

The outstanding faults of the economic society in which we live are its failure to provide for full employment and its arbitrary and inequitable distribution of wealth and incomes.

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John Maynard Keynes

## Unemployment via FRED add-in

FRED, the Federal Reserve Economic Data archive, compiles information from many sources. It is freely available online at [fred.stlouisfed.org/](http://fred.stlouisfed.org/), but we will access it through the FRED Excel add-in. This saves a lot of time and effort in getting the data in Excel for further analysis.

We bypass the appstore FRED add-in from [fred.stlouisfed.org/fred-addin/](http://fred.stlouisfed.org/fred-addin/) because it is error-prone and unstable with older Excel versions. Instead, we will work with a legacy FRED add-in file that is reliable and easy to use.

***STEP*** Download *FRED.xlam* from [tiny.cc/addin](http://tiny.cc/addin). Use the Add-ins Manager (keyboard shortcut *alt, t, i*) to install it.

We will use the FRED add-in to get and work with unemployment data, but an important goal is to demonstrate the remarkable power of this open-access software. It opens the door to a huge trove of data.

To set the stage for our work on unemployment, recall that an economy's long-run performance is measured by the growth rate of Real GDP per person. The magic number for rich countries is 2% per year. This gives doubling of output per person roughly every generation.

When we focus on the short-run, or the business cycle, we cannot use GDP because it takes too long to compile the data and publish the results. GDP is computed quarterly with a few months of lag and is often revised after initial release.

We need something at this moment that tells us how the economy is doing right now. There is new work being done on this problem using internet activity, but the traditional approach to measuring the current state of the economy relies on a monthly labor market survey.

Each month, the Bureau of Labor Statistics (BLS) releases the results of its Current Population Survey (CPS). Tens of thousands of households around the United States are interviewed and people are asked about their jobs, earnings, and other details.

In the third week of each month, the BLS releases a report on the number of workers, jobs, and, perhaps most importantly, the unemployment rate for the previous month. You can see that we are already a month behind in our quest to read the economy, but this is much better than GDP.

The unemployment rate is a key indicator of short-run economic performance. When it is high, the economy is doing poorly and when it is low (but not too low), the economy is doing well. The magic number for the overall unemployment rate is around 4 to 5%.

**STEP** Use your favorite browser to search for the “current unemployment rate”.

You interpret the unemployment rate by seeing if it is around 4% and by its change from the previous month.

Our goal is understand how the unemployment rate is computed and what it tells us. We proceed by explaining how unemployment is defined and measured. Along the way, we will learn about other labor statistics and seasonal adjustment. In the next section, we examine subgroups of people—unemployment is not the same for everyone. We will see that the overall unemployment rate masks substantial variation across demographic groups and geographic areas.

## Defining and Measuring Unemployment

Labor market statistics are based on a series of mutually exclusive categories. We place people in groups, or buckets, and then compute ratios. We begin with the total population.

**STEP** Open a blank Excel workbook and save as *Unemployment.xlsx*. Enter *pop* (or *POP*, case does not matter) in cell A1, click on the *FRED* tab in the *Ribbon*, and click the Get FRED Data button in the top-left corner.

You just used Excel to connect to the St. Louis Fed and downloaded the total population in the United States from the FRED website! Notice the blue link in cell A5. If you click it, you go to the FRED web page for this variable and it has more documentation.

As you just saw, the FRED Excel add-in is easy to use, but you do need to know how it works. You control what you get by providing four inputs:

1. Series ID
2. Data manipulation (can be blank)
3. Frequency (can be blank)
4. Start Date (can be blank)

The FRED add-in works by taking the information you input in the first four rows of a spreadsheet and then outputs the results in two columns starting in row 5. The only thing required is the *Series ID*; it fills in default choices if the other three items are not given.

***STEP*** Change cell A3 from *M* to *A* (it can be lowercase *a*) and click the Get FRED Data button. You can also use the Frequency Aggregation button in the FRED menu, but typing the letter *a* is easier.

You now have total population in the United States on an annual (yearly) basis. Taking into account the units of the variable in cell B1, we can see the US population was about 335 million people in 2023.

Notice that cell B3 continues to display “Monthly” because that is the original frequency of the variable. By entering an *A*, you directed FRED to report the variable on a yearly basis.

To get to the unemployment rate, we walk through a series of separations, as depicted in Figure 5.1. Each step down splits the category above into two mutually exclusive parts.

From a total population of 335 million people, we remove everyone who is in the military, prison, or a hospital. There are several million people in this category. The United States has one of the highest incarceration rates in the world (see [www.sentencingproject.org/research](http://www.sentencingproject.org/research)) and a large standing army so the civilian, non-institutionalized population is about 330 million people.

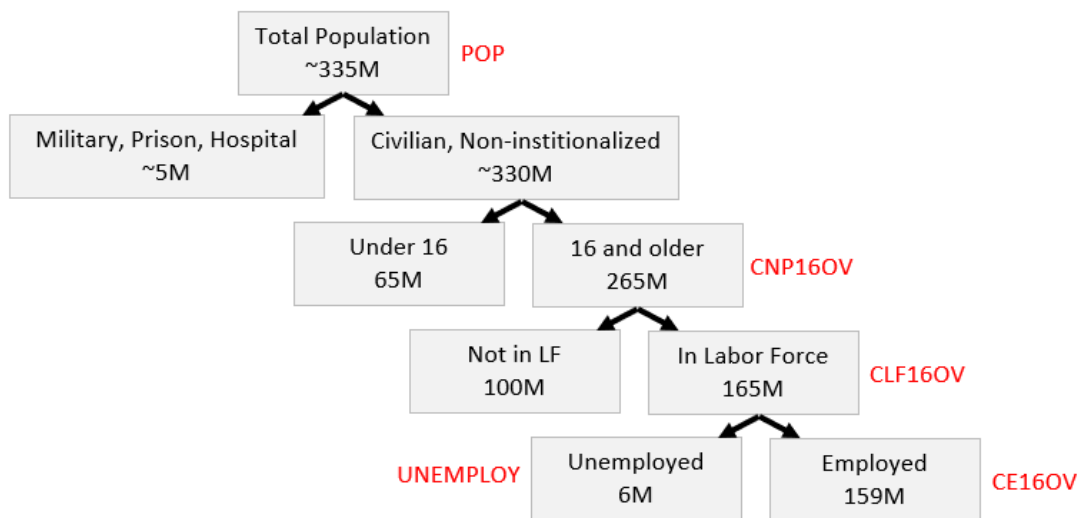


Figure 5.1: Labor Market Survey Flow Chart with FRED Series IDs.

Next, we split the civilian, non-institutionalized population into children, those under 16 years old, and working-age people, those 16 and over. The US today, like most rich countries, is rather old with only about a fifth of the population under 16 years old.

The next step is crucial. We separate the 265 million working-age people into two groups: those who want to work and those who do not. Those who work or want to work are said to be in the labor force. Those who do not (for example, they are in school, retired, or taking care of children) are out of the labor force.

Finally, the last split in Figure 5.1 separates the labor force into two parts: those with a job (employed) and those without a job (unemployed). In August 2023, the number of unemployed people was quite low relative to the total number of people in the labor force.

The numbers in Figure 5.1 are much more volatile at the bottom than the top. The number of people unemployed fluctuates quite a bit, while the population numbers at the top change much more slowly and predictably.

Figure 5.1 also reveals that not having a job does not guarantee that you are unemployed. After all, you might not have a job, but you might not want one. Then you are not unemployed, but out of the labor force. To be defined as unemployed, you must not have a job *and want to work*.

Now that we have the major labor market categories, we can compute two important labor statistics:

- Unemployment Rate =  $\frac{Unemployed}{LaborForce}$
- Labor Force Participation Rate (LFPR) =  $\frac{LaborForce}{CivNonInstPop16+}$

The *unemployment rate* is the percentage of the labor force that is unemployed. The *LFPR* is the percentage of the civilian, non-institutionalized, working-age population that is in the labor force.

## Unemployment Data

We can apply the framework in Figure 5.1 to practice our FRED skills, confirm the numbers in each category, and replicate the unemployment rate and LFPR statistics that are reported by the BLS.

**STEP** In cell C1, enter *CNP16OV* (civilian non-institutionalized population aged 16 and over. so the penultimate character is the uppercase letter O not the number 0). Click the  button.

Notice that the dates are not aligned. We need to fix that.

**STEP** Enter *1/1/1952* (the latest of the dates for the two series) in cells A4 and C4. Click the  button.

We can make a chart of the two series with FRED's built-in graphing tool.

**STEP** Click the  button and select *Create Multiple Series Graph*. Click *Series 1* and select *pop*. Click *Series 2* and select *CNP16OV*. Click the  button in the bottom left corner.

You created a chart in the signature FRED style, with a blue border and source information at the bottom. Multiple series charts do not include titles. You can add a title and other enhancements via the usual chart options—it is an Excel chart that can be edited and manipulated like any Excel chart.

We continue on our whirlwind tour of labor market statistics and FRED by confirming that the labor force is the sum of employed and unemployed people and showing how the unemployment rate and LFPR are computed.

**STEP** Insert a new sheet in your workbook. Using the Series IDs in Figure 5.1, get data on the civilian, non-institutionalized population 16 and over, labor force, employed, and unemployed from 1/1/1952. See the appendix if you have trouble.

Notice that in row 5, with the clickable link that takes you to the FRED website, the word *Level* is used. This is standard macroeconomics terminology for the value of a variable or indicator at a point in time. Often, we take the levels and perform other computations, such as the percentage change.

The level of Employed in January 1952 is 60,460 (in cell F8). Does this mean there were 60,460 people working in the United States at that time? No, that is simply too small a number. Cell F2 tells us that the data are in thousands so the employment level was 60,460,000 at that time.

**STEP** In cell I7, enter the label *Emp+Unemp=LF Check*. In cell I8, enter a formula to confirm that this is true. See the appendix if you need help.

Having confirmed that the labor force is the number of people working plus the number of people unemployed, we can use the data to compute the unemployment rate and LFPR.

**STEP** In cell J7, enter the label *UNRATE*. In cell J8, enter a formula that computes the unemployment rate. Format the unemployment rate as a percentage with one decimal point. See the appendix if you need help.

How can we check our work? That is easy. We use the FRED add-in to download the unemployment rate and see if we got the same numbers.

But we have a problem—we do not know the *Series ID* for the unemployment rate. Fortunately, FRED has a search tool that we can use to find the *Series ID*.

**STEP** Click the  button (with the magnifying glass) in the FRED menu. Enter the search text *unemployment rate* and click the  button.

FRED displays a lot of hits, but the top two look promising. If you scroll right in the search window, you will see the *Series IDs* and other information. The only difference between the two is that one is *SA* and the other is *NSA*. This means *seasonally adjusted* and *not seasonally adjusted*.

We seasonally adjust variables that vary systematically over the year. For example, construction employment falls in the winter and rises in the summer. Seasonal adjustment would tweak the construction employment numbers higher in the winter and lower in the summer so we can remove the seasonal component and make a better comparison across months.

**STEP** Click the SA (topmost) unemployment rate to select it as shown in Figure 5.2. Click the **Add Series ID** button at the bottom of the search window and click close.

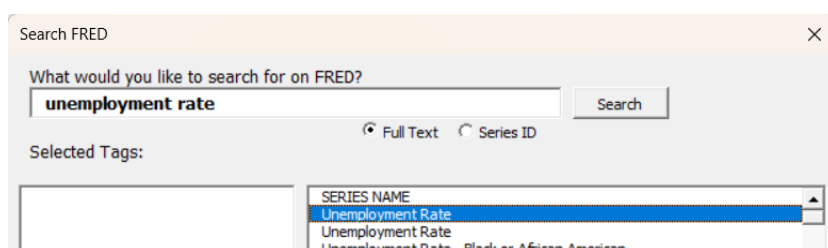


Figure 5.2: FRED's Data Search window.

FRED places information in cells I1:I4. We need to move it so that FRED does not download data on top of our work in columns I and J.

**STEP** Move cell range I1:I4 to cells K1:K4. Replace the start date with 1/1/1952. Click the **Get FRED Data** button.

It is immediately obvious that our computed version of the unemployment rate matches the *Series ID* UNRATE.

**STEP** Replicate Figure 5.3 by clicking the **Build Graph** button and selecting *Create Graph(s)*. Select the *UNRATE* series and check the option, *Include U. S. Recession Shading*. Finally, click the **Build Graph(s)** button.



Figure 5.3: The US unemployment rate over time.

The gray bars mean the economy was in a recession. Increases in the unemployment rate are strongly associated with recessionary periods.

The most recent spike was during the covid pandemic. The data in your spreadsheet show the highest unemployment rate was 14.7% in April 2020 (cell L827). Fortunately, it rapidly came back down.

**STEP** Apply the same steps used for the unemployment rate to the LFPR. Find the *Series ID*, download the data, and compare it to your own computed version to confirm they are the same. Create a chart of the LFPR with recession shading to replicate Figure 5.4. See the appendix if you need help.

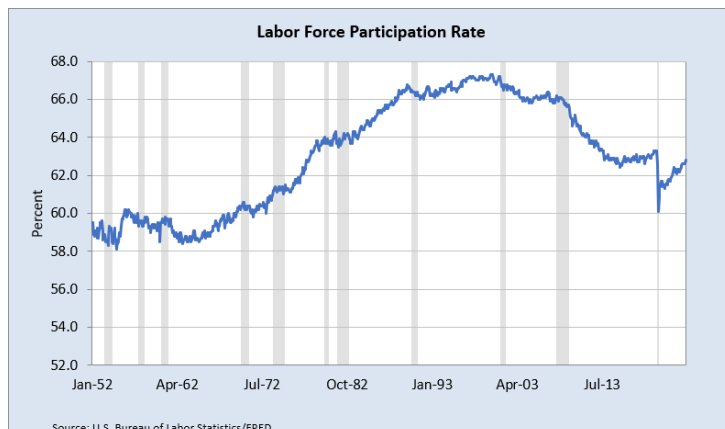


Figure 5.4: The US LFPR over time.



Unlike the unemployment rate, which bounces around a lot, the LFPR saw a steady increase until the early 2000s, when the labor force was about two-thirds of the civilian, non-institutional population 16 and older.

The LFPR fell dramatically during the covid pandemic, down to about 60% before recovering a bit. In 2023, it is still lower than its peak. This means working-age people are not as interested in working as they used to be.

## Takeaways

The FRED Excel add-in is a powerful tool that instantly downloads data from FRED into Excel.

It works by taking input from the first four rows of a sheet. Only the first row, with the *Series ID*, is required.

If you do not know the *SERIES ID*, search for it with the *Data Search* tool.

The charts created by the FRED add-in have a signature blue border and source information. FRED uses Excel's *Line* chart type and this requires the same dates for all series.

Unemployment statistics are generated by the results from the monthly Current Population Survey.

The questions are designed to create mutually exclusive categories, such as younger than 16 years old or 16 and over.

To be unemployed, you have to be without a job, but want to work. If you do not want to work (you are in school or retired or any other reason), you are out of the labor force. See Figure 5.1.

The unemployment rate is the ratio of the number of people unemployed to the number of people in the labor force.

The magic number (like batting .300) for the unemployment rate is 4% to 5%. In the long run, we want Real GDP per person growth of 2% per year and the higher the better. High unemployment is bad, of course, but the UNRATE can be so low that the economy overheats and prices rise too fast.

Because the unemployment rate is estimated every month, it is used as a predictor of short-run economic performance.

The LFPR (labor force participate rate) is another important labor market statistic. It is the ratio of the number of people in the labor force to the number of civilians 16 and over who are not institutionalized (in prison or a medical facility).

## References

The epigraph is from the opening sentence of the last chapter of Keynes, J. M. (1936) *The General Theory of Employment, Interest and Money*. Full text online at [www.marxists.org/reference/subject/economics/keynes/general-theory](http://www.marxists.org/reference/subject/economics/keynes/general-theory).

This book led to the reorganization of economics into micro- and macro-economics. It also radically changed the way economists thought about the role of government. Instead of passive onlookers, after Keynes, the Fed and other government actors saw themselves as responsible for actively managing the economy.

# Appendix

## Download Four Series

To download the civilian, non-institutionalized population 16 and over, labor force, employed, and unemployed from 1/1/1952, enter the *Series IDs* in row 1: *CNP16OV* in cell A1, *CLF16OV* in cell C1, *CE16OV* in cell E1, and *UNEMPLOY* in cell G1.

In row 4 of columns A, C, E, and G, enter *1/1/1952*.

Click the  button from the FRED menu.

In a few moments (depending on the speed of your internet connection and how much data it needs to download), the spreadsheet fills with data for the four variables you requested, beginning with labels in row 7, followed numbers.

## Emp+Unemp=LF Check

In cell I8, enter the formula `=D8-F8-H8`. and fill it down.

The many zeroes confirm that the sum of *Employed* and *Unemployed* equals the *Labor Force*. The few ones are rounding error. It is definitely true that the labor force is number of people 16 and over who have or want a job.

## Compute UNRATE

In cell J8, enter the formula `=H8/D8`. Click the  button in the *Home* tab in the *Ribbon* and add a decimal place (using the button right next *Percent Style* button). Fill it down.

## LFPR

The first hit in a search of *labor force participation rate* is CIVPART. Selecting it and clicking the  button puts the information on the sheet, but you have to move it to cell M1:N4.

Do not forget to change the date to 1/1/1952. If you do forget, then change the date and download the data again.

With CIVPART downloaded in columns M and N, enter the label *LFPR* in cell O7 and the formula  $=D8/B8$  in cell O8. Format it as % with one decimal place. Fill it down.

It is easy to see that your LFPR in column O replicates CIVPART in column N.

To make the chart, simply click the  button and select CIVPART.