A Primer on Economic Statistics

The economy (especially during periods of crisis) is clearly a subject of intense interest for many people. Accordingly, we are bombarded with economic statistics and data from numerous sources such as newscasts, the Internet, newspapers, magazines, and fellow citizens. The volume and variety of economic statistics can be overwhelming. Here are some useful tips that can be used when evaluating economic statistics.

What is this Statistic Telling Me?

It is often helpful to ask "what is this statistic telling me?" and, perhaps more importantly, "what is this statistic *not* telling me?" Knowing the precise definition of an economic statistic is important. For example, some people may equate personal income with income received from work. However, personal income also includes proprietors' income, rental income, interest, dividends and transfer payments such as social security, welfare and unemployment benefits. Most people would probably define unemployment as not having a job. But, according to the definition used in federal statistical programs, only those who are without work *and* have actively sought work within the last four weeks are considered unemployed. Discouraged workers -those who have not looked for work for four weeks or more- are considered out of the labor force and not unemployed. An additional consideration is that some unemployment rates are seasonally adjusted to distinguish between typical employment fluctuations (e.g. construction employment typically falls in the winter) and changes which warrant attention.

Changes in Magnitude (Size) and Changes in Percent

Distinguishing between changes in magnitude and percent changes is quite useful when looking at economic statistics. An increase of 10 million dollars may sound impressive but, if the base figure was 10 billion dollars, then this represents only a 0.1 percent increase. Percent changes must be looked at carefully as well. Going from a crime rate of one crime per 1,000,000 people per year to two crimes per 1,000,000 people per year is an increase of 100 percent. However, when dealing with extremely small values, any change can be proportionately large. The new crime rate is still very small in terms of magnitude. Either way, looking at long-term trends in magnitude or percent changes is beneficial because it aids in determining whether a short-term change is significant, atypical or part of a recurring pattern.

Read Statistics with Caution

Any gross statistic, such as total wages, total income or gross domestic product (GDP), must be read with caution. Hypothetically, if country "A" reports a GDP of $100,000 and country "B" reports a GDP of $10,000, it is tempting to say that country "A" has the more robust economy. However, if country "A" has a population of 100,000 people and country "B" a population of 100, then calculating per capita GDP (GDP/population) demonstrates that, *on average*, the folks in country "B" are economically better off than the people in country "A" (A=$100,000/100,000=$1 per person; B=$10,000/100=$100 per person).

Putting Averages in Perspective

Averages can be misleading as well. This is particularly true with statistics describing income or wages. To demonstrate, assume there are five individuals in an economy making salaries of $20,000, $25,000, $30,000, $40,000 and $200,000 per year. The average (or mean) yearly salary in this case is $63,000 ($20,000 + $25,000 + $30,000 + $40,000 + $200,000/5). The individual making $200,000 per year substantially skews the average salary upward. Because averages tend to be skewed by extreme values, the median measure is preferred when examining income and wages. In this case the median yearly salary (the salary exactly in the middle of the group) is $30,000, which is much more representative of what the typical person makes.

Nominal versus Real Statistics

Another important consideration is whether economic statistics are reflecting nominal or real values. Nominal values are expressed in current dollar figures, whereas real values account for the effect of inflation. Some common economic statistics that are expressed in both nominal and real values are gross domestic product (GDP), wages, income and interest rates. To illustrate, if $100 was deposited in a bank for one year and earned 10 percent interest, then $110 would be received one year later. However, if the inflation rate was 10 percent over that same year, then the $110 would have the same purchasing power as $100 did a year ago. The real value of the $110 (adjusted for inflation) is $100 and the real interest rate is zero percent because no "real" gain in income occurred. Calculating real values for economic statistics makes it possible to distinguish between real growth and increases due to inflation.

Statistical Ambiguities

It is particularly frustrating when two different sources are reaching two totally different conclusions about what seems to be the same economic statistic. This can often be the result of using different measurement techniques. For instance, suppose we are trying to determine who bears the most tax burden in a two-person economy. One person makes $100,000 per year and is taxed at an effective rate of 5 percent. The other person makes $10,000 per year and is taxed at 10 percent. The tax contributions for each individual would be $5,000 and $1,000 respectively for total tax receipts of $6,000. One can argue that the wealthier person bears a greater tax burden because his contribution represents 83.3 percent of tax revenues ($5,000/$6,000). The argument can also be made that the poorer individual bears a greater burden because a larger percentage of his income goes to taxes (10 percent vs. 5 percent). Two different measurement techniques, percent of tax receipts vs. percent of income, are being applied to determine tax burden. It is up to the reader to decide which is more applicable.

Erroneous conclusions can also be made when the direction of a statistical relationship is mistakenly reversed. Assume an economy of 100 laborers with 10 working in professional occupations and 90 in non-professional occupations. Eight of ten professional workers hold second jobs (i.e. 80 percent of professionals hold multiple jobs). In the non-professional category, 30 of 90 workers hold second jobs (a multiple job holding rate of 33 percent). From this data on our workforce we can state that those who work in professional occupations are likely to be multiple jobholders. However, the reverse is not true. We *cannot* assert that multiple jobholders are likely to be employed in professional occupations because professional occupations comprise a small percentage of the total workforce (10 percent). If we take the total number of multiple jobholders (8 from professional occupations, 30 from non-professional occupations), we find that 78.9 percent of multiple jobholders are from non-professional occupations (30/38x100=78.9%).

Sample Based Statistics

In cases where economic statistics are generated from samples of a population, rather than the population as a whole, tests for statistical significance are of particular importance. By testing for statistical significance, a determination can be made regarding how confident we are that a relationship found in the sample data depicts the same relationship in the population.

To illustrate, if you blindly drew only one marble from a box containing 100 marbles (99 of which were red and 1 that was blue), it's possible you could draw the blue marble and erroneously conclude that all the marbles were blue. Statistical significance testing necessitates that a sufficient sized sample be drawn. It also allows us to state how confident we are in the information derived from various sample sizes. Many people are familiar with political polling surveys that indicate levels of confidence and margins of error. A survey indicating a 95 percent confidence level with a margin of error of plus or minus three percent is akin to saying that, given this sample size, the researcher is 95 percent confident that the sample data is representative of the population within a margin of error of plus or minus three percent.

Case Study of a Specific Workforce Related Statistic

Average weekly wages under covered employment are a fairly common state level statistic. They are calculated quarterly by taking total wages reported by businesses subject to unemployment taxation (i.e. covered by unemployment insurance), dividing by the total employment reported by these firms, and then dividing by 13 to arrive at a weekly figure. What is this statistic telling us? The vast majority of employment is reported by businesses covered by unemployment insurance (97.1 percent of nonfarm payrolls according to the U.S. Department of Labor, Bureau of Labor Statistics). Therefore, statistical significance testing is unnecessary since virtually the entire working population is accounted for.[1] The weekly unit of measurement is a commonly understood time frame that allows for assessing how workers are faring on average. Finally, by looking at previously released figures, magnitude and percent changes can be easily calculated and trend analyses performed.

What is this statistic not telling us? Average weekly wages may not be the best indicator of how *typical* workers are faring for two reasons. First of all, many forms of compensation must be reported under unemployment compensation law. These include executive pay, stock option payments, profit distributions, bonuses, commissions and, in some cases, employer contributions to retirement plans such as 401k's. For the most part, these forms of compensation comprise a fairly small percentage of typical workers' pay. Secondly, as discussed above, averages are skewed by extreme values. As such, the relatively few employees who receive very high wages pull the average up. In addition, changes in average weekly wages may reflect changes in the length of time at work rather than an improvement in wages. Assume 10 workers, working 39 hours per week, at $10.00 per hour. Total wages would equal $3,900 (10 x 39 x $10.00). If the workweek was 40 hours instead, then total wages would equal $4,000 (10 x 40 x $10.00). Average weekly wages (total wages/total employed) would be $390 in the first case ($3,900/10) and $400 in the second case ($4,000/10). Average weekly wages have increased but not due to improving wages but the lengthening of the workweek. Finally, average weekly wages are an example of a statistic expressed in nominal value and are therefore not adjusted for inflation.

The preceding examples by no means exhaust all potential economic statistical ambiguities, misinterpretations or misunderstandings. While some degree of researcher bias is inevitable, outright deception using economic statistics is fairly uncommon. Misleading economic statistics are also often the result of unconscious bias, unfamiliarity with the "right" statistic for the analysis at hand or the lack of time, manpower or computing capacity necessary to generate optimal economic statistics. Informed consumers of economic statistics are the best antidotes to unwarranted conclusions.

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[1] An example of economic statistics that are sample based is the Current Employment Statistics (CES), a monthly survey of business establishments performed under the direction of the Bureau of Labor Statistics. Another example is the national unemployment rate, a monthly survey of households, performed by the Census Bureau.

Other Resources:

How To Lie With Statistics by Darrell Huff. W. W. Norton & Co., 1993.

Guide To Economic Indicators, 3 ed. by Norman Frumkin. M. E. Sharpe, 2000.

The MIT Dictionary of Modern Economics, 4 ed. edited by David W. Pearce. MIT Press, 1992.

A Guide To Everyday Economic Statistics, 6 ed. by Gary E. Clayton & Martin Gerhard Giesbrecht. McGraw Hill, 2004.