

## Macroeconomic Variables: Employment and Unemployment

The average person probably pays more attention to the unemployment rate than any other macroeconomic variable. The starting point to understanding unemployment is the adult civilian, non-institutionalized population. This excludes children, members of the military, and those who are institutionalized in places like prisons. For the United States, this figure was 260.9 million as of January 2021.

The population is divided between the *labor force* and those not in the labor force. The labor force consists of two groups: those who are employed (defined as working 30 hours a week) and those who are unemployed but judged to be actively seeking work. The labor force does not include:

1. Retirees. Because the population in most developed economies is aging, this group is increasing as a share of the population.
2. Students. Most students are choosing not to work and are thus not counted as unemployed.
3. Homemakers. It is useful to remember that homemakers provide non-market activity, which is not included in GDP.
4. Discouraged workers. These are people who would like to have a job but who have given up trying to find a job. Because they would like to work, their exclusion from the unemployed category is a well known issue with unemployment statistics.

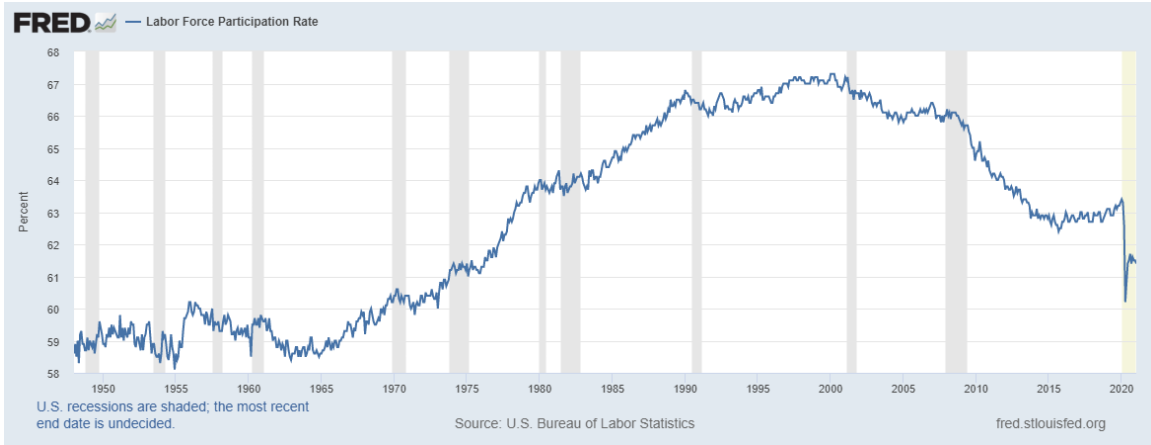
One measure of the labor market is the *labor force participation rate*. This is simply the labor force divided by the population. For January 2021, this calculation was:

$$LFPR = \frac{Labor\ Force}{Population} = \frac{160.2}{260.9} = 61.4\% \quad (1)$$

Figure 1 plots the labor force participation rate for the United States.

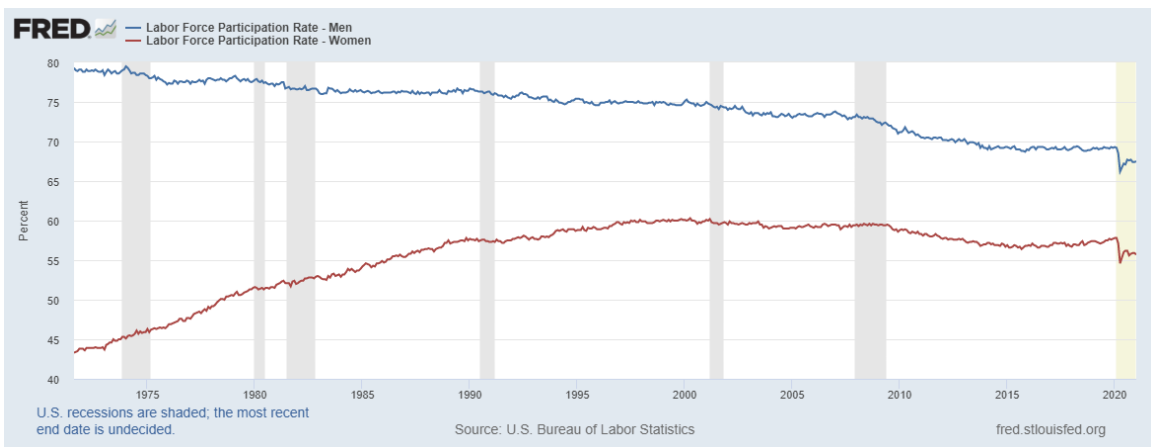
Notice three features in these data. First, the U.S labor force participation rate rose sharply from around 1965-1990. Most of this increase is from women entering the labor force. Second, the labor

Figure 1: U.S. Labor Force Participation Rate



force participation rate has declined since the Great Recession in 2008. This is due to a few factors including an older workforce and more people on disability. Third, labor force participation has declined sharply during the pandemic. This is partly because of the overall weaker labor market. But it is also because of widespread school closures that have made some parents leave the labor force. Figure 2 compares labor force participation for men and women:

Figure 2: U.S. Labor Force Participation Rate



Whether the labor force participation rate is a good measure of the economy's health is compli-

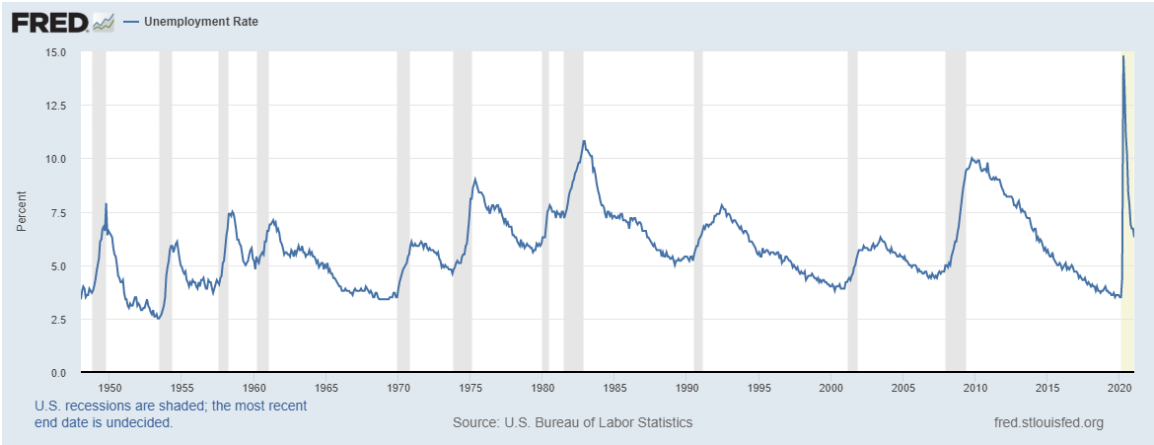
cated. In general, if changes to labor force participation are voluntary, then economists do not view them as a sign of the economy’s short-term health. Retirees exiting the labor force, for example, is not a bad sign. Because bad economic conditions can, however, drive some workers out of the labor force, there are times when a drop in labor force participation is concerning. This is true for the covid-19 related decline.

The Bureau of Labor Statistics uses surveys to estimate the number of unemployed who are actively seeking work. The headline (also known as U-3) unemployment rate is then the number of unemployed divided by the labor force. For January 2021, the calculation was:

$$UE = \frac{Unemployed}{Labor\ Force} = \frac{10.1}{160.2} = 6.3\% \tag{2}$$

Figure 3 displays the U-3 unemployment rate in the United States over time.

Figure 3: U.S. Headline Unemployment Rate



Notice that unemployment tends to rise once a recession (shaded region) has begun. It does not usually start rising before a recession starts. For this reason, unemployment is often considered a *lagging variable* that only moves once there are already other signs of trouble. This is in contrast to a *leading variable* which tends to move before it is clear that there is trouble. Covid-19 caused

the unemployment rate to rise to 14.8% in April 2020, its highest level since the Great Depression. Note that it did come down fairly quickly compared to the Great Recession.

There are important distinctions among the unemployed. Macroeconomists often divide them into three groups:

1. Frictional unemployment is the normal unemployment that results from a healthy, stable economy. People may endure a spell of unemployment because they want to change jobs or careers, or relocate. Some employees will perform poorly, and rational firms may thus fire them, rendering them unemployed. Some firms will fail, independent of the state of the economy, leaving their employees at risk of unemployment.

Policy makers do not worry too much about frictional unemployment. In addition to being normal, much of it is voluntary where the unemployed have chosen to begin a spell of unemployment. Trying to fully eliminate it would likely have adverse consequences because it is part of the normal workings of a healthy economy. When it is involuntary, most economists believe that the best approach is to provide unemployment insurance to those affected.

2. Structural unemployment is the unemployment that results from fundamental changes in the nature of the economy. In the United States, for example, the manufacturing sector has decreased in scale as the service sector has increased. Earlier in U.S history, the reduction of the agricultural sector led to considerable structural unemployment. These changes render workers in declining sectors unemployed.

Like, frictional unemployment, structural unemployment is part of a healthy economy. If it never existed, then we would still ride our horse and buggies past the local blacksmith, on our way to our monthly bleeding at the doctor's. Structural unemployment, however, is involuntary and often does enormous harm to those afflicted by it. Often, replacement jobs in declining sectors are unavailable and the households' prospects never fully recover. But like frictional unemployment, economists tend to advocate for measures assisting the structurally unemployed rather than trying to prevent structural unemployment.

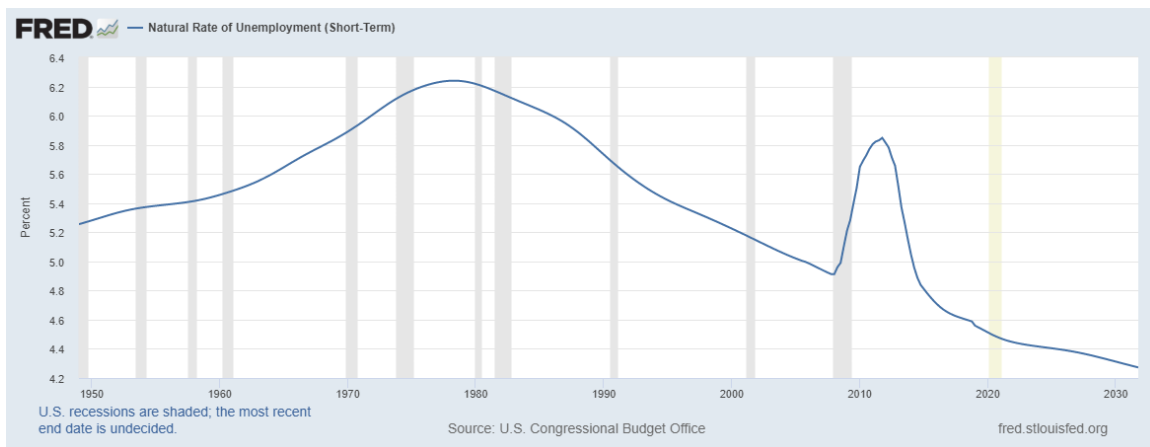
Technological progress has caused a large loss of manufacturing jobs throughout the United States.<sup>1</sup> This structural unemployment is a major issue in political elections, especially in regions like the Midwest that have been especially hard hit.

The *natural rate of unemployment* is the sum of structural and frictional unemployment. The Congressional Budget Office currently estimates the natural rate at 4.3%. Full employment, a major goal of policy makers, is often interpreted as attaining this figure. Eliminating unemployment is not a goal because doing so would interfere with the normal workings of a healthy economy.

Importantly, the natural rate of unemployment is not a variable that can be directly measured. It must instead be estimated using more complicated methods and there is thus considerable uncertainty over what it equals.

The natural rate of unemployment is not constant across countries or over time. Figure 4 shows the Congressional Budget Office's estimate for the United States since 1949:

Figure 4: U.S. Natural Rate of Unemployment



Although the natural rate of unemployment has been trending downwards in the United States, notice that it spiked up around the Great Recession. This is mostly because the Great Recession accelerated some structural change in the economy, particularly in manufacturing.

<sup>1</sup>Globalization and free trade are also secondary factors.

The Organization for Economic Co-operation and Development (OECD) has estimated unemployment rate for different economies. Whereas the United State is about 4-5%, the Eurozone is closer to 8%, with some countries, like Spain, being much higher. Japan's natural rate is probably closer to 3-4%. A number of factors influence the natural rate:

- i. The level of employment protection. In some countries, like the United States, firms are able to fire employees simply because it is profitable to do so. Other countries, including many in Europe, make this much harder, sometimes by requiring generous severance packages. When it becomes very hard to get rid of an employee, firms become more reluctant to hire them in the first place.
- ii. The generosity of the welfare state. Longer lasting and more generous unemployment compensation make spells of frictional unemployment less costly.

Note that 1-2 do not inevitably result in policy implications such as unemployment compensation being a bad idea. The point is instead that these policies have costs and we must carefully consider the tradeoffs involved.

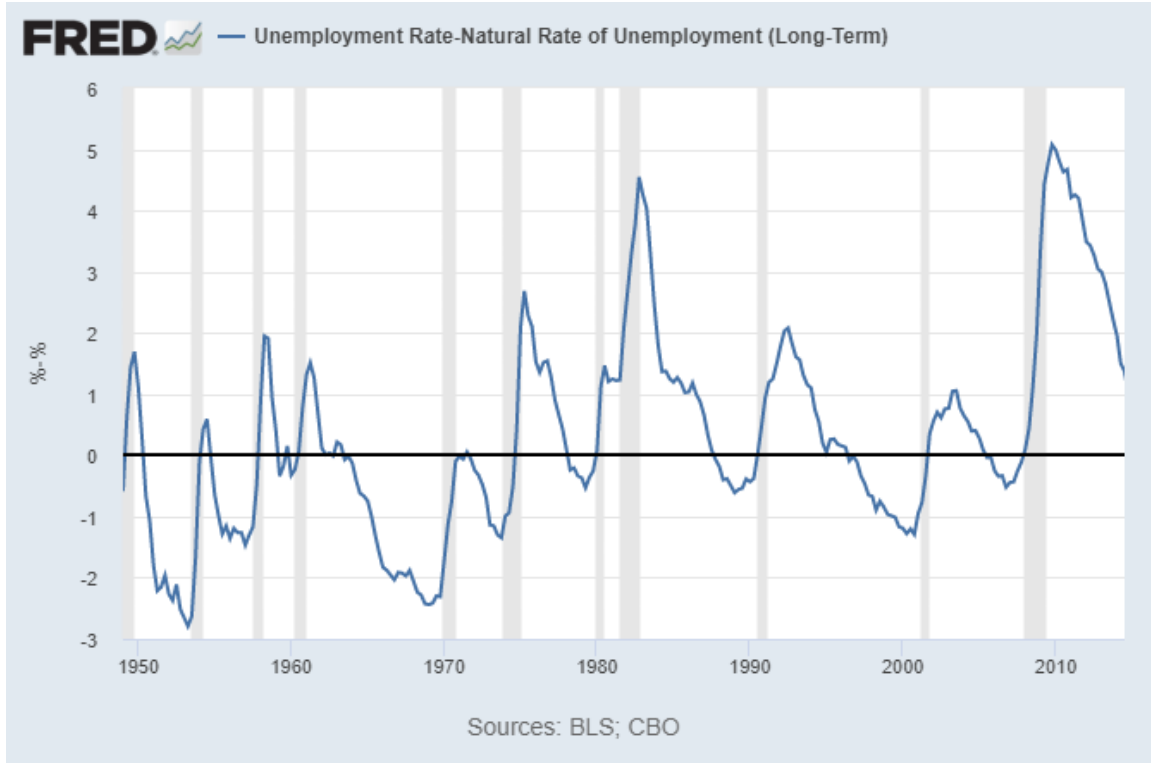
- iii. Technology. Sometimes, technological progress results in a lot of structural unemployment. Other times, it does not. Furthermore, technology might make searching for new jobs easier (think online job site as opposed to print newspaper classifieds), possibly causing a decline in frictional unemployment.
- iv. Cultural factors. How willing are households to relocate? Is lifetime employment with a single firm viewed as a virtue?

And now, the third and final type of unemployment.

3. Cyclical unemployment. This is the unemployment that results from the business cycle. It is involuntary, and of great concern to policy makers who seek to eradicate it.

Figure 5 estimates U.S. cyclical unemployment by subtracting the natural rate of unemployment from U-3:

Figure 5: Cyclical Unemployment Rate

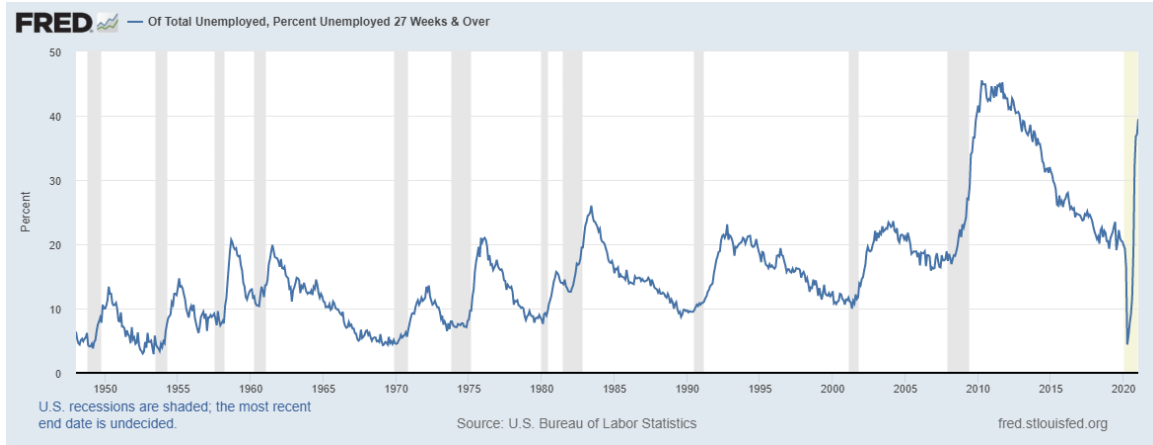


The rise in unemployment resulting from covid-19 was due to higher cyclical unemployment. It was mostly involuntary and was thus seen as a major policy issue. Policy makers enacted measures such as extended unemployment benefits to mitigate its effects. Many of the social costs of unemployment are obvious. In addition, however, long term unemployment (typically defined as a spell lasting at least 6 months) brings especially severe consequences to those afflicted. Their unemployment benefits might run out. They risk the erosion of their skills and a possible stigma when seeking future employment. An underreported aspect of the Great Recession was the increase in long term unemployment. Figure 6 shows that the share of unemployed who were long term unemployed was far higher than at any time since 1950:<sup>2</sup> This figure was initially low during the covid-19 recession. But it has increased as the pandemic has continued.

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<sup>2</sup>Source: St Louis Fed.

Figure 6: Long Term Unemployment, Percentage of Total Unemployed



### *Measuring Unemployment*

Actually measuring unemployment is surprisingly complicated. The Bureau of Labor Statistics uses survey data from firms and households, the latter being the more widely reported measure. The adult population is placed into one of the following categories:

- a. Fully employed. The cutoff is 30 hours per week.
- b. Unemployed and actively seeking work.
- c. Discouraged workers. These are unemployed workers who have given up searching.
- d. Underemployed for Economic Reasons. These are people who are working fewer than 30 hours per week but who would prefer to work more.
- e. Underemployed for Other Reasons. This would include part time workers who do not want to be full time. Students with part time jobs are a prime example.
- f. Others not in the labor force. This includes the military, the incarcerated or institutionalized, retirees, and homemakers.



Table 1: Unemployment in 2019 and 2020

	2014	2015
Employed	100	95
Unemployed	20	10
Discouraged Workers	10	20
Underemployed for Economic Reasons	5	10
Others	50	50

The baseline unemployment rate (U-3) defines the labor force to include only the employed and unemployed actively seeking work. Consider the following example:

The labor force is 120 in 2019 and 105 in 2020. The unemployment rate is thus  $\frac{20}{120} = 16.6\%$  in 2019 and  $\frac{10}{105} = 9.5\%$  in 2020. A decline in the unemployment rate is usually seen as good news, and it is if it results from the unemployed becoming employed. But I set this scenario up to illustrate another possibility. Here, employment has decreased: 5 employed workers have become underemployed for economic reasons. 10 unemployed workers have left the labor force by becoming discouraged workers. The labor market has gotten worse, not better, despite the decline in U-3.

This is not just a theoretical possibility. There are often cases where U-3 has fallen despite a weakening labor market.

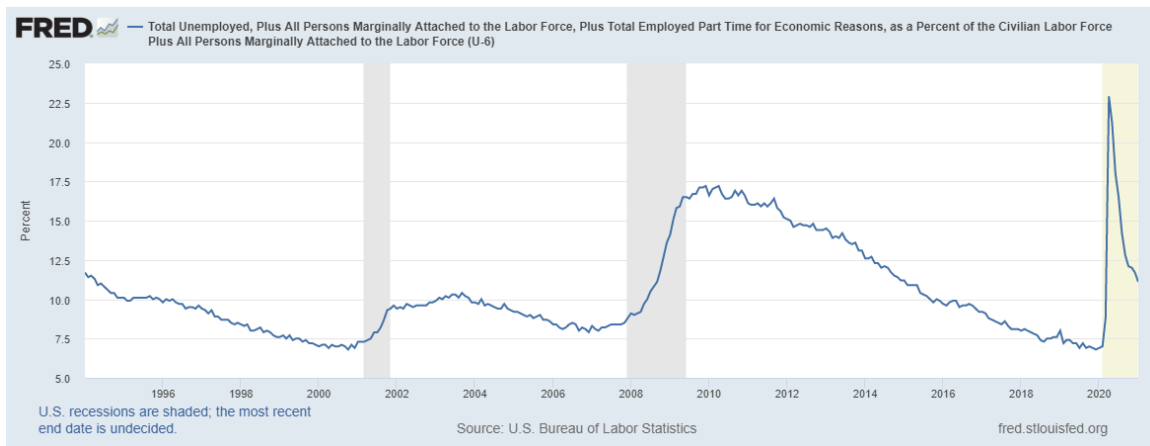
The limitations of U-3 are well known. The Bureau of Labor Statistics thus reports alternate measures of unemployment. One of these is U-6. This makes two changes to U-3. First, it redefines the unemployed to include those who are discouraged workers or underemployed due to economic reasons. The latter group is the larger of the two. Second, it adds these groups to the labor force as well. A common mistake that students make is to add these workers to the unemployed, but not the labor force.

In our example, U-6 equals  $\frac{35}{135} = 25.9\%$  in 2019 and  $\frac{40}{135} = 29.6\%$  in 2020. The U-6 rate is

always higher than U-3.<sup>3</sup> It also better captures the worsening of the labor market in our example. U-6 does have disadvantages, however. Because it involves harder classifications (such as underemployed for economic reasons vs. underemployed for other reasons), its measurement error is bigger.

Figure 7 shows the U-6 unemployment rate over time:<sup>4</sup>

Figure 7: U-6 Unemployment Rate



As of January, the U-6 unemployment rate was 11.1%. Its local peak was 22.6% in April 2020.

As bad as the Great Recession and covid-19 recessions were, they pale in comparison to the Great Recession where U-3 peaked at 25% in 1933. Neil Andrews estimates that U-6 peaked about 37%.<sup>5</sup> Unemployment also remained at catastrophic levels for much longer. The severity of a recession depends on both its amplitude (how bad are things at their worst?) and its persistence (how long does it take for things to get back to normal?).

Judging the health of the labor market requires more than any single metric. By looking at multiple measures, including U-3, U-6, long-term unemployment, and labor force participation, and providing appropriate context, we hope to gain a comprehensive view.

<sup>3</sup>The 4.3% estimate of the natural rate would have to be adjusted upward using the U-6 criteria.

<sup>4</sup>Source: St Louis Fed.

<sup>5</sup>Andrews, N. "Unemployment 1930's vs Today." *Mimeo*

## An Attempt to Model Unemployment Gone Horribly Wrong

Macroeconomics did not emerge as a distinct field until the 1930s. Prior to this time, unemployment would have been modeled using purely microeconomic tools. We will briefly imagine a world without macroeconomics by trying to explain unemployment using simple supply and demand.

Figure 8: A World Without Macroeconomists



Households supply labor. We will assume that households choose to supply more labor as the wage increases.<sup>6</sup> Supply is thus upward sloping. We will also assume that firms choose to hire more workers as the wage falls. Labor demand is thus downward sloping

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<sup>6</sup>In some cases, households might supply more labor as wages fall because they need to work more hours in order to make a given amount of income. But I leave this issue to ECO 101 and 260. It is not important for this example.

## Graph: Supply and Demand

Note that the vertical axis is the wage (the price of labor) and the horizontal is employment (the quantity of labor).

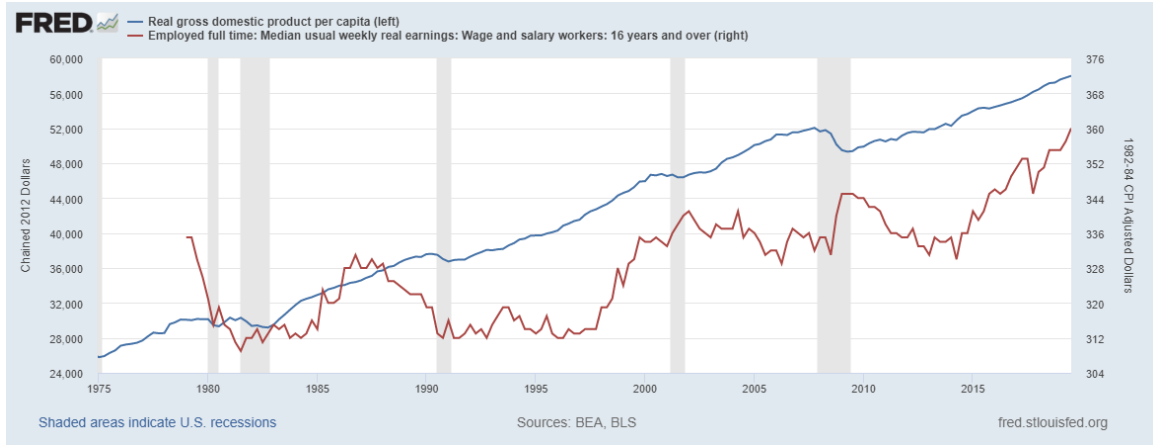
Involuntary unemployment is the difference between people who want to work at the market wage, and those who are actually able to. Graphically, it is supply less demand. In equilibrium, however, these curves are at the same place and involuntary unemployment thus equals zero. So all unemployment is voluntary, the unemployed could find work if they wanted to, but they decide the equilibrium wage is too low. This is a strained explanation during good economic times. It becomes silly during events like the Great Recession or covid-19 pandemic.

Macroeconomics emerged because events like the Great Depression cannot be explained using simple microeconomics. Obviously, something is missing. We will examine what that is when we look more closely at the theory of business cycles. *Wages vs Income*

Figure 9 shows real per-capita GDP vs the median real wage, defined as the wage where half of U.S. households earn more, and half less. The former can be considered average income and includes non-wage income including firm profits:

This graph illustrates the trend of widening income inequality in the United States, which is

Figure 9: Widening Inequality



illustrated by many different measures. Since 1980, median wages have grown at a slower rate than average income.