor Productivity: Technology and the Labor Supply

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Gross domestic product (GDP) per capita, the total production that the average person in a country generates, is often used by governments and institutions to compare labor productivity and the standard of living across countries. In economic growth models, however, differences in productivity are mainly driven by technological differences. GDP per hour worked, therefore, rather than GDP per capita, may be a better measure of labor productivity because it captures technology. In addition, GDP per capita is also affected by other variables such as fertility and mortality rates, the number of hours worked, and the composition of the labor force.

Interestingly, the two GDP measures can differ widely within a given country and relative to the United States. For instance, in 2013, Spain's GDP per capita was about 57 percent of that of the United States, while its GDP per hour was much closer—about 74 percent of the U.S. level. Singapore's GDP per capita, on the other hand, was 16 percent *higher* than that of the United States, while its GDP per hour was 62 percent of the U.S. level. To shed some light on what accounts for these differences, one can decompose GDP per capita as follows:

$$\frac{\text{GDP}}{\text{Population}} = \frac{\text{GDP}}{\text{Hours worked}} \frac{\text{Hours worked}}{\text{Workers}} \frac{\text{Workers}}{\text{Population}}$$

The first component on the right-hand side of the equation is the amount of output produced per hour worked, which captures technology. The last two components represent (i) the average number of hours worked per worker, a measure of effort, and (ii) the worker-to-population ratio, which depends on the labor force participation and employment rates of the country.

The table shows 2013 data for selected countries for each of the components in the equation relative to U.S. data. Several interesting facts arise: First, for Europe, when GDP per hour is the measure, the productivity of some countries is much closer to the U.S. level. The countries with the most striking disparities between GDP per capita and GDP per

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hour relative to the United States are Belgium, France, Germany, and Spain. Although these countries lag behind the United States in GDP per capita, their GDP per hour comes closer to the U.S. level. This finding suggests that labor utilization in these countries is much lower than in the United States. In Spain, the difference is mainly explained by the worker-to-population ratio, because of Spain's high unemployment rate. In Belgium, France, and Germany, however, fewer average hours are worked than in the United States.¹ For example, the average worker in the United States worked 1,707 hours in 2013, while the average worker in Germany worked far less—1,392 hours. In most European Union countries, hours worked are limited by new regulations.² For example, France introduced a 35-hour workweek through collective bargaining. Another reason for the low annual hours worked in most European countries is a relatively large amount of paid time off—four to six weeks annually.

Second, GDP per capita for several Asian countries is either close to the U.S. level (e.g., Japan) or has surpassed it (e.g., Singapore). GDP per hour, however, is a different story, with most countries further behind the United States. These differences in GDP per hour are mainly driven by labor utilization, with Asians working longer hours. For instance, in 2013, the average worker in Singapore worked 41 percent more hours than the average worker in the United States.³ Going forward, the disparity may lessen as working hours in Asian countries are declining. For instance, South Korea has the fastest decline in working hours among the Organisation for Economic Co-operation and Development (OECD) countries because its government is changing laws to increase leisure time.⁴

Labor Productivity Index, Relative to the United States, 2013 (U.S. = 1)				
Region/countries	GDP per capita	GDP per hour	Hours per worker	Worker-to-population ratio
Europe				
Austria	0.87	0.82	0.95	1.12
Belgium	0.79	0.91	0.92	0.95
Czech Republic	0.52	0.46	1.03	1.09
Denmark	0.75	0.83	0.84	1.08
Finland	0.73	0.73	0.97	1.04
France	0.68	0.88	0.87	0.89
Germany	0.77	0.85	0.82	1.11
Greece	0.46	0.49	1.19	0.80
Ireland	0.74	0.83	1.05	0.84
Italy	0.60	0.67	1.02	0.87
Netherlands	0.82	0.89	0.82	1.12
Norway	1.16	1.12	0.83	1.25
Portugal	0.41	0.40	1.12	0.91
Spain	0.57	0.74	0.98	0.79
Sweden	0.86	0.82	0.94	1.11
United Kingdom	0.76	0.76	0.97	1.02
Asia Pacific				
Australia	0.92	0.79	1.01	1.14
Japan	0.72	0.64	1.03	1.10
Singapore	1.16	0.62	1.41	1.33
South Korea	0.64	0.48	1.20	1.11
North America				
Canada	0.84	0.74	1.00	1.13
United States	1.00	1.00	1.00	1.00

SOURCE: The Conference Board Total Economy Database and author's calculations.

While GDP per capita is widely used to compare labor productivity across countries, GDP per hour may be a more accurate measure. ■

NOTES

¹ OECD Labor Statistics.

² Evans, Lippoldt, and Marianna (2001).

³ OECD Labor Statistics, Singapore Ministry of Manpower, and author's calculations.

⁴ Evans, Lippoldt, and Marianna (2001).

REFERENCE

Evans, John M.; Lippoldt, Douglas C. and Marianna, Pascal. "Trends in Working Hours in OECD Countries." OECD Labour Market and Social Policy Occasional Paper No. 45, March 2001; <http://www.oecd-ilibrary.org/docserver/download/5lgsjhvj7rs5.pdf?expires=1424386665&id=id&accname=guest&checksum=BD5DF75453D894D9CB7541C6E96EC8E6>.

Posted on February 27, 2015

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