Eighth Edition

A Guide to Everyday **Economic Statistics**

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Mc Graw Hill Education

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Preface: Data, Information, Understanding, Wisdom

Seven years have passed since the last edition of this little Guide was published. During that time, we came off a period of substantial if imperfect economic success and then fell into the infamous Great Recession, so called to remind us of how close it came to the disastrous Great Depression of the 1930s. We have since experienced—and apparently are continuing to experience—a slow and uneven climb to improved production and growth. And all the while we see our world and our economy undergoing remarkable technological, geo-political, social, and environmental transformations.

Among the most remarkable of these transformations, and the most relevant to our Guide, is the enormous and rapid increase in the digital data churned out by all of our various activities. Google, Facebook, Wikipedia, customer loyalty cards, telephone, Internet, and credit and debit card records, etc. are just the visible surface of this vast and growing pool of data.

But data, by themselves, tell us very little. They are the inert building blocks of concepts yet to be imagined and yet to be built. This is where our economic statistics come in. Compiling, analyzing, and distilling these building blocks into coherent statements are the tasks to which our statistical indicators are dedicated. And in doing so, they turn data into information.

Information, of course, is what we want to have. It tells us where we have been and where we might be going and helps us make important personal, family, and business decisions. Our wallets, our "breadbaskets," our careers are influenced by these decision making tools. To ignore them would be like flying blind or driving cross country without a GPS or without even a road map: not impossible perhaps, but not advisable.

Good information like good statistics, tends to come as a flow over time. Our statistics are constantly evolving. They are regularly updated. The samples on which some of them are based, such as the market basket of consumer goods and services from which the Consumer Price Index is calculated, are adjusted to reflect changing consumer buying behavior. The sets of statistical series included in

various indices are similarly adjusted to our changing economic structure. And other technical, methodological, and definitional revisions are made to increase the accuracy of the economic information they provide.

It is only natural that some statistics take on more importance—and others less so—as time goes on. The political responses to our recent economic difficulties have made government fiscal policies—government expenditures and taxes—more important than they have been for several decades. International investment and trade have also become bigger issues during that time. Economic statistics reporting on these newer concerns have moved closer to center stage.

Accessibility to our economic information also continues to evolve. Thirty years ago, many of the individual series that were used to keep track of the economy were available on the ECONOMIC BULLETIN BOARD of the U.S. Department of Commerce for a relatively modest fee. In 1995, as part of a cost-saving measure some of the most important business cycle series were transferred to The Conference Board, a private, non-profit business organization, which sold them to users at a significantly higher cost. Since then, most federal information generating agencies have put their series on the internet, thereby increasing accessibility and lowering the cost to users. Most of the federal sites now also have utilities that allow users to retrieve a staggering amount of information in a wide variety of formats. And always, easy access to much of this is provided by www.EconSources.com.

Finally, the public media seems to have a voracious appetite for numbers. Press releases from private and public statistical sources are picked up and quoted virtually verbatim, as if they were doctrine from on high. We are left to sort it out. That is, we are left to transform information into understanding. Here is where our little book becomes especially important. It has no axe to grind. It is neither a statistics lecture nor an economics textbook. Instead, it is a handy little guide that can be consulted for clarification whenever any of the statistical series dealt with herein are encountered. It examines how different series are constructed and how we may use them effectively. Above all, it tries to put this information in context, so the reader can see how the economic statistics lead to an understanding of the larger picture.

By the way, you won't have to read this book consecutively from beginning to end, although that is OK too. But keep it handy! Do so even in good times when it may seem less urgent to keep an eye on economic statistics. Remember, we may put off watching our diets or keeping tabs on our blood pressures when we are in robust health. But, as more than a few of us have learned, this is also a time when concern about our personal well-being is critical. Doing likewise with our economic statistics not only helps keep track of our economic health, it may also enable us to move from understanding to the final level of sophistication: call it wisdom.

That's what this little book is all about. Use it well, and use it often.

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About the Authors

Gary E. Clayton is Professor and former Chair of the Economics & Finance Department at Northern Kentucky University. His Ph.D. in economics is from the University of Utah and he is the only American with an Honorary Doctorate from the People's Friendship University of Russia (PFUR) in Moscow. He has appeared on numerous radio and television programs and for two years was a regular guest commentator on economic statistics for NPR's *Marketplace*. In addition to his other writings and newspaper commentary, he has published five textbooks in the middle school, high school and college markets, including the best-selling *Understanding Economics* with McGraw-Hill Education. Professor Clayton's web portal, www.EconSources.com, was described as "among the most useful [sites] on the web" by the Federal Reserve Bank of Boston's *Ledger*.

Dr. Clayton has taught international business and economics to students in London, Austria, and Australia. He is interested in the economic advancement of developing nations and in 2006 helped organize a micro loan project in Uganda. He is a year 2000 Freedoms Foundation Leavey Award winner for Excellence in Private Enterprise Education, an Association of Real Estate License Law Officials (ARELLO) national Consumer Education Award winner, and the recipient of a national teaching award from the National Council on Economic Education. In 2005 Dr. Clayton was the recipient of Northern Kentucky University's Frank Sinton Milburn Outstanding Professor Award.

Martin Gerhard Giesbrecht is Professor Emeritus of Economics at Northern Kentucky University. He has taught and/or conducted research at Stanford University, the University of Chicago, Harvard University, Indiana University, National Chengchi University (Taiwan), Rutgers University, and Wilmington College. His doctoral degree (cum laude) was earned at the University of Munich, Germany, which he attended on a Fulbright Grant. Making economics accessible, intellectually enlightening, and even entertaining is the mission of Martin Giesbrecht's professional life. All of his 12 books, including this one, and his many shorter articles, some of which have also appeared in German and Chinese, are dedicated to that end, as are his weekly radio commentaries on WNKU and WMKV.

Because he writes and speaks in a way that people can understand, the Society of Professional Journalism bestowed the Award for Excellence on him in 1993. He has also won awards from the German-American Chamber of Commerce, the National Aeronautics and Space Administration (NASA), the American Society for Engineering Education, the National Science Foundation, the General Electric Foundation, the Ford Foundation, the U.S. Small Business

Administration, and the National Endowment for the Humanities, among others. He is especially gratified that the ΦΒΛ (Future Business Leaders) Fraternity voted him their favorite professor on the NKU campus.

Feng Guo is Chief Economist at Heaven-Sent Capital Management Group, one of largest private equity firms in China, and Managing Partner & Head of the Research Institute at Zhejiang Silicon Paradise Asset Management Group. Previously, Dr. Guo was Chief Representative of Asia Pacific and Chief China Economist at the Institute of International Finance (IIF) in Washington DC for six years. He also worked as a Senior Research Economist at the Center for Economic Analysis and Development at Northern Kentucky University. From 2004 to 2008, Dr. Guo was a Research Economist with The Conference Board in New York City where he specialized in the development of business cycle indices for China and in forecasting aggregate economic activities for East Asian economies.

Dr. Guo has published numerous research reports and peer-reviewed academic papers on East Asia's macroeconomics, financial markets, and economic developments. Dr. Guo obtained his Ph.D. in Economics from the Graduate Center, City University of New York, and his master's degree in Economics from Rissho University in Tokyo, Japan.

Acknowledgments

For almost two decades now, through the many editions of this little book, we have benefited from the generous help, advice, comments, and suggestions of hundreds of economists, statisticians, journalists, financiers, students, leaders in industry and government, and other interested readers. We continue to be enormously grateful to them all, as we are to McGraw-Hill for working with us from the beginning to bring you this little Guide. And finally, we are especially indebted to our families for putting up with us during the weeks and months when they were pushed aside while we worked on manuscript and deadlines—we could not have done it without them! And, of course, any errors that remain are entirely our responsibility.

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Chapter 1

INTRODUCTION

How the Statistics in This Book Were Chosen

We need economic statistics to know how we are doing, and we need to know how we are doing in order to figure out how to get where we want to go. Decision making requires knowledge, and knowledge is the only logical basis of action. That is why we need economic statistics.

The problem is that there are literally millions of statistical series! At the personal level, each of us could probably generate a dozen series from our grocery receipts, odometer readings, telephone bills, and electricity bills. Every business, town, city, county, and industry could do, and often does, the same in its own field of operation.

Even the broad-based measures of economic statistics, those that deal with whole states, regions, and nations, number into the thousands. In fact, there are now so many national statistics that the U.S. Census Bureau can no longer publish all of them in its comprehensive annual *Statistical Abstract of the United States.*[1]

Yet, only a handful of economic statistical series are dealt with in this book. Why?

First and most obvious, there is such a thing as too much information. It can prevent us from seeing the forest for all the trees.

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[1] Even though the *Abstract* has not been published since 2012, complete copies of the *Statistical Abstract* from 1879 to 2012 are available on the Census Bureau's Statistical Abstracts Series website at https://www.census.gov/library/publications/time-series/statistical_abstracts.html. For more current data, the site advises readers to "refer to the organizations cited in the source notes for each table of the [appropriate] *Abstract*."

Second, many statistical series, like one detailing our own personal electricity consumption, are just not interesting to everyone.

Third, many statistical series are compiled and published too late to be of much more than historical interest.

Finally, many statistical series are not reported regularly in the press and broadcast media, and are therefore of less interest.

However, other statistics have extremely high profiles. Some, like the Dow Jones Industrial Average, are reported daily on television, radio, in newspapers, and on the Internet. Others, like the prime rate, are mentioned less frequently, but still receive prominent attention. Even others, like auto sales, are important because they tell us how a particular sector of the economy is performing.

If we want to know how we are doing or where we are headed, even a handful of series are usually more than enough. They include most of the major economic indicators that are important all of the time. Consumer confidence, the consumer price index, and the unemployment rate would certainly be in the top half-dozen of anyone's list of key economic statistics. Many others are important most of the time, and the rest are important at least some of the time.

We may not have selected everyone's favorite statistics for this little book—and for that we apologize—but we are driven by a positive philosophy of wanting to describe "what is" rather than a normative one of "what should be." The popular press may neglect some statistics when they should not be, while others are widely reported when there is less reason to do so. However, the objective here is to provide a guide to those series that *do* receive the attention rather than to the ones that *should*.

A Frame of Reference

The main measure of overall economic and business activity is gross domestic product (GDP), whose fluctuations are the most important gauge of good times or bad times that we have. Because GDP is defined as the total dollar value of all new final goods and services produced in a country during a one-year period, GDP is to be understood as a final, bottom-line accounting measure, an economic result, rather than as an indicator of things to come.

Many of the statistics reviewed in this book measure either the whole or parts of GDP. Other statistics, The Conference Board's Leading Economic Index preeminent among them, serve better as signals of things to come. There are also more specialized series, such as the Standard & Poor's 500 (S&P 500), that serve both as general indicators of future economic activity and as first-order indicators for their own industries. Finally, we have other series such as new housing starts that provide important information for their own industries, but less value as indicators of future economic activity.

As we peruse the formal world of economic statistics, bear in mind that they cannot be evaluated in a vacuum. Statistical series need a background, or a frame of reference, so that they can be put in proper perspective. This the book attempts to do. Sometimes the frame of reference is discussed in terms of the historical development and evolution of the series. Or, the perspective may take the form of a detailed discussion of the way the statistic is measured and compiled. The frame of reference may also be the way the particular indicator or statistic relates to other developments in the economy. In the end, our goal is to provide a perspective that allows for proper interpretation and application of the particular series.

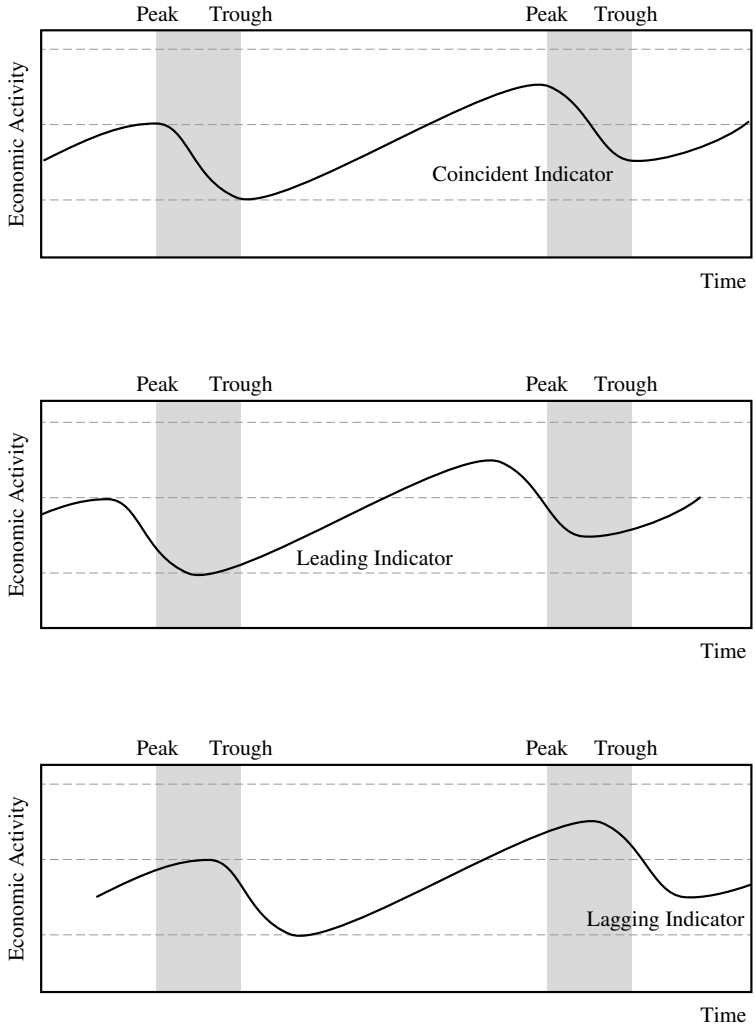
Of particular interest are the three types of indicators—leading, coincident, and lagging—shown in Figure 1-1. The name given to each refers to the way the series moves in relation to changes in overall economic activity. For example, the series marked "leading indicator" turns down (gets worse) before the economy enters a recession (indicated by the shaded area in the figure) and turns up (gets better) before the expansion begins.

The "lagging indicator" series behaves just the opposite—it turns down after the economy enters a recession, and up after the recovery is underway. A coincident indicator neither leads nor lags. Instead, its timing is such that it turns down when the economy turns down, and up when the economy turns up.

Sometimes a series may lead a peak (a relative high) and/or a trough (a relative low) in the economy, and at other times it may lag a peak and/or trough. When this happens, the series is simply less useful for forecasting purposes.

Whenever possible, the economic series examined in this book are plotted against the historical background of recessions and

Figure 1-1
Coincident, Leading, and Lagging Indicators



Economists use the convention of shading recessionary periods to distinguish them from periods of expansion. Economic series are classified as leading, coincident, or lagging indicators depending on how their turning points—their peaks and troughs—compare to changes in the overall economy.

Leading indicators get most of the attention because they tend to change direction before the economy goes up or down, and in so doing give us a warning as to where the economy may be headed.

expansions in the manner illustrated in Figure 1-1. As will be seen, many series behave like those in the figure, although the timing of the turning points will vary considerably. Others will appear to have little, if any, relationship to changes in the overall economy. Even so, we feel that the presentation is useful if you are to make your own judgments about the importance of the series.

Finally, we also provide a brief summary of the statistical series that includes its status as an economic indicator, the source agency that compiles the data, the frequency of release, and other key information at the end of every section. In addition, current updates to most of these series, along with press releases, data retrieval tools, background articles, and even related web sites can be found on the *www.EconSources.com* website.

The Many Faces of Economic Statistics

The task of interpreting economic statistics might seem to be a simple one: just take the numbers and describe how they changed from one period to the next. Unfortunately, it's not always that easy because most statistical series can be reported in a number of ways.

To illustrate, consider a hypothetical report stating that total sales increased by 5 percent from $800 billion to $840 billion over a recent 12-month period. If the report is in terms of current prices, and many initial reports are released this way, then it stands to reason that some of the $40 billion increase is due to inflation.

To compensate for inflation, sales can be measured in terms of "real," "constant," or "chain-linked" dollars using prices that prevailed in an earlier base year.[2] If 2009 is used as the base year, the same report could be worded like this: "In terms of chained (2009) prices, total sales increased from $720 billion to $738 billion for the most recent year." This time the increase of $18 billion is only a 2.5 percent gain, so half of the current dollar increase was due to inflation, the other half was due to real growth.

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[2] In 1996, the U.S. Department of Commerce switched from a system of base-year fixed prices to a system using chain-weighted geometric averages with 1992 as the reference year. In 1999, the base year was rebased to 1996 and is now 2009 although it will again be updated before long. This technique is described more fully in the Appendix.

Most series that are susceptible to the distortions of inflation are reported in both current (nominal) and real (constant 2009 or chained 2009) dollar amounts. Both kinds of information are valuable—if used correctly—although the availability of both means that statistics such as sales can be reported in a number of different and seemingly confusing ways[3]:

- the final *current* or *nominal* dollar value of total sales ($840 billion)
- the change in the *current* or *nominal* dollar value of total sales ($40 billion)
- the final *chained*, *constant*, or *real* dollar value of total sales ($738 billion in 2009 dollars)
- the change in *chained*, *constant*, or *real* dollar value of total sales ($18 billion in 2009 dollars)
- the percentage change in the *current* or *nominal* dollar sales (5.0 percent, or $40 billion/$800 billion)
- the percentage change in *chain-weighted, constant*, or *real dollar sales* (2.5 percent, or $18 billion/$720 billion in 2009 dollars)

We have a similar problem when numbers are converted to an index, such as the consumer price index, the producer price index, or any other index. For example, suppose that the index under consideration has a base year of 1977 = 100 and currently stands at 145. If the index goes to 146 in the next month, there is an increase of 1 over the base period activity, or a 0.69 percent increase in the index over the previous month (1/145 = 0.0069). If the index were to grow at the same rate for each of the next 11 months, the annualized rate would be 8.6 percent.[4]

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[3] Unfortunately the terms that economists use to describe numbers that are—or are not—distorted by inflation can be an endless source of confusion. While we tend to use some terms interchangeably in the text, the following guide may be of help when it comes to sorting out the differences. Specifically:

- Series adjusted for inflation are described as being in *constant dollar*, *real dollar*, or *chained dollar* amounts (where chaining is the inflation adjustment technique used).
- Series *not* adjusted for inflation are described as being in *current* or *nominal* dollar amounts. If nothing is said about the series, as in "GDP this year is expected to be $20 trillion," then *current* (unadjusted) numbers are assumed.

[4] The series is compounded monthly, so the correct computation is as follows:

$$\text{Annualized growth} = (1 + \text{monthly percentage change})^{12} - 1$$
$$= (1 + 0.0069)^{12} - 1 = 0.086$$

Because of compounding, you cannot multiply the monthly percentage change of 0.0069 by 12 to get an annualized rate, although this mistake is often made!

Using the numbers in the preceding paragraph, we can see that the change in any index can be reported in several different ways:

- the *absolute level* of the index (145)
- the *absolute change* in the level of the index from period to period (1)
- the *relative percentage change* from the previous period (0.69 percent)
- an *annualized projection* of the current period percentage change (8.6 percent)

In general, the relative percentage change is the most useful, with the annualized version coming in next. However, the reader should be advised that even these lists are not exclusive. For example, sometimes the change in the level of the index is compared to a period 12 months earlier. If the new level of 146 is 10 points higher than it was 12 months ago, then we could also say that the annual increase was closer to 7.35 percent.

Abusing Economic Statistics

The governments of most modern, industrialized nations of the free world—the United States among the best of them—enjoy a remarkable reputation for producing honest statistics. Many of these same countries also have a number of nongovernmental agencies that produce high-quality statistical series as part of a public service effort to gain acclaim and acceptance for their organizations. In some nations however, statistics are exaggerated, underreported, or simply faked for political or ideological reasons. When this happens, the usefulness of the statistics is radically reduced. Whether they know it or not, it is also a tragic loss to those nations that support this type of activity.

In the United States, our statistics tend to be brutally honest. Agencies that report their statistics normally publish release schedules months in advance of the actual release, and the methodology used to compile the series is remarkably open. As a result, there is not even the slightest hint that the release of new statistical figures is delayed in order to prevent some political or commercial embarrassment.

Abuse, however, does occur.

Perhaps the most common abuse of economic statistics is to apply them to situations for which they were never intended. For

example, some series with little, if any, relationship to movements of the overall economy are often treated as if they are significant predictors of future changes in GDP. Personal income in current dollars, discussed in detail in Chapter 2, is one such example. The historical record shows that personal income almost always goes up, even when the economy is in recession.[5] Even so, increases in personal income are dutifully reported and widely heralded by the press each time they are released.

Other series are treated as indicators of future economic activity when, in fact, they are actually coincident or lagging indicators. Interest rates can be cited in this context, especially the prime rate which consistently lags changes in real GDP. Changing interest rates certainly affect selected sectors of the economy, especially housing, automobiles, and to some extent stock prices, but changing interest rates are of little use in predicting future changes in the direction of the overall economy.

Yet another abuse is to focus on nominal dollar values when the real, or inflation-adjusted, figures give a better picture of the underlying changes. Unfortunately, various government agencies sometimes contribute to this problem because the nominal dollar data and the price deflators needed to adjust the data are not available at the same time. When the U.S. Department of Commerce releases its mid-month *Advance Monthly Retail Sales* report, the data are adjusted for seasonal, holiday, and trading day differences, but not for inflation. By the time inflation-adjusted figures are finally available, the initial change in retail sales has already been reported and the new figures are of little interest to the media.

Finally, we should note that the media often report on new economic figures without giving us enough information to evaluate the significance of the numbers. It is not at all unusual to hear that a particular index has gone up, say, 4 points, without any mention of the overall level of the index. Four points on a basis of 40 is one thing, but 4 points on an index with a value of 400 may be quite another. In fact, changes in the Dow Jones Industrial Average are often reported this way, as in "the market was up today, increasing a total of 60 points."

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[5] The Great Recession of 2008–09 was an exception in that personal income suffered four quarterly declines. See the discussion of disposable personal income in both current and constant dollars on pages 33–35.

Using Economic Statistics

Some decision making may require an understanding of other economic conditions, perhaps those that occur at a regional or industry level. Even if the data you need are not described in these chapters (as most of the statistics in this book pertain to the national economy), you should be able to use the methods described here to build your own set of economic indicators.

If you do, remember that every statistical series has its own distinct personality. If you want to use a series, examine it carefully and try to see how it relates to your own situation. For example, are series measured in real, rather than nominal, dollars better for your application? Also, you might examine the series to see if changes in the series are more important than the absolute level of the series.

And, what about the timing of the series? If it lags, then it may not be of much help. If it leads, then you may have to spend more time trying to anticipate its movements. If you need regional or industry-specific data, don't forget to look for other sources of data generated by state departments of economic development, chambers of commerce, economic development districts, local universities, and industry and trade publications.

One practical way of organizing economic statistics for your own use is to build your own historical database of the statistical series that are especially important to you. You can do this with an appropriate spreadsheet program on your personal computer and then chart or otherwise present the results. Yearly entries may or may not be sufficient for the bygone years, but quarterly and monthly data for more recent times will keep you more up-to-date.

To monitor overall economic conditions, you may want to keep tabs on GDP, the consumer price index, the unemployment rate, or several other series, such as the Leading Economic Index (LEI). To zero in on your own individual area of concern, focus on those series that affect this area more directly. For example, you would examine consumer spending and retail sales if your concern is retail marketing, or the Dow Jones Industrial Average and Standard & Poor's 500 if you are more concerned with the stock market.

As your sophistication grows, this accumulation of statistical data will not only reveal the current state of affairs to you, but you

will also begin to be able to discern the development of trends. Being able to do this on your own, rather than relying on the news media, gives you that decisive competitive edge that is so important in today's business world. It's mighty useful in your personal affairs too.

Don't be afraid to be creative. If the statistics enable you to perceive your economic reality, your economic reality may also enable you to anticipate the statistics. This can be very useful. For example, if your decision is to refinance a mortgage, and if you are waiting for the lowest possible rates, it helps to know that interest rates usually go down during a recession and continue to go down well into the subsequent recovery.

So, if the economy appears to be just entering a recession, it might be wise to postpone the refinancing for another year or so. Or, if the expansion is well underway, you may want to refinance immediately since interest rates have a history of increasing late in the recovery. In either case, knowledge of how a series relates to the overall economy can be helpful in a number of ways.

Finally, bear in mind that—until you become more familiar with the statistics in this book—you don't even have to be an expert to know if the economy is in a recession or an expansion. Just stay tuned to the news, and the media will keep you abreast of developments. Of course the media may miss the beginning or ending of a recession by six months or so—but be especially suspect of politicians who make proclamations about the state of the economy as they may be trying to distort the real situation for personal political gain. For the most part, however, those who report on national economic developments in the media usually do a reasonably good job of keeping us posted on the state of the economy.

And Beware of Forecasts!

With all of this said, we should also point out that none of this is a formal theory nor a method for making forecasts. Much longer books than this have dealt unsuccessfully with that subject. But we do encounter many large and small forecasts in our daily lives, and these often contain fertile opportunities for making statistical trouble. Be forewarned! Here are some things to look out for:

Point Forecasts These are the most common, but they are often wrong because outcomes are unlikely to reach the precisely predicted point. For example, if we predict that the GDP next year will be $20 trillion, we have an almost 100 percent chance of being wrong because next year's GDP

might turn up to be $20 trillion and 1 cent or any other such number. It is better to make an *interval forecast* that next year's GDP will be $20 trillion, give or take $50 billion.

Probability Forecasts It is even better to say that next year's GDP has an 85 percent probability of being between $19.95 trillion and $21.05 trillion. The higher the probability, the more believable the forecast will appear to be, assuming that the forecaster is reputable.

Conditional Forecasts "There is an 85 percent probability that next year's GDP will be between $19.95 trillion and $21.05 trillion if the Federal Reserve System does not raise the primary credit rate" is a conditional forecast because all bets are off if the Fed does raise the primary credit rate. This not only gives the forecaster an "out" if the forecast turns out to be wrong, but it also makes the forecast a bit less useful to the user.

Time Series Forecasts A series of forecasts that march into the future by convenient time steps—months, quarters, or years—are much more complicated than a single-event forecast. For example, forecasting that "GDP next year will grow at an annual rate of 4 percent during the first 6 months and then slow to 3 percent in the last half of the year" is actually making two forecasts. Since the second one is probably dependent on the accurate of the first, this kind of forecasting can be tricky.

Extrapolation Forecasts Extrapolating a constant rate of growth from a series of monthly or quarterly changes often appears as a kind of time series forecast. However, this type of forecast is even more problematic than a time series forecast as "Anyone who believes that exponential growth can go on forever in a finite world is either a madman or an economist."[6]

Weighted Moving Average Forecasts If a particular series is subject to considerable fluctuation, a moving average with specific weights assigned to earlier periods can be used to smooth the data. When this technique is adapted to forecasting, it is easier to predict the next number in the average since a portion of the data used to construct it is already in hand. And, with our attention focused on the moving average, the forecaster can even be excused if the next new observation "deviates" from the mean.

Many of the forecasts that we encounter in the daily news have considerable value. Many others, however, have little or no value since we are not clear as to what kind of forecast they are or how they have been constructed. They may use hedging or waffling language that, when carefully examined, pulls the rug of credibility out from underneath them. Even worse, they could be based on other statistics that may not be well suited for the forecast being made.

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[6] Economist Kenneth Boulding, quoted in "Out in the Sort" by John McPhee, *The New Yorker*, 18 April 2005, page 167.

A Final Word

Throughout, this book tries to be ideologically and theoretically neutral, or at least conventional. Notice that the economic indicators described in the following chapters are grouped primarily by economic function rather than by alphabet or other method. This is to recognize implicitly that, while no formal theoretical or ideological statement is intended, our economy is nevertheless a functioning system made up of identifiable parts that somehow work together.

And remember: we should never become so blinded by the apparent numerical precision and by the "scientific," "theoretical," or "official" nature of these economic indicators that we ignore our own sensitivity to economic and business conditions. Our own observations may be rather parochial, but they are immediate and undisputably real. Keeping an eye on the amount of construction activity in the neighborhood where we live, the type of cars that we and our neighbors drive, the intensity of traffic on our streets, how hard or easy it is to find a place to park, what and how much people are buying in the stores where we shop, the number of layoffs or job promotions among our friends and acquaintances, the level of maintenance and upkeep in our surrounding buildings and grounds, and even the changes in the frequency of marriages and new babies in our communities can all be very revealing. We ourselves are, after all, living daily in the very economy we are trying to understand.

This economic awareness, this "feel" for business conditions, should be extended to our interpretations of statistical series as well. We can examine the way statistical series are constructed, and we can look at the historical record to see how they behave. But in the end, it comes down to developing a feel for what they really tell us. This is why forecasting is, and will likely remain, an art rather than a science.

Chapter 2

TOTAL OUTPUT and INCOME

Gross Domestic Product

The most comprehensive measure of production is ***gross domestic product (GDP)***—the market value of all final goods, services, and structures produced in one year by labor and property located in the United States, regardless of who owns the resources.[1] GDP is the summary statistic that comes from our national income and product accounts (NIPA) compiled by the Bureau of Economic Analysis (BEA) in the U.S. Department of Commerce. The NIPA and its components are the results of the most exhaustive statistical collection efforts ever undertaken—and collectively they give us our most comprehensive view of the economy's performance.

The need to know more about the economy became apparent during the Great Depression of the 1930s when it was discovered that our information about overall economic performance was limited at best. Pioneering work on GDP was done by Dr. Simon Kuznets of the National Bureau of Economic Research in the 1930s and 1940s. Later, he received the Nobel Prize for his efforts. The measure has been refined and improved since then, and in December of 1999, the U.S. Department of Commerce announced that the development of GDP and NIPA was "its achievement of the century."[2]

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[1] In 1991, GDP replaced *gross national product (GNP)*, a measure of the total income produced in one year with labor and property supplied by U.S. residents, regardless of where the resources are located. The conversion to GDP made the measurement of total output consistent with the system of accounts used by the World Bank and most other industrial nations.

[2] "GDP: One of the Great Inventions of the 20th Century," *Survey of Current Business*, January 2000.

Estimating GDP

The concept of GDP is fairly easy to grasp. Basically, if we could determine how many goods, services, and structures are produced in a year, and if we multiplied them by their prices, we could add them up to get a dollar measure of GDP. This is how the advance first quarter 2017 estimate of $19,027.6 billion, or $19.0 trillion, in Table 2-1 below was derived.

Table 2-1
Computation of GDP in Current Dollars

GDP in Current Prices (billions of dollars):

Annual Domestic Output		Quantity in Millions	Current Prices	Value in Billions of $
Goods:	Automobiles	10	$39,000	$390.0
	Chairs	8	50	0.4
	..... Other	—	—	—
Services:	Legal	12	800	9.6
	Child care/wk	4	100	0.4
	..... Other	—	—	—
Structures:	Residential	4	240,000	960.0
	Commercial	2	340,000	680.0
	..... Other	—	—	—
		GDP in current dollars		***$19,027.6***

However, the size and complexity of any economy makes this simple computation a monumental task. It is so difficult, in fact, that it is more accurate to say that GDP is "estimated" rather than measured. So, exactly what data do economists use when it comes to estimating the size of our GDP?

Fortunately, data from a wide variety of sources are available to estimate GDP and the NIPA components. The primary source is the Economic Census which covers virtually the entire economy. This census is updated every 5 years with most recent one being conducted in 2012.[3] Various other sources are also used to supplement the underlying five-year estimates. For example, income is derived from

[3] Prior to 2012, the various censuses that covered manufacturing, retail and wholesale trade, agriculture, construction, transportation, and government, were all available in printed form. Since 2012 they have been conveniently available on the Census Bureau's website.

the Quarterly Census of Employment and Wages that is conducted by the Bureau of Labor Statistics (BLS). This report covers more than 98 percent of U.S. jobs and provides income data from wages, salaries, stock options and even executive bonuses.

In addition, the Internal Revenue Service provides estimates for corporate profits; the Census Bureau conducts retail trade surveys to update shifts in consumer spending patterns; and, the Customs Bureau provides data on exports and imports. In addition to the major 5-year revisions, new data are added as they become available and are incorporated in their annual updates.

Other entries, as in the case of owner-occupied housing, are imputed. For example, someone who rents an apartment makes a periodic payment to cover the value of housing services received, whereas the owner of a home does not. To accurately reflect the value of all housing services in GDP, the BEA imputes the rental value of owner-occupied housing.

We could go on, but the bottom line is that the estimation of GDP is a complex undertaking; so, we'll leave the measurement problem to the statisticians and focus on other matters instead.

Quarterly Revisions

GDP is reported quarterly, but then it is updated twice in the next two months, so what accounts for this?

Basically, the BEA faces a trade-off between quality and timing. Because the data used to compute GDP are only available after a lag, the longer the lag in reporting GDP, the better the estimate because more complete data are available. However, some users are more interested in getting the quarterly estimates as soon as possible, so the BEA releases three estimates for every quarter[4]:

Advance—released near the end of the *first* month after the end of the quarter and is based on source data that are incomplete or subject to further revision.

Second—released near end of the *second* month after end of the quarter and is based on more detailed source material as they become available.

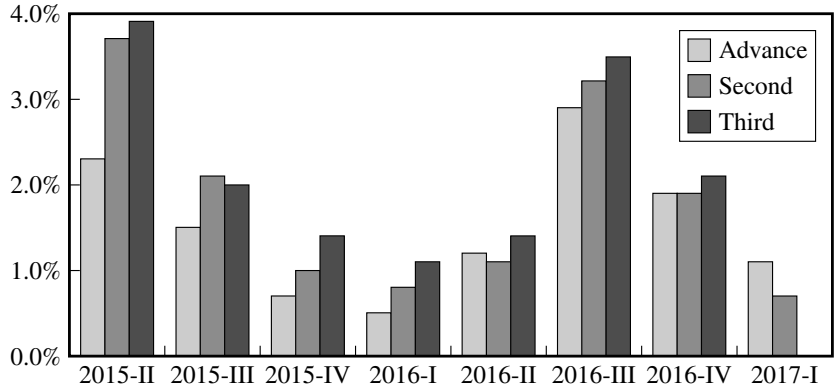
Third—released near the end of the *third* month after the end of the quarter and is based on the most complete source data.

[4] The three releases were previously known as Advance, Preliminary, and Final.

Figure 2-1 shows the three GDP estimates from the second quarter of 2015 into the first quarter of 2017. Each quarterly estimate is reported on an annualized basis—which means that this is the rate at which the economy would grow for a 12-month period if the growth in the other three quarters were the same as the current one. Since this is seldom the case, the final figures for the year will be slightly different.[5]

Despite the frequent revisions, they provide surprisingly reliable results. One BEA study found that each of the estimates—Advance, Second, and Third—provide reliable indications of the *direction* of real GDP change 97 percent of the time. In addition, they provide reliable indications of the *rate* of change (accelerating or decelerating rates of growth) about 75 percent of the time.[6] When all

Figure 2-1
Quarterly GDP Estimates



Monthly GDP revisions may vary modestly from one month to the next. Historically, the average revision—without regard to sign—from the advance to the third estimate was plus or minus 1.1 percent. On this basis, the final estimate for 2017-I should fall between 1.8 and −0.4 percent of the advance estimate.

[5] The final figures for the year may also include statistical and methodological improvements not reflected in the quarterly estimates.

[6] See Dennis J. Fixler, and Bruce T. Grimm, "Reliability of GDP and Related NIPA Estimates," *Survey of Current Business*, January 2002. The survey covered a 68-quarter period beginning in 1983 and ending in 2000.

of these factors are taken into account, it turns out that the advance estimate for any given quarter—despite the fact that it is revised almost continually—is a fairly reliable statistic.

These revisions mean that we never have the luxury of just adding the latest GDP numbers to an existing time series such as that shown in Figure 2-2 on page 24. Instead, we always have to obtain the most recent estimates for the whole series regardless of whether our interest is in long-term GDP trends or simply in monthly changes from one quarter to the next.[7]

Current vs. Constant Dollar or Real GDP

So far we have covered some of the issues related to getting a reasonable estimate of GDP at a given point in time. However, now we need to consider the way in which inflation can distort comparisons of GDP in different periods—which means that we have to make a distinction between current and constant dollar, or real, GDP.

If GDP is valued using the prices of the period in which the transactions occurred, then the measure is simply *GDP*, *GDP in current prices,* or *nominal GDP*—which unfortunately gives us three ways of saying the same thing.[8]

However, there are times when we want to compare the GDP in one period with the GDP in another. This is easily done, but first we have to recognize that prices have probably changed between the two periods, and that these changes will have biased the resulting

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[7] A 1999 benchmark revision was made to treat software purchases as a capital investment, rather than to treat it as a business expense. This revision caused an increase in the level of GDP that extended back to 1959.

[8] We don't want to belabor the point, but we know that these terms can be a constant source of confusion for our students, so we'd like suggest the following guide to separating ***current*** and ***real*** dollar amounts:

> Dollar values *not* adjusted for inflation are described as being in ***current*** or ***nominal*** dollar amounts. For example, if nothing is said about a report, as in "GDP this year is expected to be $22 trillion," then this year's dollar values are assumed. And, if GDP was estimated at $20 trillion two years ago, then GDP was estimated using the prices that prevailed in that year.
>
> Dollar values adjusted for inflation are described as being in ***constant dollar***, ***real dollar***, or ***chained dollar*** amounts where chaining is the adjustment technique used to remove the distortions caused by inflation. See "Chain Weighting" in the Appendix, pages 169–172, for more on this topic.

comparison. As a result, economists have introduced the concept of "real" GDP to remove these price distortions.

Real GDP is estimated for different periods by using the same set of prices to value the output in each. By using the same set of prices, any difference between GDP totals *must* be due to actual changes in the quantity of goods, services, and structures produced—hence the term *real* GDP. Clearly, the difference cannot be due to inflation because the same set of prices was used for both periods.[9]

The BEA currently uses year 2009 base year prices, but it really doesn't matter which year is used as a base year as long as the same set of prices are used when making comparisons. So when a set of constant year 2009 base-year prices are used, the measure is called *real GDP*, or *GDP in constant (2009) dollars*—even though there is nothing otherwise "real" about the computation.

Table 2-2 illustrates both types of computations for the U.S. economy in the first quarter of 2017 (usually denoted 2017-I). Suppose that the items in the quantity column represent actual amounts produced in that year. If output is valued at prices that existed at that time, the total value of production—or GDP in current dollars—is taking place at an annual rate of $19,027.6 billion. In the bottom part of the table, the same output is computed using smaller 2009 chain weighted prices to give us a value of $16,861.6 billion.[10]

Table 2-2 clearly shows that constant or real dollar GDP in part (B) is smaller than in (A) only because prices in 2009 are smaller than the prices in 2017. The difference in GDP for the two measures was *not* due to a change in quantities column.

The advantage of using constant dollar prices is that it enables us to compare the annual rate of total output in the first quarter of 2017 to the third quarter of 2005, or to any other year and quarter

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[9] A favorite question economists like to use in the classroom goes something like this: "If an economy produces 1000 widgets in one year at a price of $10 each, and if it produces 1000 widgets in the next year at a price of $20 each, did real GDP increase?

The answer is *no* because the real output of the economy, 1000 widgets in both years, did not change. However, nominal GDP doubled because $10,000 of widgets were produced in the first year while $20,000 of widgets were produced in the second year. This example clearly shows that the increase in GDP, i.e. *current* or *nominal* GDP, was due to the inflationary increase of prices from $10 to $20.

[10] The phrase "chain-weighted" or "chain-linked" refers to the manner in which percentage increases are computed from one year to the next. Chain weighting uses prices from both years to compute a geometric mean called the "Fisher Ideal." A brief example of this computation also appears in the Appendix on pages 169–172.

Table 2-2
Computation of GDP in Current *and* Constant (Chained) Dollars, 2017-I

(A) GDP in Current Prices (billions of dollars):

Annual Domestic Output		Quantity in Millions	Current Prices	Value in Billions of $
Goods:	Automobiles	10	$39,000	$390.0
	Chairs	8	50	0.4
	..... Other	—	—	—
Services:	Legal	12	800	9.6
	Child care/wk	4	100	0.4
	..... Other	—	—	—
Structures:	Residential	4	240,000	960.0
	Commercial	2	340,000	680.0
	..... Other	—	—	—
			GDP in current dollars	***$19,027.6***

(B) Real or Constant GDP (in chained 2009 dollars):

Annual Domestic Output		Quantity in Millions	2009 Dollars	Value in Billions of $
Goods:	Automobiles	10	$25,000	$125.0
	Chairs	8	25	0.2
	..... Other	—	—	—
Services:	Legal	12	412	4.9
	Child care/wk	4	50	0.2
	..... Other	—	—	—
Structures:	Residential	4	114,740	459.0
	Commercial	2	69,469	138.9
	..... Other	—	—	—
			GDP in constant dollars	***$16,861.6***

for that matter. If real GDP, or GDP in constant dollars, changed by 2 or 3 percent, the difference *must* be due to changes in the number of goods, services, and/or structures produced after compensating for changes in price levels. The change *cannot* be due to inflation.

An additional advantage of using "real" terms is that only the percentage change is relevant, not the dollar or index value of the series. And, when we focus on percentage changes, the choice of the base year is not important.

GDP—A Measure of Output or Welfare?

Occasionally GDP is criticized on the grounds that it does not adequately measure our welfare, or our overall feeling of well-being.

So, do increases in GDP mean that we are really better off one might ask—especially during times of urban sprawl, environmental decline, congested traffic, high divorce rates, crime, and so on?[11] The short answer is that no single series could ever be comprehensive enough to take into account all of the factors that make us happy or unhappy. However, there is some truth to the assertion that GDP is at least a partial measure of welfare.

Let's see why!

We say this because a market economy is based on voluntary transactions. For example, whenever you buy something that was just produced (a transaction reflected in GDP), you must have felt that the money you gave up was worth less to you than the product you acquired—otherwise you would not have made the transaction. Likewise, the producer must have felt that the product given up was worth less than the money received—or the producer would not have made the sale. In the end, the exchange took place because both parties felt that they were better off after the transaction than they were before it took place. Because both parties were better off, there was an increase in welfare, even if we can't measure it!

Even so, we need to remember that GDP was designed as a measure of total output, not as an overall measure of welfare—so those who claim that it fails in this regard really miss the mark. The fact that GDP can tell us anything about welfare should be considered as a plus, and so we should be looking at the glass as if it were half full rather than half empty.

Does GDP Overlook Anything?

You bet! For example, GDP tells us nothing about the mix, or composition of output. A bigger real or constant dollar GDP only tells us that the dollar value of total output increased. We don't know if the increase was due to the production of new roads, homes, parks and libraries—or to the increased production of nerve gas, exotic military

[11] This argument is made by Cobb, Halstead, and Rowe, "If the GDP is Up, Why is America Down?" *Atlantic Monthly*, October, 1995.

defense expenditures, and toxic waste landfills. Also, GDP doesn't tell us anything about the quality of life. For example, you might feel that the quality of life is enhanced every time a new city park, swimming pool, or museum is built instead of nuclear weapons. Or, you might not.

Perhaps the biggest limitation is that GDP excludes nonmarket activities such as the services performed by homemakers and the services that people perform for themselves. For example, GDP will go down if a homeowner marries his or her housekeeper and does not hire a replacement. Likewise, GDP will go up if you hire someone to mow your own yard, but it will not go up if you do it yourself.

Other activities—prostitution, gambling, and drug running—are mostly illegal and are simply not reported to the IRS, Department of Commerce, or to anyone else. These activities are part of the underground economy and are not directly included in GDP, although estimates have been made for their inclusion.[12]

Gross National Happiness

Still, some people want to have a more comprehensive measure of welfare or happiness, and so we take note here of the official efforts made by the government of Bhutan to establish a measure of Gross National Happiness (GNH), which they prefer to GDP.[13] While their statistics are still in the early stages of development, they cover many traditional economic measures such as household income and home ownership along with many other noneconomic variables. For example, one of the components of GNH is the frequency of meditation (psychological wellbeing), another is the perception of soil erosion and river pollution (ecology), and yet another is long-term disability status and body mass indices (health).

Other components of GNH include the "ability to understand Lozey"—a rich oral poetic composition tradition—and "Zorig chusum skills"—the thirteen visual arts that the Bhutanese have practiced for generations. These components are culturally biased, of course, and

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[12] In December 1985, GNP statistics extending back to 1929 were revised upward to account for the unreported underground economy activity. As a result of the revision, GNP in 1984 went up by $119.9 billion, and these revisions are now part of GDP. Even so, some private sector economists think that these revisions were not large enough.

[13] The websites at www.grossnationalhappiness.com report on these efforts. GNH is reported on a scale from 0 to 1, with a score of 1.0 being perfect happiness.

that makes international comparisons of GNH difficult, but they seem to work for the Bhutanese, which is why the GNH statistics were established in the first place.

One of the Great Inventions of the 20th Century

As you can tell by now, economists are passionate about their work, and they are passionate about their statistics—especially GDP and the national income and product accounts (NIPA) that support it. This endeavor is truly one of the remarkable efforts of our time, and the recognition the U.S. Department of Commerce bestowed on these efforts by announcing GDP as being "One of the Great Inventions of the 20th Century" is truly well deserved.[14]

Gross Domestic Product

Compiled by:	Bureau of Economic Analysis in the U.S. Department of Commerce
Frequency:	Quarterly with two subsequent monthly revisions
Release date:	*Advance* estimate at the end of the first month following end of the quarter
Revisions:	*Second* estimate the end of the second month; *Third* revision at the end of the third month following end of the quarter; *Annual* revision every July; *Comprehensive* benchmark revision every 5 years
Internet:	http://www.bea.gov/ http://EconSources.com

[14] "GDP: One of the Great Inventions of the 20th Century," From the January 2000 Survey of Current Business, https://www.bea.gov/scb/account_articles/general/0100od/maintext.htm.

Recession vs. Depression

We generally want to know more than the size of GDP at any given time—we also want to see how it changes over time. The reason is that GDP does not always go up—it sometimes goes down as it did during the Great Recession of 2008–09.

Over time, most economists usually call successive contractions and expansions of GDP *business cycles*—which implies systematic changes in real GDP marked by alternating periods of expansion and contraction. Other economists prefer to talk of *business fluctuations*, which imply alternating, but not systematic, periods of contraction and expansion. Neither is perfect, but they both get the idea across.

When Is the Economy in a Recession?

That depends on the measure as two different definitions are used to address this question.

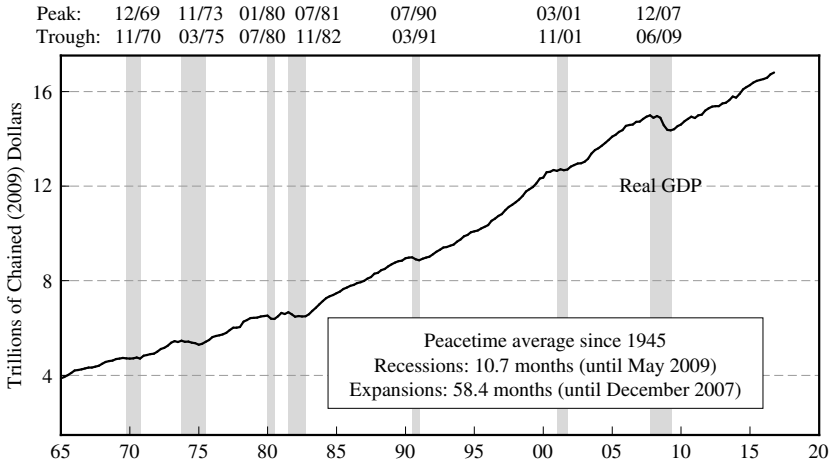
For example, the first definition has a recession occurring whenever real GDP (or GDP measured in constant dollars) declines for two consecutive quarters. This definition is popular because GDP is reported on a regular basis and it is fairly easy to keep track of changes in the quarterly GDP estimates.

The second—and ultimately official—definition is not from the Bureau of Economic Analysis, the Department of Commerce, or any other government agency. Instead, it comes from the National Bureau of Economic Research (NBER), a prestigious private institute with a long and distinguished record of research into the causes and measurement of business cycles.[15] According to the NBER, a recession is defined as "a significant decline in economic activity spread across the economy, lasting more than a few months, normally visible in real GDP, real income, employment, industrial production, and wholesale-retail sales."[16] When shown graphically in Figure 2-2,

[15] A list of the prominent economists who make up the NBER's business cycle dating committee can be found at http://www.nber.org. Also see "Determination of the December 2007 Peak in Economic Activity" article at the NBER site (December 11, 2008) for more on this topic.

[16] "The NBER's Recession Dating Procedure," January 7, 2008, http://www.nber.org

Figure 2-2
Expansions, Contractions, and Real GDP



The shaded areas in the figure represent recessions which can be of varying durations. According to the NBER, the economy entered the last recession in December 2007 and did not begin to recover until the middle of 2009. This made the Great Recession of 2008–09 the deepest and longest recession since the Great Depression of the 1930s.

recessions appear shaded and the expansions are unshaded. Together, a recession and an expansion make up a business cycle.

To nail down the turning points of the business cycle, the NBER considers as much data as it can—most of it monthly—and then identifies specific months (rather than quarters) when the economy reached a relative peak or trough in economic activity. As a result, the NBER turning points may not always coincide with quarterly changes in real GDP. However, the prestige of the NBER is such that virtually all economists use the two-quarter definition of a recession only until the NBER announces the "official" business cycle turning points, which are shown in Table 2-3.

An advantage of the NBER approach is that monthly data are subject to less frequent revision than are the GDP numbers compiled by the BEA. A disadvantage is that many months may pass before the NBER makes an official announcement. For example, the NBER

Table 2-3
Business Cycle Expansions and Contractions in the United States

Peak	Trough	Peak	Duration in Months* Recession	Expansion	Cycle
June 1857	December 1858	October 1860	18	22	40
October 1860	June 1861	April 1865	8	*46*	*54*
April 1865	December 1867	June 1869	*32*	18	*50*
June 1869	December 1870	October 1873	18	34	52
October 1873	March 1879	March 1882	65	36	101
March 1882	May 1885	March 1887	38	22	60
March 1887	April 1888	July 1890	13	27	40
July 1890	May 1891	January 1893	10	20	30
January 1893	June 1894	December 1895	17	18	35
December 1895	June 1897	June 1899	18	24	42
June 1899	December 1900	September 1902	18	21	39
September 1902	August 1904	May 1907	23	33	56
May 1907	June 1908	January 1910	13	19	32
January 1910	January 1912	January 1913	24	12	36
January 1913	December 1914	August 1918	23	*44*	*67*
August 1918	March 1919	January 1920	*7*	10	*17*
January 1920	July 1921	May 1923	18	22	40
May 1923	July 1924	October 1926	14	27	41
October 1926	November 1927	August 1929	13	21	34
August 1929	March 1933	May 1937	43	50	93
May 1937	June 1938	February 1945	13	*80*	*93*
February 1945	October 1945	November 1948	*8*	37	*45*
November 1948	October 1949	July 1953	11	*45*	*56*
July 1953	May 1954	August 1957	*10*	39	*49*
August 1957	April 1958	April 1960	8	24	32
April 1960	February 1961	December 1969	10	*106*	*116*
December 1969	November 1970	November 1973	*11*	36	*47*
November 1973	March 1975	January 1980	16	58	74
January 1980	July 1980	July 1981	6	12	18
July 1981	November 1982	July 1990	16	92	108
July 1990	March 1991	March 2001	8	120	128
March 2001	November 2001	December 2007	8	73	81
December 2007	June 2009	—	18	—	—
Averages for all cycles:					
	1854–2009 (33 cycles)		17.5	38.7	56.2
	1854–1919 (16 cycles)		21.6	26.6	48.2
	1919–1945 (6 cycles)		18.2	35.0	53.2
	1945–2009 (11 cycles)		11.1	58.4	69.5

*Cycles are measured from peak-to-peak; the underscored figures are for wartime periods.
Source: National Bureau of Economic Research and the *Survey of Current Business.*

took 8 months to declare that the 2001 recession had begun, and then another 20 months to decide that it was officially over. It also took 11 months for the NBER to decide that the economy had entered a recession in December 2007. Delays like this are partially responsible for the popularity of the first definition, especially when we are eager to know more about the current state of the economy.

What About a Depression?

It's difficult to give an exact definition of a depression because the U.S. economy experienced only one since 1865, and that was the Great Depression that began with the stock market crash in October of 1929 and lasted 43 months, or about 3½ years. Various estimates put the decline in real GDP by 40–50 percent although we have no way of knowing the exact decline because GDP had not yet been invented.

Even so, the extent of decline in the 1930s was extraordinary, and recessions both before and after never reached the extremes of production decline, joblessness, and price deflation that we experienced in the 1930s. Many modern contractions, with the exception of the Great Recession of 2008–09, were so mild that real GDP barely seemed to have declined at all, despite all of the attention paid to them in the media. Even the Great Recession was only 18 months long.

And yet our fascination with economic statistics remains undiminished as we are always interested in how long an expansion will last or when the next recession will take place. History is not always bound to repeat itself, but it can be a reasonably good guide to the future. For example, the second-longest expansion since the 1930s was 106 months under President Ronald Reagan while the longest one was 120 months under President Bill Clinton.

When this little book went to press in October 2017, the current expansion was exactly 100 months long. So, is a recession imminent, or can we break the 106 or 120 month records? We'll soon find out!

The NIPAs

The National Income and Product Accounts, or NIPAs, are a comprehensive set of nearly 300 accounts that provide detailed information on our nation's income and output. GDP is the best-known NIPA measure and is treated as the sum of the final expenditures of four sectors—consumers, private businesses, government, and a conceptual "rest of the world" sector to capture the net exports of and goods and services.

The approach of dividing the economy into sectors and then aggregating the sectors to get GDP is evident in Table 2-4 which presents the second estimate for the 2017-I quarter. The table also shows the size of each component in both current and constant (2009) dollar amounts, as well as their relative percentage sizes.

Are Other Statistics Related to GDP?

Good question! In fact, the very structure of the NIPAs almost guarantees that the majority of economic statistics are related to GDP one way or another. Some statistics report on the major components of total output like personal consumption expenditures or gross private domestic investment. Others track subcategories like durable and nondurable goods, and even others track the production of various product categories like automobiles and residential housing.

Many statistics, including most of those examined in this book, are designed to track GDP or one of its major components, while other statistics are designed to help predict future changes in the level of GDP or one of its major components. In addition, whenever anything is produced for the market, income is generated in the form of wages, tips, salaries, interest, rents, or profits. Since the recipients eventually spend this income, even more statistics are kept on these activities. Almost every economic statistic, then, is related to GDP in one way or another.

If there is a difficulty with most NIPA tables, it is that the numbers are so large as to boggle the mind. As a result, the BEA also presents another useful table that shows the contribution to the change in real GDP made by individual GDP components.

Table 2-4
The National Income and Product Accounts
First Quarter 2017 Second Estimate—Billions of Dollars

	Current	Constant (2009$)	% GDP
Gross domestic product	***$19,027.6***	***$16,861.6***	***100.0***
Personal consumption expenditures	***13,108.4***	***11,688.5***	***68.9***
Durable goods	1,439.1	1,642.4	7.6
Nondurable goods	2,779.5	2,530.6	14.6
Services	8,889.8	7,567.8	46.7
Gross private domestic investment	***3,149.1***	***2,902.2***	***16.6***
Fixed investment	3,147.4	2,879.0	16.5
Nonresidential	2,395.5	2,257.2	12.6
Structures	537.3	471.7	2.8
Equipment	1,074.3	1,055.4	5.6
Intellectual property	783.9	732.0	4.1
Residential	751.8	615.5	4.0
Change in private inventories	1.7	4.3	0.0
Net exports of goods and services	***(557.9)***	***(599.9)***	***(2.9)***
Exports	2,314.0	2,168.0	12.2
Imports	2,871.9	2,767.9	15.1
Government consumption and gross investment	***3,328.0***	***2,899.3***	***17.5***
Federal	1,260.4	1,115.2	6.6
National defense	732.1	656.2	3.8
Nondefense	528.2	458.0	2.8
State and local	2,067.7	1,782.3	10.9
Residual		*(57.8)*	

Source: Tables 1.1.5 and 1.1.6, second estimate, Bureau of Economic Analysis. The first column of numbers shows current dollar entries, the second column shows "real" or constant dollar entries that are based on the chain weighting calculations discussed the Appendix. Also, note that one of the idiosyncrasies of chain weighting is that "real" or constant dollar amounts are sometimes larger, and sometimes smaller, than their corresponding current dollar amounts—as a result, a residual is employed because chain weighted numbers cannot be added. The percent of GDP column is based on current dollars; percentages are slightly different for chain weighted dollars.

Table 2-5 shows the contributions to percent changes in real GDP for four consecutive quarters. The most recent quarter in the table shows annualized first-quarter growth at 1.2 percent. The biggest contribution came from gross private domestic investment at 0.78 percent while the weakest contribution came from government consumption and gross investment at a −0.20 percent.

Table 2-5
Contributions to Percent Change in Real GDP
Percent Change at Annual Rates—First Quarter 2017 Estimate

	2016-II	2016-III	2016-IV	2017-I
Gross domestic product	***1.4***	***3.5***	***2.1***	***1.2***
Personal consumption expenditures	***2.88***	***2.03***	***2.40***	***0.44***
Durable goods	0.70	0.84	0.82	−0.11
Nondurable goods	0.80	−0.07	0.47	0.18
Services	1.37	1.26	1.11	0.37
Gross private domestic investment	***−1.34***	***0.50***	***1.47***	***0.78***
Fixed investment	−0.18	0.02	0.46	1.85
Nonresidential	0.12	0.18	0.11	1.34
Structures	−0.06	0.30	−0.05	0.69
Equipment	−0.17	−0.26	0.11	0.39
Intellectual property	0.35	0.13	0.05	0.27
Residential	−0.31	−0.16	0.35	0.50
Change in private inventories	−1.16	0.49	1.01	−1.07
Net exports of goods and services	***0.18***	***0.85***	***−1.82***	***0.13***
Exports	0.21	1.16	−0.55	0.69
Imports	−0.03	−0.31	−1.27	−0.55
Government consumption & gross investment	***−0.30***	***0.14***	***0.03***	***−0.20***
Federal	−0.02	0.16	−0.08	−0.14
National defense	−0.13	0.08	−0.14	−0.16
Nondefense	0.10	0.08	0.06	0.02
State and local	−0.28	−0.02	0.11	−0.06

Source: Table 1.1.2, first quarter second GDP estimate, Bureau of Economic Analysis.

The advantage of the table is that it helps us see some of the emerging strengths and weaknesses of the economy. For example, it is clear that the decline in personal consumption expenditures from the fourth quarter of 2016 was largely due to the decline in durable goods spending which went from 0.82 and −0.11, while the change in private inventories of −1.07 was a major drag on gross private domestic investment. There's a lot in the table that we can't hope to explain right now, we just want to show its value as a tool to uncover potential problem areas in the economy.

Personal Income

Personal income sounds as if it should be about the income people earn: their salaries, tips, and hourly wages. In a way it is, but in a more fundamental sense, ***personal income*** (***PI***) represents the total current income received by persons from all sources *minus* social insurance payments. A more direct measure is **disposable personal income** (**DPI**), the amount we have left to spend after taxes and non-tax payments.

GDP may be the primary measure of the nation's total output, but it is not the best measure of the nation's income for two reasons. First, GDP *includes* output generated with resources owned by foreign residents. Since income earned by these individuals leaves the United States, it cannot be included as part of our nation's income. Second, GDP *ignores* income earned by U.S. residents as a result of their investments abroad.

Table 2-6 shows the two adjustments necessary to convert GDP (the measure of total domestic output) to GNP (the measure of total domestic income).[17] The first step is to add the income earned by U.S. residents as a result of their international investments. The second step is to subtract the income earned by foreign residents as a result of their investments in the United States. Because it usually takes longer to get some of this information, estimates of GNP always lag GDP estimates.

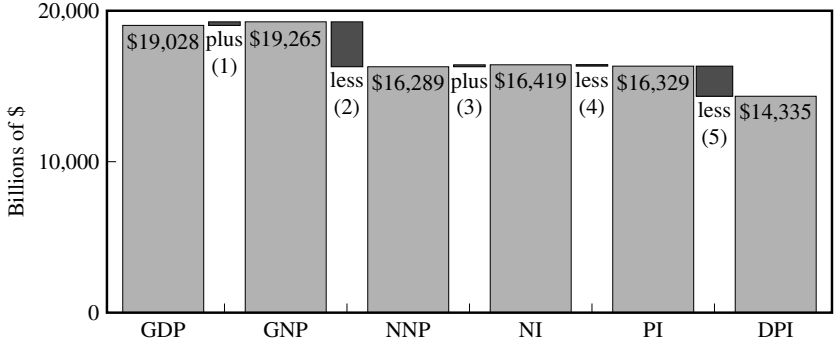
Table 2-6
Converting GDP to GNP, Billions of Current Dollars

Gross domestic product (GDP)	**$19,027.6**
Plus: Income receipts earned abroad	883.9
Less: Income payments to foreign residents	646.8
Gross national product (GNP)	**19,264.8**

Data are for 2017-I second estimate, Table 1.7.5, Bureau of Economic Analysis

[17] In the case of the United States, the two adjustments are nearly offsetting, so that GNP and GDP are almost the same. This is not always the case for other countries. Canada's GDP is usually several percentage points larger than its GNP because foreign investments in Canada are much larger than Canadian investments in the rest of the world.

Figure 2-3
Derivation of Personal and Disposable Personal Income



Note: data are annualized 2017-I estimates

(1) Factor income payments to foreigners are subtracted, and factor income receipts from foreign residents are added to GDP to get gross national product (GNP).

(2) Consumption of fixed capital is subtracted from GNP to get net national product (NNP).

(3) A statistical discrepancy is added to equate NNP and national income (NI).

(4) Undistributed corporate profits, corporate income taxes, and social insurance contributions are subtracted and transfer payments are added to NI to get personal income (PI).

(5) Tax and nontax payments are subtracted from PI to get disposable personal income (DPI).

The rest of the NIPA components are shown in Figure 2-3. To go from GNP of $19,264.8 billion to a ***net national product*** (***NNP***) of $16,289 billion, we subtract the wear and tear on the capital stock, more formally known as ***consumption of fixed capital.*** The BEA then needs a modest statistical discrepancy to arrive at the measure called ***national income (NI)*** of $16,419 billion.[18] NI represents the sum of employee compensation, proprietors' income, rental income, corporate profits, and net interest payments in the economy.

To get to ***personal income*** (***PI***), undistributed corporate profits (retained earnings) and contributions for social insurance payments like

[18] The BEA uses two ways to estimate GDP in the NIPAs, one is through an incomes approach and the other is through an expenditures approach. The statistical discrepancy is used to rectify the difference between the two as they seldom match.

social security are subtracted. At the same time, transfer payments, such as unemployment compensation, welfare, and other aid, are added in. The result, shown in Figure 2-3, is the aggregate measure called personal income in the amount of $16,329 billion.

Finally, if we subtract tax and other nontax payments from PI, we get ***disposable personal income*** (***DPI***) of $14,335 billion, the income people actually have left over for spending purposes.

Disposable Personal Income as an Economic Indicator

Before we plot DPI, we should note its remarkable stability. For example, if we were to examine the nominal (unadjusted for inflation) disposable personal income series from 1965 until 2017, a period of 52 years or 208 quarters, we would find that it only turned down a total of eight times—and four of those declines were during the Great Recession of 2008–09. When measured in constant or real dollars, the series shows a bit more instability, but not much.

Figure 2-4 shows DPI in both nominal and real (2009) dollars from 1965 until the first quarter of 2017.[19] Overall both series rise modestly during expansions and are relatively flat to negative during recessions. In retrospect, this is exactly the pattern we should have expected. DPI is such a large component of GDP, about 75 percent, that both should to go up and down together even though the quarterly movements are relatively small. In fact, DPI would have been down a little more during the recessions had it not been for transfer payments that act as buffers to lessen the decline.

On rare occasions DPI can even be affected by political events. Right after the presidential election of 1992, many individuals who feared higher tax rates under the Clinton administration arranged to have their annual bonuses paid in December of 1992, rather than wait for January when a new tax year—and possibly higher tax rates—would apply.[20] This spike in the data has since been removed, but it's entirely possible for it to happen again.

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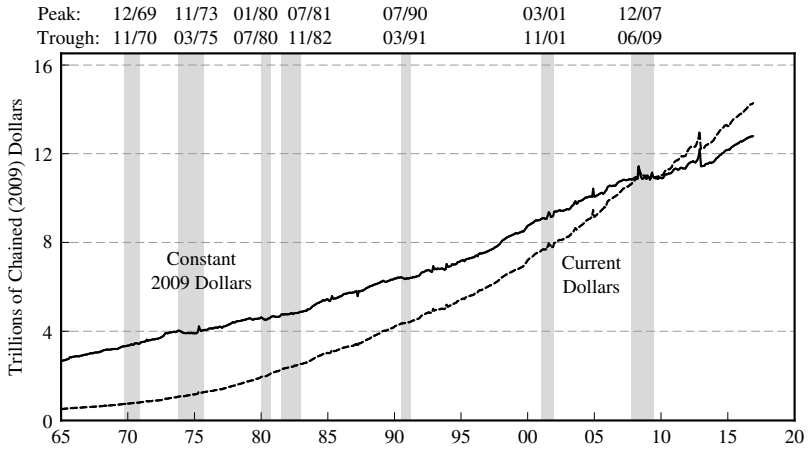
[19] Personal income data are collected and published both monthly and quarterly. The monthly data are released in BEA's "Personal Income and Outlays" news release. Quarterly estimates for personal income are published in the *Survey of Current Business* along with other NIPA accounts.

[20] Under the Clinton administration, Congress made the individual income tax more progressive by adding a fourth marginal tax bracket of 39.6 percent which applied to taxable income over $250,000.

Figure 2-4
Disposable Personal Income in Current and Constant Dollars



Disposable personal income is fairly stable and often goes up even during most recessions, although the Great Recession of 2008–09 is an exception because of its severity. The constant dollar measure is preferred by economists, although the current dollar measure is the one most frequently reported in the press.

What Else Should We Know About Personal Income?

First, because PI and DPI are such large and relatively constant components of GDP, they behave more as coincident indicators than as leading or lagging ones. Coincident indicators don't give us the advance warning of where the economy is heading that leading indicators do, but they are nevertheless important because they tell us where we are and how well we are doing.

Also, we should note that because personal income is one of the major NIPA components, it is subject to the same revisions as GDP. This means that any new announcement of personal income will almost always mention a revision of the previous monthly or quarterly figures.

While the BEA releases both real (chained 2009 dollars) and current dollar estimates simultaneously, the press often seems to focus on the current dollar figures because the amounts are larger. But, real

dollar estimates are always a better measure of how well we are doing because they remove the distortions caused by inflation, so don't be tempted to just look at the largest figures.

Finally, the first announcement we hear about personal or disposal personal income will be in monthly numbers rather than the quarterly reports discussed here so far. After all, it takes three months to make a quarter and if the monthly data are available, the BEA likes to report them. The monthly release for personal income and outlays also comes with a one month delay; for example, a report released on the 1st of November will have data for September, but not October. Each monthly release also comes with a full list of interesting tables which provide a considerable level of detail.

Personal and Disposable Personal Income

Indicator status:	Coincident economic indicator overall
Compiled by:	Bureau of Economic Analysis
Frequency:	Monthly
Release date:	beginning of month
Revisions:	Second and third revisions of the advance estimates
Published data:	*Economic Indicators*, Council of Economic Advisors Survey of Current Business, U.S. Department of Commerce *Personal Income and Outlays*, BEA News Release, U.S. Department of Commerce
Internet:	http://www.bea.gov http://www.EconSources.com

Chapter 3

PRODUCTION and GROWTH

Purchasing Managers' Index

Economists have long been interested in predicting the output of goods, and one of the more interesting indicators of this activity is the monthly ***Purchasing Managers' Index*** (***PMI***) compiled by the Institute for Supply Management (ISM).[1] The series is reliable as both a *coincident* and a *leading* indicator—meaning that it tells us where the economy is and where it is likely to be going. It is one of a handful of major series maintained by a private industry and/or educational group rather than a division in the U.S. Department of Commerce.[2]

The PMI is the major component of the ISM's monthly Report on Business which surveys manufacturing firms on a number of topics including production, new orders, inventories of purchased materials, employment, prices, backlog of orders, and supplier deliveries. The ISM releases the PMI on the first business day following the close of the reporting month. Its usefulness and accessibility makes it a perennial favorite among economic forecasters.

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[1] ISM, formerly known as the National Association of Purchasing Management (NAPM), is a not-for-profit association that exists to educate, develop, and advance the purchasing and supply management profession. With more than 50,000 members, ISM and its affiliates in 90 countries work to establish and maintain best-in-class professional standards pertaining to research, education, and certification.

[2] Other series examined in this book include, but are not limited to, the *Help-wanted Advertising Index* and the *Consumer Confidence Survey* compiled by The Conference Board, the *Index of Consumer Expectations* compiled by the Institute for Social Research at the University of Michigan, the *Dow Jones Industrial Average* compiled by the Dow Jones Corporation, and the *S&P 500* by Standard & Poor's Corporation.

The Sample and the Survey

The PMI is derived from a monthly survey of purchasing managers at hundreds of companies in 18 manufacturing industries. Each industry is weighted according to its contribution to GDP, and each firm in the industry is given equal weight, regardless of its size.[3] The questions, similar to the following example, are designed to detect changes in the direction and intensity of business activity[4]:

> SUPPLIER DELIVERIES - Check the **ONE** box that best expresses the current month's **OVERALL** delivery performance compared to the previous month.
>
> ☐ **Faster** than a month ago ☐ **Same** as a month ago ☐ **Slower** than a month ago

When all of the responses are collected, the results are tabulated and then reported in the form of a diffusion index.

What Does a Diffusion Index Tell Us?

A diffusion index is different from other series in that it focuses on the direction and magnitude of change as opposed to the absolute level of the series. The diffusion index used by the ISM ranges from 0 to 100 percent and is considered to be expanding whenever it has a value greater than 50 percent, so the more the number exceeds 50 percent, the more intense the expansion of the series. By the same token, the series is contracting when the index is less than 50 percent—and the smaller the number, the more intense the contraction.

In addition to the series on supplier deliveries, separate indices are constructed for production, new orders, inventories of purchased materials, customers' inventories, employment, prices, backlog of orders, new export orders, and, imports. These 10 series are combined to make up the overall Purchasing Managers' Index.

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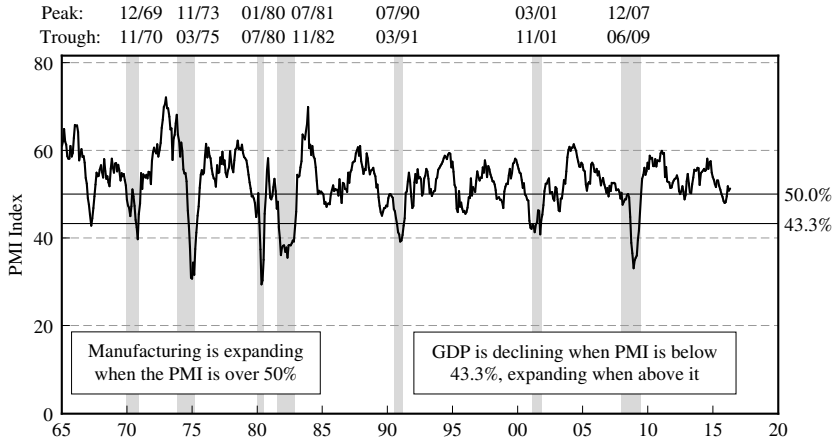
[3] Bretz, Robert J., "Behind the Economic Indicators of the NAPM Report on Business," July 1990, in NAPM's *Report on Business Information Kit*, March 2000.

[4] To illustrate, weights of 1, 0.5, and 0 are given to each of the three responses. If half of the respondents select "faster" and if half respond "slower," the index will have a value of 50 percent [or, $0.5(1) + 0.5(0) = 0.5$]. Likewise, if 60 percent respond "faster," 20 percent "same," and 20 percent "slower," the index will have a value of 70 percent [or, $0.6(1) + 0.2(0.5) + 0.2(0) = 0.7$].

Figure 3-1
The Purchasing Managers' Index



Whenever the PMI is over 50 percent, the manufacturing sector of the economy is expanding. Whenever the PMI is greater than 43.3 percent, the overall economy—which includes services in addition to manufactured goods—is expanding. Because the PMI is a diffusion index, it has the properties of a leading indicator, reaching a peak before the economy peaks and a trough before the economy reaches a trough.

The Historical Record

Figure 3-1 shows the PMI since 1965. The manufacturing sector of the economy is claimed to be generally expanding when the index is above 50 percent, and contracting when below that level. The horizontal line at 43.3 percent is the value of the index thought to be most consistent with no change in real GDP, so the overall economy should be expanding when the PMI is above 43.3, and contracting when the index is below it.[5]

It also helps to examine the intensity and direction of change as well as the general level of the index. For example, when the index was above 43.3 percent and *rising,* the economy was indeed

[5] This number is revised annually because GDP is continually being revised. When the last edition of this book was published in 2010, the number was 41.2 rather than 43.3. However, most PMI changes are relatively small, in the range of one or two tenths of a percent annually.

expanding. Yet, when the index was above 43.3 and *declining,* the economy was beginning to slow and headed for a recession.[6]

The reason for this is that the PMI is a diffusion index, which means that it also has the properties of a leading indicator. If we examine Figure 3-1, we can see that the index peaked, with highly variable lead times, well in advance of every recession. Likewise, the index usually hits a minimum just before the recovery began.[7]

Purchasing Managers' Index

Indicator status:	The level of the PMI is a *coincident* indicator; peaks and troughs in the PMI function more as *leading* indicators with highly variable lead times
Compiled by:	Institute for Supply Management (ISM)
Frequency:	Monthly
Release date:	First business day following close of the reporting month
Revisions:	None, responses are raw data and are not changed
Published data:	*Manufacturing Report On Business*, ISM's monthly publication
Internet:	www.ismrob.org

[6] A 1985 paper presented by Theodore S. Torda at the NAPM International Conference and later published in *Purchasing Management* (July 1985, pp. 20–22) states that ". . . monthly data on the NAPM composite index and the Commerce Department's composite of leading economic indicators . . . (both) tend to reach their peaks and troughs before those of the general business cycle." Later in the same paper, the author states that "the NAPM composite index clearly leads the (BEA) coincident index."

Another paper by Alan Raedels, "Forecasting the NAPM Purchasing Managers' Index," in the *Journal of Purchasing and Materials Management* (Fall 1990), concluded that "the PMI can be considered a coincident indicator of the economy."

[7] A peak in the series is analogous to an inflection point in a series that grows first at an increasing and then at a decreasing rate. The trough is analogous to an inflection point for a series that decreases at an increasing and then at a decreasing rate.

Index of Industrial Production

The ***index of industrial production*** is a comprehensive index of industrial activity compiled by the Board of Governors of the Federal Reserve System. Because of the Fed's responsibility for monetary policy, and because of delays in reporting final GDP, the index is designed to give the Fed a quicker reading on the overall health and activity of the manufacturing sector of the economy.

The overall index is made up of approximately 300 individual series that represent a broad range of industries. The data are collected directly from numerous sources, including gas and electric utilities, the Bureau of Mines, the Census Bureau, other government agencies, and industry trade associations.[8] After the source data are compiled and weighted according to their respective industry size, they are expressed as a percentage of base-year output with monthly estimates released mid-month of the following month.[9]

Industrial Production and GDP

Industrial production covers the goods portion of GDP and amounts to about 22 percent of total output. The Industrial Production series is reported several ways: the first is the *total* index, which is a compilation of all individual indices; a second tracks durable and nondurable consumer goods production; a third features major market groups—with subcategories for consumer goods, business equipment, information processing, national defense and space equipment, construction and business supplies. Finally, a fourth tracks major industry groups to highlight activity in the manufacturing, mining, and utilities industries. These reports are all possible because the nearly 300 individual series can be grouped in a variety of different ways.

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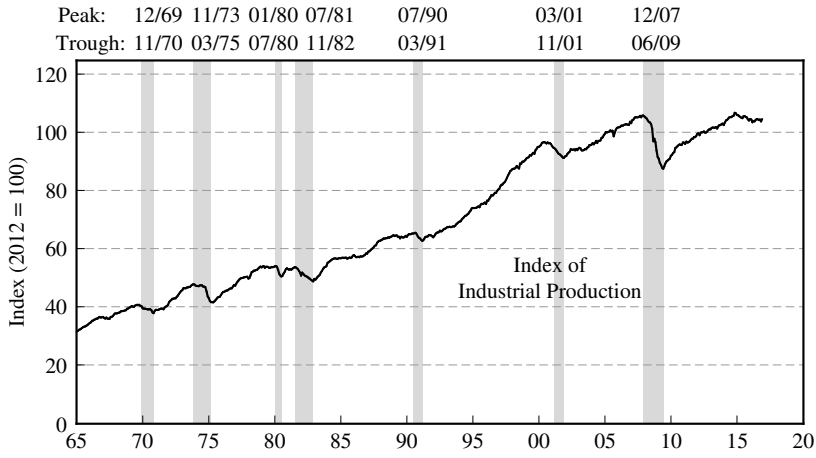
[8] Oddly enough, the Fed uses some quarterly series to compile the monthly index of industrial production. The Fed does this by making monthly estimates that are then revised as the quarterly data become available.

[9] The industrial production index represent the level of real output relative to the current base year of 2012. The monthly production index is anchored to annual benchmarks that, according to the Fed, "are less timely but typically based on more comprehensive data." See "Technical Aspects of the Revision," *Annual Revision, Industrial Production and Capacity Utilization—G.17*, March 31, 2017.

What About the Historical Record?

Figure 3-2 shows that the total index of industrial production usually behaves as a coincident indicator, meaning that the peaks and troughs in the series occur at approximately the same time that the economy has its peaks and troughs. This is to be expected, since overall industrial production represents such a large proportion of total GDP.

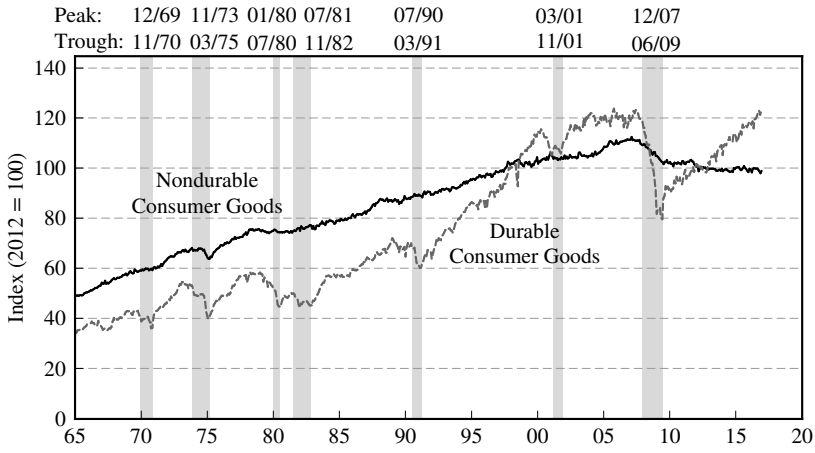
Figure 3-2
The Index of Industrial Production and Aggregate Economic Activity



With the exception of the 2001 recession, the index of industrial production normally behaves as a coincident indicator, with changes in the series normally taking place at about the same time as changes in the direction of overall economic activity. The severity of the 2008–09 Great Recession was such that the index fell by more than 20 percent, taking it back to a level of activity recorded ten years earlier in mid-1998.

When the durable and nondurable goods series are presented separately, as shown in Figure 3-3, it is evident that the durable goods portion of the index is the more volatile component. This normally occurs because the purchase of durable goods—automobiles, boats, furniture, and appliances that last more than three years under normal conditions—can usually be postponed if consumers find themselves short of purchasing power.

Figure 3-3
Durable and Nondurable Goods Production



The durable goods component of the industrial production index is more volatile than for nondurables. The durables index also performs better as a leading indicator for recessions because it usually reaches a peak just before a recession begins, and then begins to recover just before the recession ends.

Monthly Estimates and Revisions

The initial release of the index of industrial production, like most other economic data, is subject to considerable revision. The process is complicated by the fact that the overall index is made up of so many different series, most of which become available at separate times, and some of which are themselves subject to further monthly revisions.

The Fed deals with this problem by substituting its own estimates for missing data if data have not yet been received.[10] To illustrate, if electric power usage data are not available when the initial report is issued, the Fed makes a judgment as to what it thinks the numbers should be. The same is done for other missing data, so a

[10] See Charles Gilbert, Norman Morin, and Richard Raddock, "Industrial Production and Capacity Utilization: Recent Developments and the 1999 Revision," *Federal Reserve Bulletin*, March 2000.

portion of the initial release is based on the Fed's estimates. Then, as better data become available over the next three to five months, it is used in place of the Fed's estimates.

Despite these procedures, the initial release is fairly reliable. As for revisions, whenever the Fed releases the latest industrial production number for the month, it shows both the preliminary and the revised estimates for the preceding five months.

Index of Industrial Production

Indicator status:	Overall index generally coincident with changes in real GDP, although the durable goods component is more of a leading indicator for recessions and recoveries
Compiled by:	Federal Reserve System Board of Governors
Frequency:	Monthly
Release date:	Preliminary estimate around the fifteenth of the following month
Revisions:	Preliminary estimate subject to revision in each of the subsequent 5 months and annual revisions every spring
Published data:	*Economic Indicators*, Council of Economic Advisors *Statistical Release G.17*, Federal Reserve System
Internet:	https://www.federalreserve.gov/releases/g17/Current/ http://www.EconSources.com

Capacity Utilization

When the Federal Reserve System collects data on industrial production, it also makes estimates of manufacturing capacity. When the Fed compares the level of industrial production to manufacturing capacity, the result is ***capacity utilization***. This monthly series is generally regarded as being a leading economic indicator for downturns in overall economic activity.

Measuring Capacity Utilization

The Fed's data on manufacturing capacity, like its *index of industrial production*, are expressed in terms of an index with a base year of 2012 = 100. The two are then divided to express production as a percentage of actual capacity:

$$\text{Capacity Utilization} = \frac{\text{Index of Industrial Production}}{\text{Index of Industrial Capacity}}$$

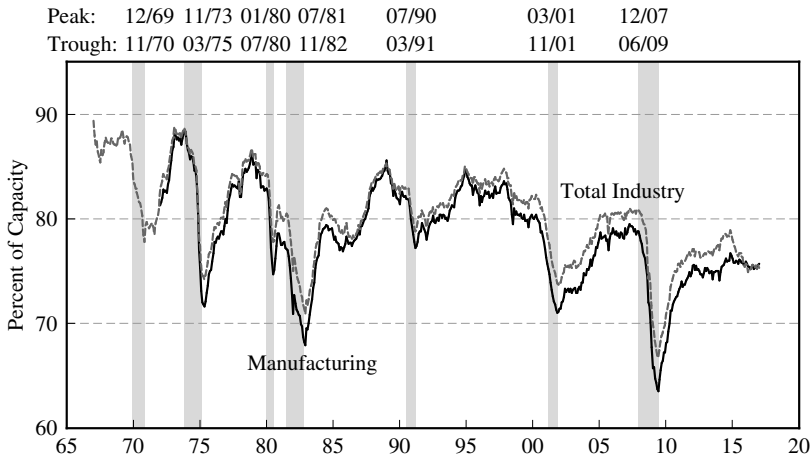
In February 2017, for example, the industrial production index stood at 103.7 while the capacity index stood at 136.7. When the former was divided by the latter, capacity utilization was 0.759 or 75.9 percent.

Estimates of industrial capacity are available for a number of industries and product groups including manufacturing, mining, utilities, durable goods, chemicals, and paper, to name a few. The monthly series is released approximately two weeks after the close of the month and is closely watched by many economists, especially those who watch the Fed.

Why Is Capacity Important to the Fed?

One of the responsibilities of the Fed is to foster steady economic growth in a climate of reasonable price stability. The capacity utilization rate is designed to tell the Fed if the economy is "heating up" to the point where inflation might surge because of production bottlenecks. This sometimes happens when demand for output is so strong that producers are tempted to use less skilled labor and less efficient equipment to generate even more output.

Figure 3-4
Manufacturing and Total Industry Capacity Utilization Rates



Originally, the Fed made capacity utilization estimates for manufacturing. It later added mining, utilities, and several others to get a "total industry" series which are now available from 1967 to the present. Despite the availability of several separate "total" series, manufacturing gets most of the attention—even though the two series behave about the same.

When the capacity utilization rate gets high, the Fed might be tempted to tighten the money supply to slow the economy and lessen the threat of inflation. When the capacity utilization rate is low, the economy is perceived to have some "slack" that acts to ease inflationary pressures.

What About the Historical Record?

The capacity utilization rates for two series, manufacturing and total industry, are shown in Figure 3-4. Because the series are expressed as a percent of total capacity, their levels never exceed 100. Historically, the Bureau of Economic Analysis classified both as leading indicators for peaks in real GDP, although the lead times are too variable to be of precise value for forecasting.

The capacity utilization series, like most other economic data, is continually revised as new information becomes available and