Alternative Scenario Probabilities

Thoughts about and methods for assigning probabilities

2 December 2019

Introduction

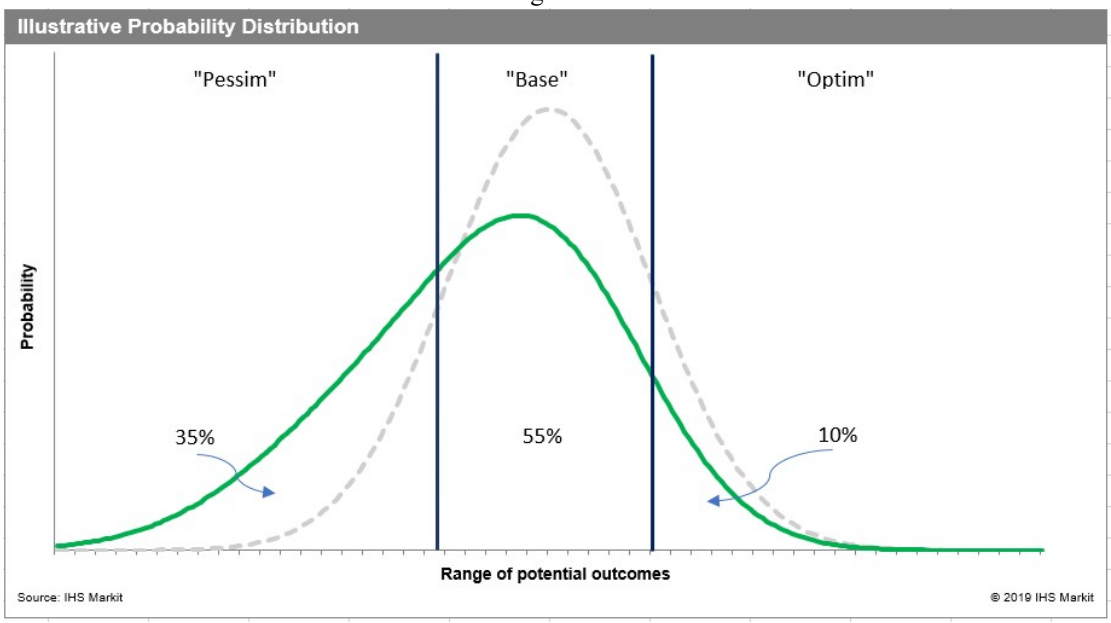
At any given time there are many risks to the economic outlook, which permutations suggest a virtually infinite number of possible outcomes. Because of this fact, users of economic forecasts would be wise to consider a range of potential scenarios in planning for the future. In a general sense, this immediately raises the issue of which scenario is most likely and how much weight should be placed on the various scenarios under consideration. Having a rough sense of the likelihood of each scenario, or a qualitatively and quantitatively similar scenario, would be helpful. This, of course, takes on new importance with recent regulatory guidance such as IFRS-9 or CECL where financial institutions are expected to estimate expected credit losses taking account of the influence of forward looking information, i.e., a range of economic forecasts. This new found "appreciation" for the probabilities assigned to the various scenarios we produce is the motivation for this piece which provides some background on the probabilistic nature of economic forecasts and alternative scenarios and lays out our approach to assigning these probabilities.

Some basics

A single forecast may represent the "most likely" scenario or an "expected value" derived from the entire range of outcomes or a representative subset of those outcomes as a probability–weighted average. When the risks around a given base forecast are balanced—with upside and downside risks equally likely to be realized— the expected value of the range of outcomes and the modal outcome (highest probability) are the same. This is not strictly true where there are important nonlinearities, but it's a fair approximation in the context of macroeconomic scenarios.

Things start to get interesting where the risks are asym-metric, with relatively more weight on either upside or downside risks. The probability distribution of potential outcomes is then skewed. Figure 1 below illustrates a symmetric normal distribution shown in the dashed grey line and a modified, skew normal distribution, with more probability weight to the downside (left) of the mode shown by the solid green line. While this illustration is for a range of outcomes for a single series, in principle it can be generalized to a

Figure 1



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multi-dimensional space representing hundreds of series.

Current Scenarios and Probability Assessments

As of this writing (November 2019), we generally view the risks as skewed somewhat to the downside. There are a number of reasons for this that we have spoken about in presentations and written about in our regular forecast reports as well as in special focus pieces.[1] Among the most often cited reasons that the economy might perform worse than in our base forecast are: slowing growth abroad that could worsen, particularly in Europe and China; a worse outcome for Brexit than is now expected; escalation in the tariff skirmishes; geopolitical risks, worsening global economic malaise; and other policy mistakes. Missing from the list is fear of a bursting of some obvious big asset price bubble. Nevertheless, there are plenty of things to worry about.

On the upside, the main alternative reflects that our base forecast may be underestimating the growth potential of the US. In the event, GDP could grow materially faster without further tightening in labor and product markets that would generate an unacceptable rise in inflation. That is, we could grow faster without the Federal Reserve feeling compelled to raise interest rates so as to slow economic activity. Our upside scenarios therefore reflect that the economy can only grow faster for very long if growth of the economy's productive capacity picks up materially. Faster GDP growth without that acceleration in "potential GDP" would drive the unemployment rate still lower, and might not even be possible given capacity constraints in portions of the labor market. We are already at a 3.6% unemployment rate, and it can only go so low.

We'll discuss in a bit how we assign these probabilities, but we should press on with the description of what is in Figure 1. For literally decades, IHS Markit and its predecessor organizations have been publishing regular Base forecasts and "Optim" and "Pessim" scenarios representing better and worse outcomes than the base case, respectively. The nature of these scenarios evolves through time to reflect the most important upside and downside risks present at each forecast cycle. Where low probability, but high-impact events could generate another scenario of interest, these are typically handled outside the usual Base-Optim-Pessim set of scenarios.

We view the probability associated with any particular scenario as applying to a range of outcomes that are qualitatively and quantitatively similar to that scenario.

In Figure 1 we have sliced up the probability mass into three neat sections. The center portion corresponding to the Base forecast comprises 55% of the probability mass of the skewed distribution, while the Pessim claims 35% and the Optim 10%. How should we think about this? The Base forecast is a point forecast after all (we even put a number after the decimal on the forecast of GDP growth!!!) yet, Figure 1 shows the Base forecast encompassing a range of outcomes.[2]

We view the probability associated with any particular scenario as applying to a range of outcomes that are qualitatively and quantitatively *similar* to that scenario. How similar depends in part on how many scenarios or slices will be absorbing the probability. This brings in two important constraints operating on the process:

- The sum of the probabilities across the scenarios should sum to 100%.
- The probability associated with the Base forecast should be at least 50%.

We have adopted these constraints based on client feedback, because of the resulting simplicity in explaining the resulting probabilities, and because the answer to the question from the corner office, "Is the Base forecast more likely than not?" is "Yes!"

These constraints require us to account for the fact that for purposes of assigning probabilities we view each

[1]See our *Recently Asked Questions* report, 13 January 2017 discussing how the *maturity* of an expansion could impact the probability of a recession, as well as our *Recession Watch* report, 2 October 2019. The latter will be updated monthly for the foreseeable future, or until the US enters a recession.

[2]Of course, the probability associated with any point in a continuous probability density function is exactly 0, so we clearly have something else in mind, other than telling you the likelihood of our exact forecast.

scenario as associated with a range of outcomes. Scenarios therefore might overlap. In this case it would be possible for the sum of the probabilities of a set of scenarios to exceed 100%. We avoid this by adjusting the probability associated with a given scenario by reducing or expanding the range of outcomes associated with that scenario within the probability density function depending on the number of scenarios. That is, we adjust what we mean by "similar."

This will become clear as we consider Table 1 at right. Table 1 contains the probabilities we currently assign to the set of eight scenarios that comprise our alternative scenarios set at this time. Each column contains the probabilities assigned to the scenarios when there are three to eight scenarios in the set. When we divide the probability space among the three basic scenarios, Base, Optim and Pessim, we will have higher probabilities associated with each scenario than would be the case if we were dividing 100% probability among more than just these three scenarios. The scenario ranges and probabilities are illustrated in Figure 1 and reflect the asymmetric downside risks discussed above, as well as other information.

With the recent focus on stress testing in all its guises, the demand for alternative scenarios to consider has grown. As a result, we moved from producing just three scenarios each month, to now providing eight scenarios every month, across which we must assign probabilities.

When we move to four scenarios by adding a second upside scenario characterized by higher productivity growth and faster growth of potential GDP, we view that as dividing the 10% upside probability. (See the discussion of potential GDP on page 5.) As a result, we reduce the probability associated with the Optim to 5%, and assign 5% probability to the High productivity scenario.

Similarly, when we add a fifth scenario, the Trade wars scenario, we make room for it in the probability space by reducing the probability associated with both the Base forecast and the Pessim. The Trade wars scenario is viewed as straddling the Base and Pessim scenarios. It is not an outright recession, but it is significantly worse performance than the Base forecast. It shows the weakest growth of the "non-recession" scenarios.

Table 1

Suggested Scenario Probabilities

	Based on n scenarios					
	3	**4**	**5**	**6**	**7**	**8**
Base	55	55	50	50	50	50
A1 Optim	10	5	5	5	5	5
A2 Pessim	35	35	30	25	15	10
A3 High productivity		5	5	5	5	5
A4 Stagflation				5	5	5
A5 Trade wars			10	10	10	10
A6 Average recession					10	10
A7 Severe recession						5
Total	100	100	100	100	100	100

The Stagflation scenario also lies between the Base and Pessim scenarios. However, in observing our constraint to maintain the probability associated with the Base forecast at 50% or higher, we reduced the probability associated with the Pessim. Think of it as maintaining the lower boundary associated with the Base forecast, while carving out some space within the Pessim portion of the probability space for this weak scenario.

The final two scenarios, the Average recession and Severe recession scenarios, clearly occupy space in the lower third of the probability distribution so we further reduce the probability associated with the Pessim. Think of this as slotting them into the left hand portions of the space in the probability distribution previously fully occupied by the Pessim scenario.

The foregoing describes the process by which we move from the set of probabilities associated with the three main scenarios to assigning probabilities for all eight scenarios. In a subsequent section we discuss how we arrive at these probabilities.

A Few Words About Scenario Design

Scenarios are motivated by one of two considerations. First, we continuously monitor real current risks present in the global economy today so we are aware of the potential narratives associated with those risks. These often include some economic or political event that could serve as a catalyst for the economy taking a path that diverges from the base forecast. In these cases the probability of the catalytic event will influence

the probability we assign to the scenario, where we rely on expert judgement to assess the probability of the event. For example, if home prices were considered to be in bubble territory (that is there was some non-trivial probability of a 40% decline), we would convene discussions within and outside the firm with experts, consider any survey evidence, etc. to assess the probability that the bubble would burst and prices would decline in the range of 40%.

Second, we look to the statistical record to inform the likelihood of GDP growth occurring in various ranges in the period ahead. This will help to define the GDP path in a potential scenario. We will then reverse engineer a plausible story that could produce the target GDP growth path.

Well-Informed Subjective Probabilities

Where we are looking to the statistical record to provide some guidance in assigning probabilities, we are informed by a variety of tools and statistical information. The goal is to identify what GDP growth ranges are more or less likely. This is akin to determining the shape of the distribution in Figure 1. The tools and information we have available to bear on this process includes the following:

- Histograms of historical GDP growth, both unconditional and conditioned by where we are in the cycle.
- Our recession probability model's assessment of the odds of a recession within the next 12 months.
- A survey of professional forecasters collected by the Federal Reserve Bank of Philadelphia allows us to see not just the distribution of modal forecasts, but the aggregation of the forecast distributions of the forecasters.
- An estimated multivariate cumulative density function (CDF) that permits us to gauge the relative CDF location for any set of historical or simulated values across six economic/financial variables. This is especially useful for identifying scenarios that are in the lower or upper tail of the distribution.

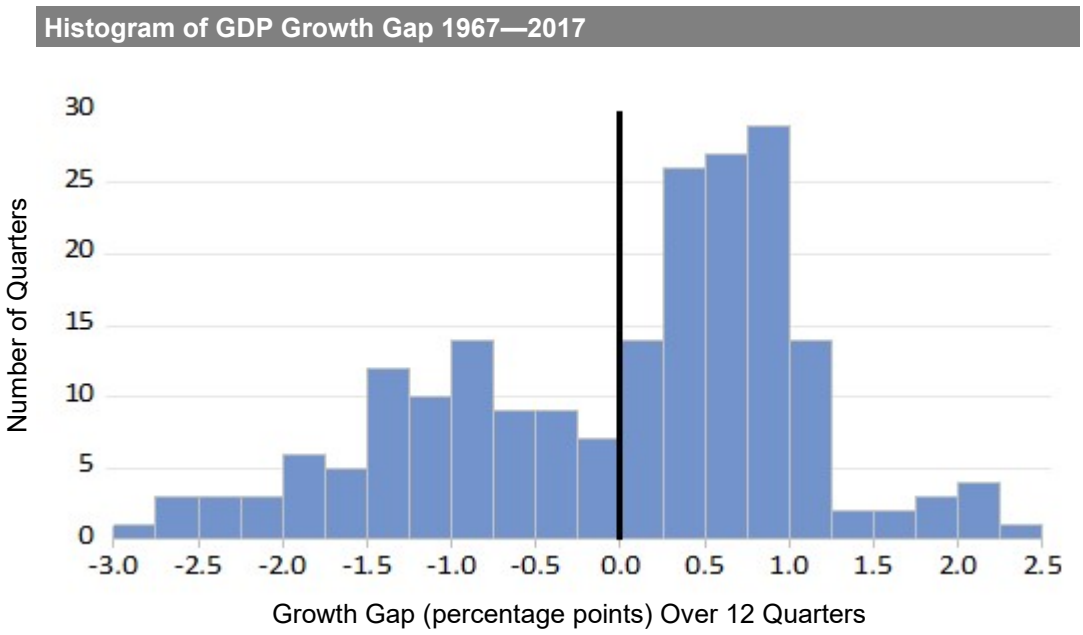
A useful starting point is simply to understand what has been the distribution of GDP growth rates over a long historical sweep. Reviewing the longest possible record with consistent data and which encompasses a number of complete business cycles can tell us a lot. Of course, the structure of the economy has changed considerably since 1929 when the modern and consistent US national economic accounts begin. Therefore, we typically look to data since the mid-to-late 1960s in our analysis of GDP growth patterns.

It is also important to recognize that the underlying growth rate of the economy has seen some important swings over this period. The most obvious source of the variation in the underlying growth rate is demographics. The post WWII baby boom led to a dramatic increase in population growth that subsequently fueled a rapid increase in the growth of the labor force. This was magnified by the sharp increase in the labor force participation rate of women that occurred starting in the mid 1960s. For example, over the 1970s the labor force grew at an average annual pace of 2.7%, but that growth fell to just 0.5% in the ten years ending in 2018.

A second source of variation in the underlying growth rate of the economy is the growth of *structural* productivity. That is productivity after we eliminate the cyclically-related increases and decreases and also back-out the contribution to productivity from increases in the business capital stock per worker. While difficult to predict, long rising and falling trends in structural productivity growth have had important influences on the underlying growth rate of the economy. For example, our estimate of average annual structural productivity growth in the 10 years to 2018 was a meager 0.4%, down from an average of 1.1% over the prior three decades.

We refer to the underlying growth rate of the economy as the rate of growth of potential GDP. It is the pace at which the economy can grow with all resources fully utilized without increasing imbalances across labor and product markets. Growth above potential is typically associated with a falling unemployment rate, which is good when the unemployment rate is high, but unsustainable when it is low. Actual GDP growth below the rate of growth of potential GDP or an outright contraction in GDP is associated with a rising unemployment rate. When thinking about the ex-

Figure 2



pected growth rate of the economy over the next few years, a look at the historical distribution of GDP growth rates is only helpful if we adjust it for the changing pace of potential GDP growth that may have occurred over the sample period. When we subtract the growth of potential GDP from the growth of actual GDP we have what we refer to as the "growth gap." It is this measure that we focus on when thinking about the possible distribution of GDP growth. Figure 2 above shows the distribution of the GDP growth gap, measured over a 12-quarter period, over the past five decades. This includes all 12-quarter periods within the range.

Importantly, we know that the distribution of growth rates varies significantly depending on where we are in the business cycle. Economists have a variety of ways to estimate the level of the unemployment rate that can be sustained without inflation either rising or falling. This specific rate is referred to as the *natural rate*, and it corresponds, roughly speaking, with actual GDP being at the level of potential GDP, where all resources are fully utilized without unsustainable im-

Figure 3

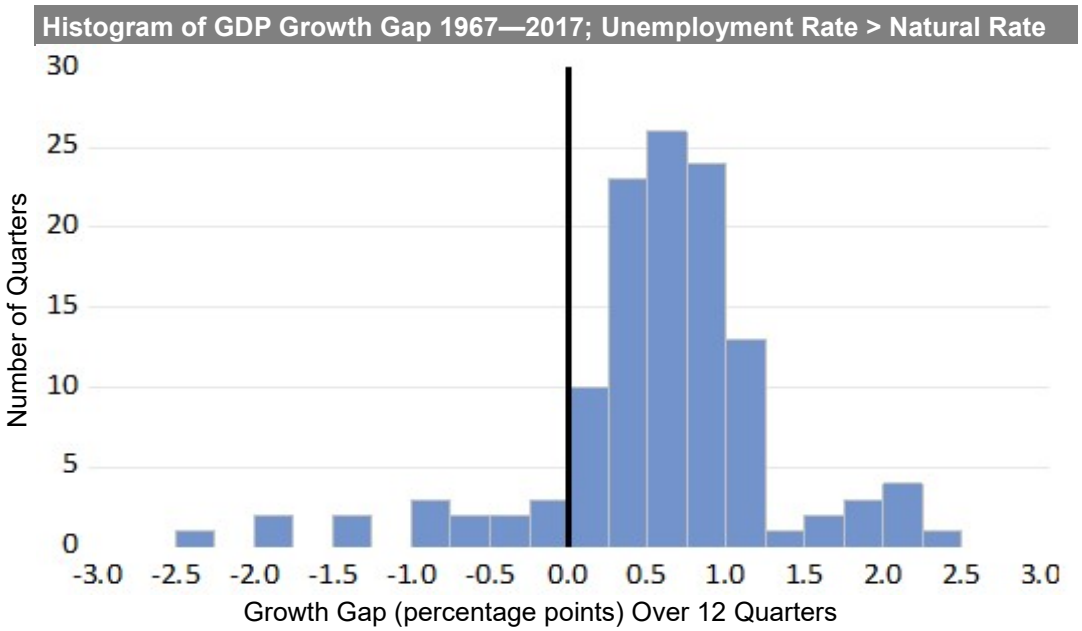
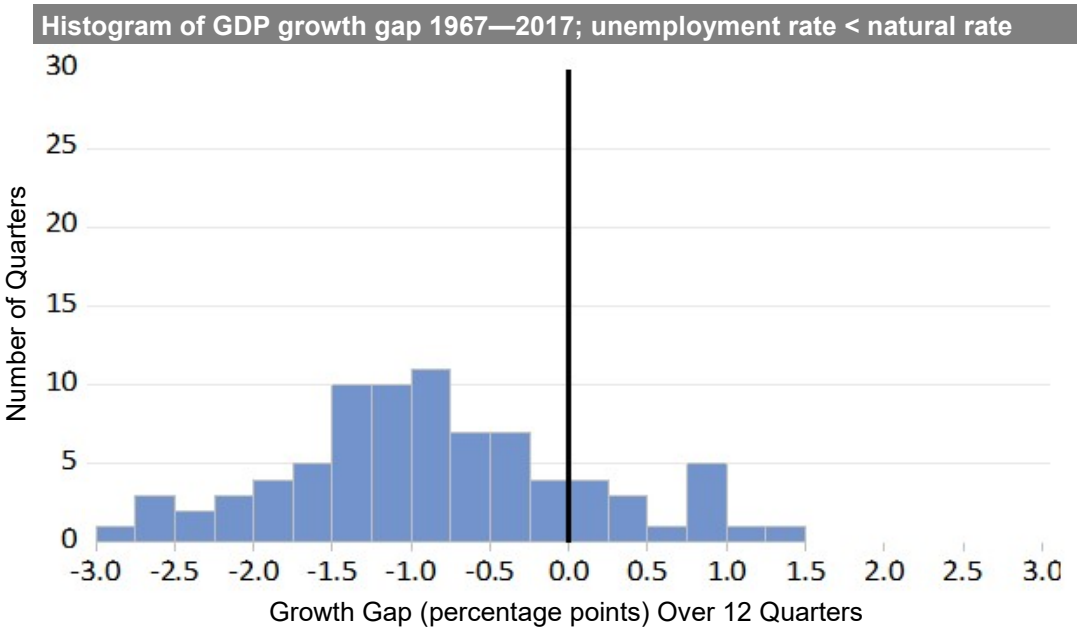


Figure 4



balances across labor and product markets. As shown in Figure 3 below, GDP tends to grow much faster when the unemployment rate exceeds the natural rate. This is because there are ample unutilized labor resources that could be re-employed without putting undue upward pressure on wages, and under-utilized capital that could be put back into service. Federal Reserve policy is usually accommodative to growth during these periods, and often times fiscal policy has been loosened through tax cuts or spending increases to help stimulate growth.

The opposite is true when the unemployment rate is below the natural rate. Labor and product markets are tight, with some upward pressure on wage and price inflation. The Fed is usually in a tightening phase during these periods. Fiscal stimulus would typically be lacking. The challenge of finding qualified workers can also limit expansion plans.

Thus, it is no surprise that most of the time, starting from a position when the unemployment rate is below the natural rate, the economy will grow slower than the rate of growth of potential GDP.

Importantly, this suggests how scenario probabilities will evolve through the business cycle. Today, with the unemployment rate so low, there is little upside opportunity. Near the trough of the next recession, most of the probability mass will lie to the right of the then-current negative GDP growth rate, with relatively little probability space to the left. We discuss this notion more fully in the last section of this report.

Table 2

GDP growth gap and changes in unemployment rate across scenarios

Scenario		Average GDP growth gap* (percentage pts.)	Change in the unemployment rate** (percentage pts.)
Base		-0.1	0.1
A1	Optim	-0.2	-0.1
A2	Pessim	-1.0	1.7
A3	High productivity	0.3	-0.4
A4	Stagflation	-0.5	0.7
A5	Trade wars	-0.9	1.2
A6	Average recession	-1.3	2.6
A7	Severe recession	-2.5	5.4

* The growth gap is the difference between the annualized growth rate of GDP in the scenario and the annualized growth rate of potential GDP. We averaged this difference over the first 12 quarters.

** The change in the unemployment rate is calculated over the first 12 quarters of the scenario.

As seen in Table 2, the 12-quarter growth gap corresponding to our current base forecast is –0.1 percentage point, just to the left of zero in Figure 4. The 12-quarter growth gap in our Pessim scenario is –1.0 percentage point, near the center of the histogram mass. Wouldn't that suggest we have the probabilities reversed?

The answer is "no," but this is where it becomes clear that assigning probabilities is not for the faint of heart, as they cannot be rotely determined by looking at his-

torical distributions of growth rates, even if carefully conditioned by where we are in the business cycle.

So why don't we consider the Pessim to be the "most likely" scenario, i.e. the "base" case. There are several reasons that suggest the Pessim scenario might be too pessimistic to be the most likely scenario. First, the economy has proven to be a lot less inflation prone at these low unemployment rates than would have been the case over much of the sample. With less upward pressure on inflation, the Fed can remain accommodative for longer. Moreover, in many of the prior cycles when the unemployment rate was below the natural rate, inflation was already thought to be unacceptably high, while today, it is thought to be unacceptably low.

Second, we know the economy got a fiscal boost from the Bipartisan Budget Act of 2019 that will help to sustain growth for the next year, or so. And, the Federal Reserve has recently embarked on an easing cycle, turning policy a bit more accommodative based mostly on concerns about foreign growth, but also in light of recently low inflation that has trended below the Fed's two-percent inflation target.

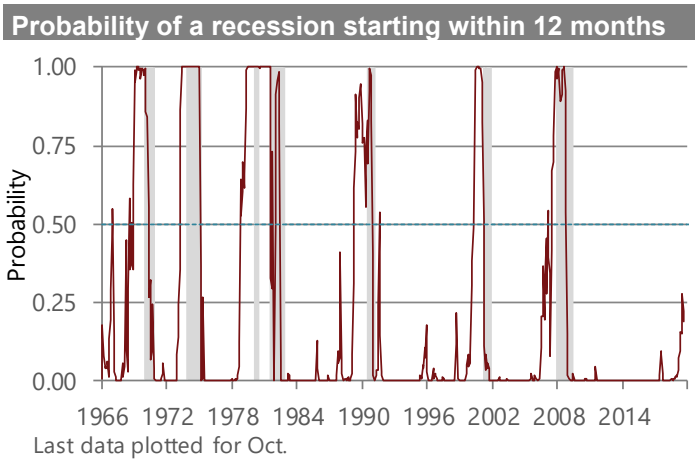
Third, there are no other major imbalances, or bubbles that appear in danger of bursting and which might push the economy over the edge. The absence of those imbalances stems in part from the relative slowness of this expansion and the new financial regulations imposed after the Financial Crisis.

Fourth, the household sector today is in remarkably good shape: debt-to-income ratios are down, the burden of the debt is relatively low, employment and income is growing solidly, and the savings rate is historically high.

For these reasons we would tend to down-weight the rather high probability we might otherwise assign to the Pessim scenario based on the data underlying figure 4. A more sanguine view suggested by the next tool we discuss reinforces that decision.

Another tool we like to consult, especially when we find ourselves far into an expansion, is our recession probability model. We issued an update of this model on October 1 (see footnote 1) in our Recession Watch report, which included a full description of the model.

Figure 5



The model is based on a binary probit estimation that indicates the likelihood that a recession will begin within the next 12 months. There are seven explanatory variables, including the term slope. An inverted term slope is a very good predictor of an impending recession, but our fully specified model does an even better job. The model also includes, stock prices, home prices, oil prices, and where we are in the business cycle, as indicated by the unemployment rate relative to the natural rate.

Figure 5 above shows the predictions from that model. Readings over 50% have reliably signaled a recession within the next 12 months. Updated with available October data, the model is indicating roughly a 20% probability of a recession starting before November 2020. This fact is given a fair degree of weight in counteracting the signal from the conditional growth gap histograms discussed above.

It is roughly the case that a growth gap analysis built on the data underlying Figure 4 would suggest something like a 50% probability that a recession would occur over the next three years. On the other hand, the recession probability model is signaling only a 19% chance that a recession would begin in the next 12 months. The average of these two figures is 35% probability. So, combining those data points yields roughly 35% odds of a recession beginning within the two- to three-year forecast horizon.

We also look at surveys of economists' forecasts. The Blue Chip Consensus has been asking a special question for the last several months about the probability of a recession starting in the next year, and the figures

Figure 6

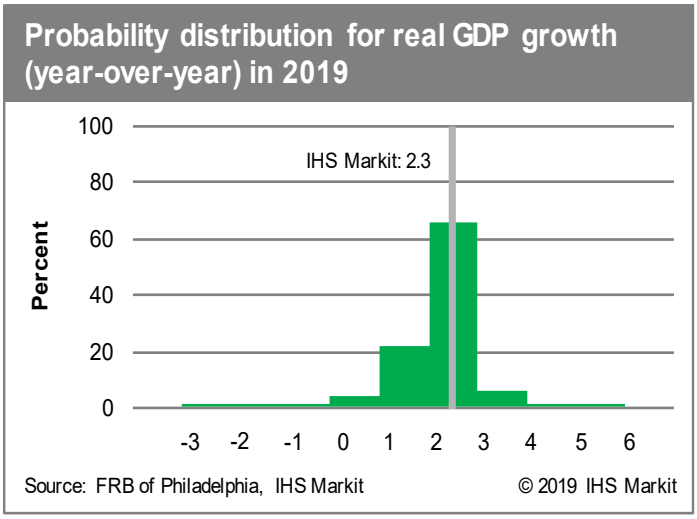
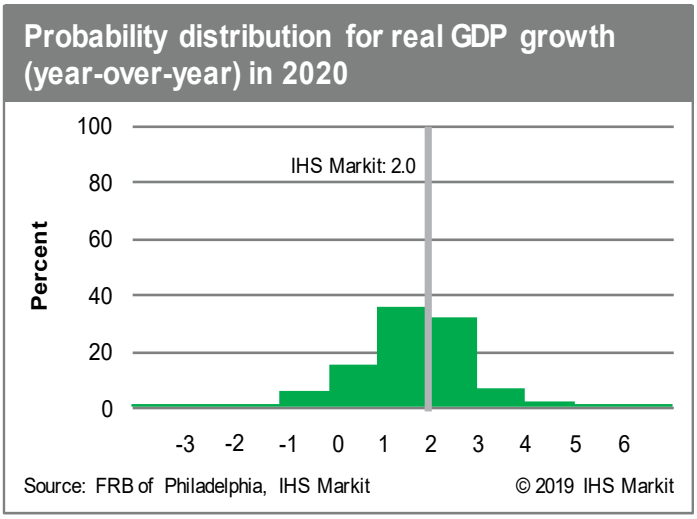


Figure 7



have come in generally around 35%-40%. The 10 October, 2019 issue put the odds of a recession beginning in 2020 at 39%. If not in 2020, the panel thought the odds of a recession in 2021 rose to about 41%. So this is broadly in line with the 35% probability we assigned to the Pessim scenario.

We also look at the Survey of Professional Forecasters (SPF) from the Philadelphia Fed. A key advantage of that survey is that it asks the respondents to provide a probability distribution of GDP growth rates for the current year and next year. This allows us to aggregate to an average distribution, not just a distribution of modal forecasts. Figures 6 and 7 show the aggregated distributions from the SPF. Also shown is the growth rate corresponding to our current Base forecast. It is clear the SPF panel sees asymmetric downside risk to the base forecast in both 2019 and 2020, similar to our assessment.

In 2020, a year-over-year growth rate as low as 0.5% would most likely mean the economy slipped into recession sometime that year. For example, our current Pessim scenario, which includes a three-quarter recession starting in the third quarter of 2020 with a 2.0% peak-to-trough decline in GDP, implies GDP growth of 0.3% measured year-over-year in 2020. GDP growth in 2021 in that scenario is –0.2%, measured year-over-year.

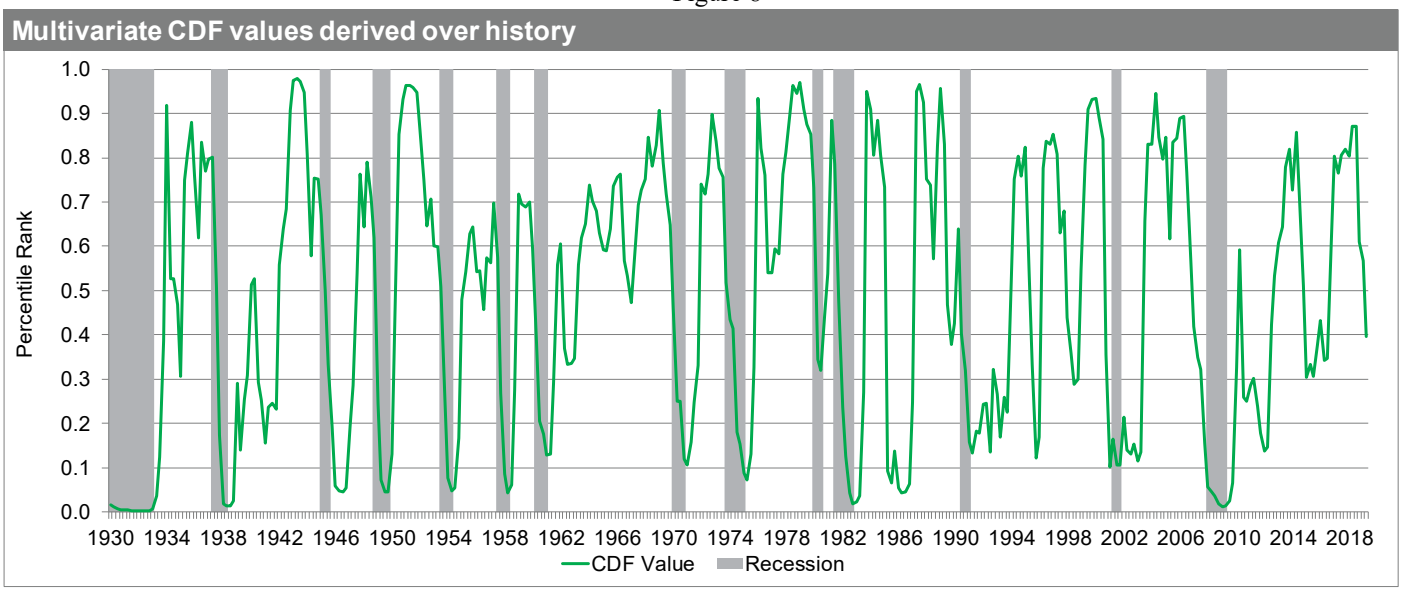
While this survey does suggest that risks to our Base forecast are skewed to the downside, it does not appear to put as much probability weight on a recession in 2020 as does the Blue Chip panel in response to the special question posed to that panel of forecasters.

About once a year we refer to another tool we have developed that helps to define benchmarks for the upper and lower tails of the GDP growth distribution. This is our multivariate cumulative density function (CDF) tool. That tool includes an empirically estimated six-variable CDF using quarterly data from 1930 to present on: GDP growth, negative of the 4-quarter change in the unemployment rate, inflation, change in equity prices, change in home prices and the 4-quarter change in the 10-year T-Note yield.

We can input any vector of values for these six series and determine the CDF rank. In the multivariate case, the lower-tail CDF value is the probability that a random vector drawn from the distribution has components that are all less than the corresponding component in the reference vector. In practical terms this means that the lower the growth rate of GDP, the bigger the rise in the unemployment rate, the weaker are home prices and inflation, and the bigger the decline in the the stock market and interest rates—all characteristics of a weaker economy—the lower will be the CDF value.

Inputting the historical values for the six variables generates a time series of CDF values. These are plotted in Figure 8 on the next page. The shaded bars denote official recession periods. Note that the values during the Great Depression are in the 1st percentile, while the Great Recession (GR) is in the 2nd through 5th percentile range. These correspond to the lower tail of the distribution where the probability mass is quite low. Inte-

Figure 8



grating a small range around the GR values yields a value around 5%. This serves as the basis for assigning a probability of 5% to the Severe recession scenario, which is a bit more severe than the GR. Note that this is not an exercise we need to repeat very often.

Specific Steps to Assigning Probabilities

Thus far we have outlined our thinking about how to think about scenario probabilities, provided the specific probabilities we have assigned to the current set of scenarios and described some of the inputs to our process. As already indicated, we believe the process is inherently subjective. It is the case that we can target and design scenarios that are meant to be near the 5th percentile (for example) and where we know the probability of such a scenario is low because it sits in the far left tail of the distribution. The process is different when we first create the narrative and the detailed scenario and then ask what is the appropriate probability. Below we outline the specific steps followed in reviewing and assigning probabilities:

Step 1) Review the set of existing scenarios:

The point of this review is to determine if any changes need to be made. These can be as simple as small adjustments to certain series, typically to reflect some new initial conditions or emerging sense of risks around the specific scenarios of the specific series. For example, we may decide that the rise in risk spreads in a scenario could be larger or smaller than is currently expressed in the scenario. We might also decide that some other narrative has become more compelling and deserves to replace one of the scenarios. In that case we will sketch out what the narrative is and what the key way-points are that will define the scenario, such as the degree of weakness in GDP, the extent of the rise in the unemployment rate, and other key metrics. Part of this review is to take into account client feedback on the scenarios and in particular whether the set of scenario is adequately reflecting the nature of the risks that are of concern to them.

Step 2) Update the scenarios

This step involves producing or reproducing each scenario using the MA/US model. This is reasonably straight forward. At times we use a solution-difference -transfer facility to reproduce the scenario. This quickly updates the scenario to account for the new initial conditions, new assumptions about exogenous variables and revised judgment reflected in the updated Base forecast. At other times we will create the scenario "from scratch" by identifying the key series that characterize and define the scenario within the narrative, and reapply those broad changes to the updated Base forecast.

Step 3) Calculate and review key metrics

Once the scenarios have been produced and checked, we calculate key metrics such as those shown in Table 2 (page 6) and produce a large set of charts that compare key economic and financial series across the 8 scenarios. Many of these are the same charts that ap-

pear in the quarterly Macro/Financial Alternative Scenarios report. For the most part the changes to the scenarios and these key metrics tend to be incremental, unless a scenario is swapped out and a new one, corresponding to a new narrative, is introduced.

The metrics and charts are reviewed by the scenarios team and other senior members of the team. The data from the scenarios are judged against the historical distributions, an updated recession probability signal, any new survey data and other new information about shifting risks that could affect the likelihood of each scenario.

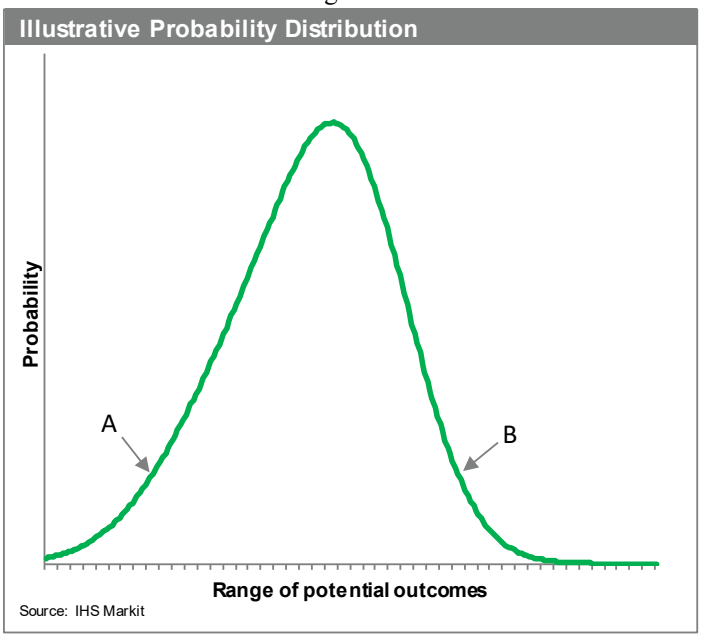
Step 4) Collect updated probability assessments and adjust them as needed

Team members submit any proposed changes in probability weights using a version of Table 1 to the internal CECL scenarios manager. Any changes relative to the prior set of weights needs to be justified in accompanying notes. If there is a clear consensus, the probabilities are updated as needed and we are done. Where there are some notable discrepancies, we convene a meeting to discuss the differences and reach a consensus on the final set of probabilities.

Probability Assignment Through the Business Cycle

It goes without saying that the probability assignments will evolve over the business cycle. At some point a recession scenario will become the most likely, i.e. the Base forecast and get assigned a 50% or higher probability. If the distribution shown in Figure 9 is viewed as the unconditional distribution, say for GDP growth in the next couple of years ahead, where we find our selves on that distribution will help define the set of scenarios we will be discussing and the probabilities we will assign to them. That is, where we are in the cycle matters!

Figure 9



For example, if the economy were in a deep recession, identified by a low GDP growth rate (in fact significantly negative), say at point A, there would be much more potential for the economy to recover than to worsen. Starting from point A, our Base case might be a modest recovery. A downside scenario might include a longer and more severe downturn, but there is limited probability space to the left of point A and so we would not assign much probability to that scenario.

On the other hand there is plenty of probability space to the upside of point A. Two or three different scenarios involving successively stronger recoveries would be part of the suite of scenarios.

Conversely, if we found ourselves at point B on an unconditional distribution, there would be a much greater likelihood that the economy would weaken from there than that it would strengthen. Consider if this were the probability distribution for the unemployment rate and 0 were on the far right, with the rate increasing as you move leftward along the horizontal axis. At point B there are greater odds that the unemployment rate would rise than that it would fall. This is not that dissimilar from the situation we find ourselves today. In our Base forecast, we have the unemployment rate trough at 3.5% in the second quarter of next year, but then rise seven-tenths of a point from the third quarter of next year to the third quarter of 2023. Recall the Base forecast comprises 50% of the probability space.

Using the Assigned Probabilities for CECL

We expect that users of these scenarios for CECL are most likely to pick three scenarios, the Base, Optim and Pessim and use the probabilities we have assigned to weight the results of their internal modelling of credit losses. Where a client intends to use four sce-

narios, adding the Severe recession scenario, they should use the assigned 5% probability for that scenario and reduce the weight on the Pessim scenario by 5 percentage points, in line with the discussion around Table 2 on page 6.

Given the significant nonlinearities in credit loss models it is important to use multiple macro/financial scenarios to drive into the credit modeling and then take a weighted average of the results rather than average the output from the macro/financial scenarios and use that in a single run of the credit loss models.

Concluding Thoughts

Assigning probabilities to a base forecast or alternative scenario is a highly subjective process, but one that can be informed by historical regularities and experience. Nevertheless, considerable judgment needs to be brought to bear to make sensible adjustments to that historical guidance to account for changes in the structure of the economy, where the economy is in the business cycle, current and prospective economic policy, and a host of other factors.

Using multiple inputs and methods and involving a team of experienced economists to arrive at a consensus will help assure that the resulting probabilities are defensible and that they will evolve over the business cycle in a gradual and, hopefully, predictable fashion.

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