MACROECONOMIC ADVISERS
By IHS Markit

Macro Focus

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How might the expansion end? Boom and Bust is a real risk

It is an unfortunate reality that economic expansions eventually end. Historically, how long they continue and how they end has varied considerably. The current expansion is getting long in the tooth at 8 years 7 months, and the economy, while not without pockets of lingering weakness, has returned essentially to full employment. This is both a blessing and a curse. While there are not obvious significant imbalances whose correction might initiate a process that would end in a downturn, there remain concerns that the seeds of the next recession have already been sown. In this report we a) briefly review the set of factors that typically spell the end of an expansion, b) discuss two possible ways in which the current expansion might end, and c) present an alternative simulation that, given the recent significant reduction in taxes and legislated increase in spending, coming at a time when the economy is already at full employment, illustrates an expansion-ending scenario that should be of increasing concern, which we refer to as the "Boom/Bust" scenario.

So how do expansions typically end?

A review of business cycles reveals that one or more of a small set of key factors or events have typically combined to tip the economy from expansion into recession, sometimes violently. We group these factors into five relatively broad categories: 1) bubbles build and burst; 2) supply/commodity price shocks; 3) policy "mistakes"; 4) financial minefields or meltdowns; and finally, 5) war and pestilence. Let's briefly consider each of these in turn.

Bubbles build and burst:

Perhaps the cause of expansions ending most front of mind is that asset-market bubbles can arise and expand in magnitude sufficiently that their eventual rapid deflation becomes a significant adverse event for the economy that results in a recession. Recent examples include the bursting of the dot-com bubble being a major contributor to the 2001 recession, and of course, the bursting of the housing bubble being a major cause of the Great Recession.

Supply/commodity price shocks:

A sharp increase in the relative price of a key industrial commodity, whether engineered by a cartel, the result of a man-made or natural disaster, or other cause, can have a dramatic impact on both aggregate supply and aggregate demand, resulting in an expansion coming to an end. Two recent and clear examples include the oil price shocks that occurred in the mid- and late 1970s. From mid-1973 to early 1974, oil prices tripled as a result of the formation of the OPEC oil cartel and the resulting effective control of the supply and price of oil. The 1974–1975 recession ensued. Similarly, from late 1978 to early 1980, oil prices increased by more than 2½ times. While in both cases, these were significant relative price shocks, the importance of oil in the US economy was such that the resulting surge in the overall price level resulted in a significant decline in real incomes (and wealth) sufficient to push the economy into recession. (Note that the Fed initially tried to accommodate the price shocks by allowing inflation to rise, rather than resist a rise in the overall price level.) More recently, oil prices roughly doubled, from around $65 per barrel in early 2007 to over $130 per barrel by mid-2008. While the collapse of the housing bubble

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and associated collapse in the value of mortgage-backed securities may have been the more important catalyst for the Great Recession, the surge in oil prices also played a significant role.

Policy "mistakes":

Perhaps the most interesting contributing cause of expansions ending are policy mistakes. We put mistakes in quotes because the motivation for policies that may ex post appear to have contributed to a recession can be quite complicated, involving competing interests, bad luck, and the interplay of multiple factors. As an example, the 1953–1954 recession largely resulted from the sharp decline in real defense expenditures at the conclusion of the Korean war. In real terms, those expenditures fell 22% from mid-1953 to mid-1955, with much of that decline subtracting 2.6 percentage points from GDP growth over the four quarters of 1954. The peak-to-trough decline in GDP during the recession was only 2.4%. Reducing defense spending at that time was hardly a "mistake", but it does appear to be the proximate cause of that recession. Ill-timed tax increases that occurred in the late 1960s and in 1990, arguably contributed to recessions that began in 1970 and 1990, respectively. Policymakers at the time felt that such tax increases were necessary to address growing structural federal deficits, but the timing turned out not to be so good from a macroeconomic stability perspective.

Turning to monetary policy, some have argued that the Federal Reserve was late in tightening policy sufficiently in the late 1990s, allowing the dot-com bubble to build and eventually bust, contributing to the 2001 recession. Similarly, the housing bubble that emerged over roughly 2003–2007, along with the more insidious subprime mortgage crisis, arguably could have been averted or mitigated by a more timely Fed policy response aimed at slowing the economy and preventing the bubble in home prices and associated overbuilding. If there was a mistake, it was that policy tightening was too late, followed by a need to tighten more aggressively at the same time the subprime minefield posed a unique and hidden vulnerability. And then there is the significant monetary tightening that occurred beginning in late 1979 aimed at curbing the inflation spiral then underway. The sharp rise in real interest rates played a major role in causing the 1980 and 1981–1982 recessions. Was the tightening or the severity of the tightening a mistake? Few economists would today call it a mistake. In retrospect the policy was effective in ending and reversing the upward inflation spiral then underway, and the move is generally lauded as ushering in the period of low stable inflation we have enjoyed the last couple of decades. If there was a mistake, it was in not responding appropriately to the prior oil-price shock and letting inflation continue to build over the second half of the 1970s. Of course, hindsight is 20/20, and the accuracy of the forecasts upon which policy must in part rely is woefully inadequate to the task…yes, we forecasters share some of the blame.

Financial minefields and meltdowns:

The subprime mortgage debacle is the best example of a financial minefield. These are in the nature of a major mispricing of asset valuations, perhaps the result of a mispricing of risk tied to fraud, "soft fraud" as was identified in the subprime crisis, and the kinds of financial exuberance that economist Hyman Minsky once labelled Ponzi finance. In these cycles, credit and leverage grow rapidly, where accelerating cash flows and rising value of collateral support a (sometimes self-reinforcing) expansion of leverage up until it becomes clear the collateral may not be worth what was previously thought and cashflows are found to be insufficient to prevent default on the loans. At the risk of oversimplification, the subprime crisis occurred as a result of improperly aligned incentives that allowed a mortgage credit boom that fed the house-price bubble, that in turn seemed to justify the credit boom, until it became clear that the price expansion was unsustainable. At the core was a rapid buildup in the issuance of mortgages of questionable quality, and certainly mispriced, that were then wrapped into mortgage-backed securities (MBS) in a rapidly growing securitization binge, while rating agencies failed to see or properly warn of the underlying riskiness of the mortgages. Once the façade began to crack—the Minsky Moment as it has come to be called—MBS values plunged, and a whole super structure of leverage built upon them came crashing down. Homebuilding, which had already

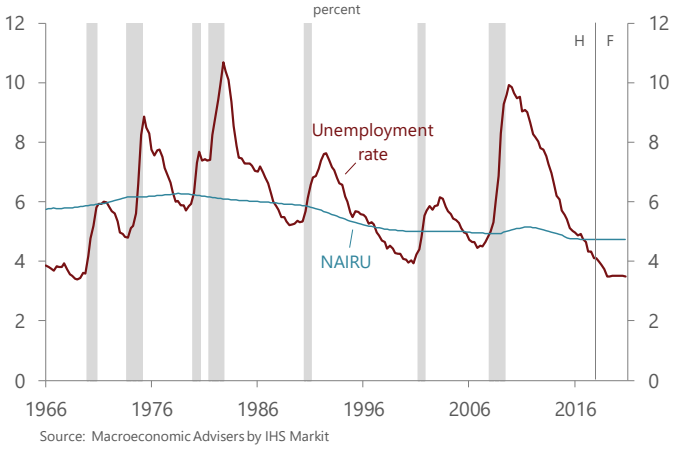
begun to slow as a result of prior overbuilding, then came crashing down, and, well, you know the rest.

War and Pestilence:
This broad category could include any conflict, outbreak of disease, or natural disaster that so disrupts economic activity as to materially reduce output and/or raise unemployment. It could include the 9/11 attacks on the US, which did contribute to the 2001 recession. It's possible that absent the attacks, the weakness evident in 2001 would not have been broad, deep or of sufficient duration to qualify as a recession. The tsunami that hit Japan in March 2011 is also in this category. The tsunami contributed to a sharp 6% annualized decline in Japan's GDP in the first quarter of 2011, followed by a 2% annualized decline in the second quarter. The economy had already declined in the fourth quarter of 2010 at a 2.9% clip, so the tsunami contributed to a three-quarter recession that included a 2.7% cumulative decline in GDP.

In most post-WWII recessions, more than one factor contributed to the downturn, and policy—it could be argued—nearly always played some sort of a role. Often policy's role was in the form of doing too little to prevent the economy from overshooting full-employment. Then, as inflation or asset bubbles built, policy tightening turned out to be sufficiently severe to tip the economy into recession, perhaps with a bursting bubble as part of the mix. This brings us to today and concerns that having essentially reached full employment, if not having overshot it, and with more fiscal stimulus poised to further tighten labor and product markets, tightening monetary policy "just right" will prove to be a difficult, if not impossible task. We often have noted the difficulty of achieving what we call a "soft landing from below," whereby the Federal Reserve is able to slow economic growth by just enough to have the unemployment rate drift up from below the sustainable rate of unemployment (or NAIRU) to the NAIRU. Indeed, such a feat has not been successfully achieved in the US in at least the last half-century.

As seen in the upper-right chart, in each case where the unemployment rate fell below the NAIRU, the economy eventually found itself in a recession. The simple reality is it is quite difficult to apply just the

Chart 1. In search of a Unicorn



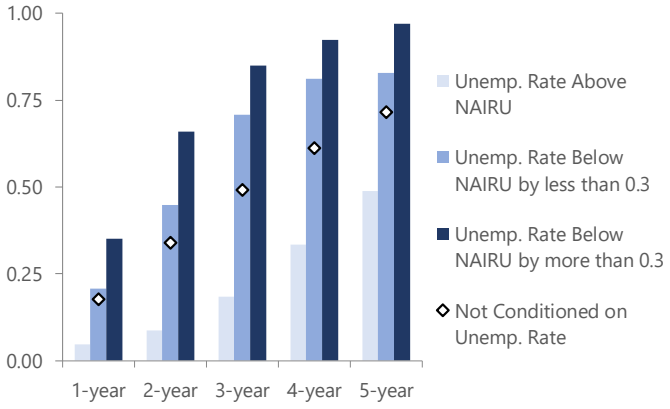
Source: Macroeconomic Advisers by IHS Markit

right amount of policy restraint—fiscal and monetary—to slow the economy enough to see the unemployment rate rise without causing an outright recession. Today, with the unemployment rate at 4.1% and expected to decline to close to 3½% as a result of strong momentum in the economy and fiscal stimulus coming from both the tax cut and the Bipartisan Budget Act of 2018 (BBA 2018), policymakers face a significant challenge in the years ahead to avoid an unacceptably large increase in inflation, while nudging the unemployment rate back toward the sustainable rate of unemployment, estimated to be in the neighborhood of 4½%.

In a recent report, we observed how the ex post probability of a recession occurring over the next 1 to 5 years, in the historical record since the mid-1940s, depended upon whether the unemployment rate was above or below the NAIRU.[1] We found that, if the unemployment rate was below the NAIRU by more than three-tenths of a percentage point, the likelihood of recession two years out was dramatically higher than when the unemployment rate was above the NAIRU. The key findings are summarized in the chart on the next page. The diamonds show the unconditional probability of a recession occurring within the time frame specified on the horizontal axis based on all non-recession months from 1947 to 2016. However, when we conditioned the results based on the unemployment rate relative to the NAIRU, we get dramati-

[1] See our *Recently Asked Questions* report, "What is the probability that a recession will begin at some point over the next year? Or five years?," January 13, 2017.

Chart 2. Recession Probabilities by Maturity of Expansion



Source: Macroeconomic Advisers by IHS Markit

cally different results. As shown in the chart, if the unemployment rate is above the NAIRU, the ex post probability of a recession over the next one through five years rises slowly from below 5% to 50%. However, if the unemployment rate is below the NAIRU the ex post probability rises more quickly, and especially if the unemployment rate is below the NAIRU by more than three-tenths of a percentage point.

The ex post probability of recession tends to rise as the unemployment falls below the NAIRU because as the unemployment rate falls below the estimate of the NAIRU, it indicates a degree of labor market and product market tightness that tends to cause inflation to rise. As the Fed tightened policy to squelch such an increase in inflation, the resulting slowing in economic growth, perhaps intensified by the bursting of an asset bubble, has contributed to an ensuing recession. As noted above, tax surcharges in the late 1960s, aimed at reducing the budget deficit and slowing the rise in inflation, also played a role in the 1970 recession.

Today, with an estimate of the NAIRU near 4½% and an unemployment rate of just 4.1%, this analysis suggests that the probability of recession within the next three years could be elevated, well over 50%. However, there are several reasons why this time could be different. First, the NAIRU could be well below 4½%. Second, we are starting with inflation at least somewhat below the Federal Reserve's inflation target, rather than at 3% or above as occurred late in the prior expansions, meaning that policy tightening could proceed more cautiously than in prior cycles. Third, the short-term relationship between the change in inflation and the level of the unemployment rate relative to NAIRU, what is referred to as the slope of the short-run Phillips curve, has flattened over time. This also argues that the Federal Reserve may be able to tighten policy at a slower pace than was the case in prior cycles.

Another very important reason why this time could be different is that with considerable fiscal stimulus coming online from both the Tax Cuts and Jobs Act of 2017 (TCJA) and the BBA 2018 supporting aggregate demand growth, the probability of recession in the next two years is quite low. Nevertheless, with the effects of fiscal stimulus on growth likely to begin to wane in 2020, at the same time that the Fed is proceeding with a series of interest rate hikes, the likelihood of recession at that time must be thought to be somewhat elevated. Indeed, we view this as the most significant risk to a continuation of the expansion and will be featuring some variant of this scenario as the most likely alternative to our base forecast.

So how will this expansion end?

As the previous discussion suggests, we are concerned that it will be very difficult to achieve the "soft landing from below" and that policy tightening (both explicit monetary tightening from the Fed and implicit fiscal policy tightening when the current bout of stimulus runs its course) will play a role in tipping the economy into a recession. Broadly speaking there are two qualitative scenarios of concern. First, we expect the Fed to raise the federal funds rate target range four times this year. This is somewhat ahead of market expectations (although they are catching up) and so jumps in market interest rates are quite possible as expectations adjust. If such jumps occur, and if the boost to growth from the tax cut and spending increases proves to be not very large, then a sharp slowing in growth cumulating in a recession could occur.

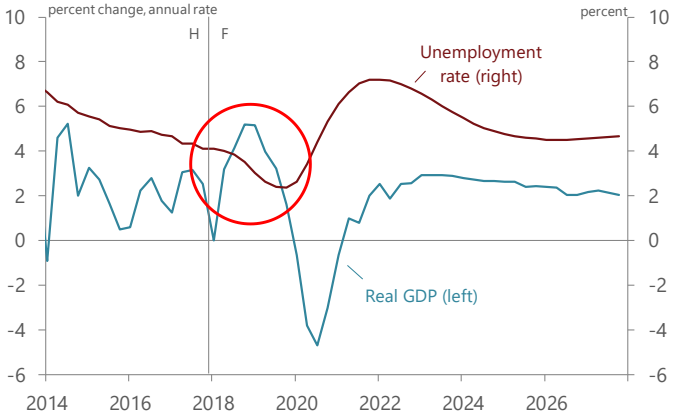
The more likely scenario is what we have termed the "Boom/Bust" scenario. In this case, the Federal Reserve has already set about on a course of interest rate increases it believes is necessary to normalize monetary policy and achieve outcomes for inflation and unemployment consistent with its dual mandate. Projections of economic growth by the Fed and others have been

raised to account for the expected stimulus from the recently legislated tax cut and spending increases. It is quite possible that growth could turn out to be significantly stronger than currently expected, especially if improved business confidence contributes to a dose of positive "animal spirits" resulting in more investment and hiring than is currently expected. That is, the makings of an economic boom are in place. In the Boom/Bust scenario presented below, we assume such a boom occurs with growth of GDP and employment sufficient to push the unemployment rate to below 2½% by mid-2019. GDP growth late in 2018 and early 2019 exceeds 5% (annualized), before later slowing as the effects of the stimulus wane and as rising rates and falling equity values take their toll. An unemployment rate of 2.4% would be the lowest in the US since during the Korean War.

In this scenario inflation begins to rise faster than in the base forecast, and we further assume a little bad luck on inflation, so that core consumer price inflation quickly rises above 2½%, touching 2.9% by early 2019. While we believe the Fed would welcome some temporary overshoot of its 2% inflation target, in this scenario inflation quickly exceeds the Fed's comfort zone. See chart 4.

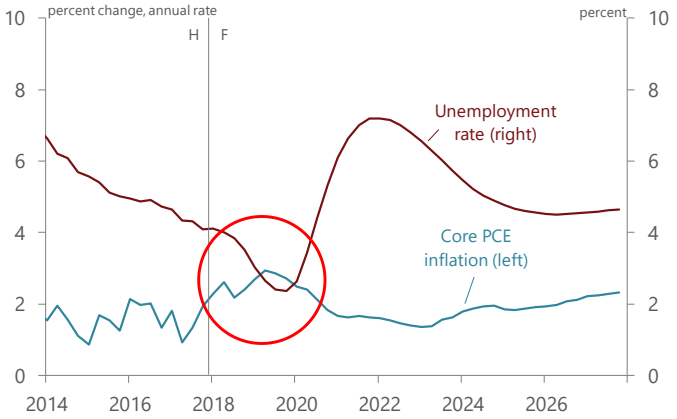
With inflation then well above the Federal Reserve's 2% target and growth of GDP exceeding 5%, the Federal Reserve begins to tighten much more aggressively than in our base projection, and long-term interest rates surge. The top of the target range for the federal funds rate reaches 5½% by late 2019, briefly exceeding both the 2-year and 10-year Treasury Note yields. The surge in rates, along with the widening expectation that the surge in rates will push the economy into a recession is assumed to knock roughly 25% off the value of the S&P 500. This, of course, contributes to the eventual downturn. Home prices also soften, contributing to a significant decline in household net worth that results in a decline in consumer spending. Business fixed investment makes a hasty retreat. The sharp rise in interest rates in the US relative to abroad results in the broad, trade-weighted dollar exchange rate moving roughly 6½% above that in the base projection. The rise in the exchange rate reduces exports and boosts imports, contributing to a lower path of net ex-

Chart 3. Risk of overheating - Boom/Bust



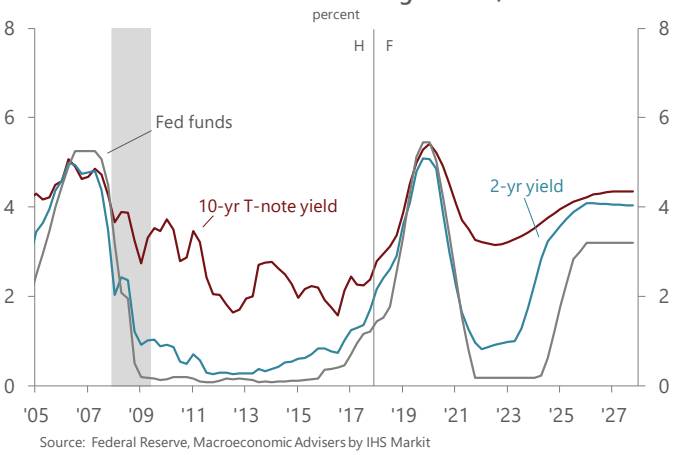
Source: BEA, BLS, Macroeconomic Advisers by IHS Markit

Chart 4. Risk of overheating - Boom/Bust



Source: BEA, BLS, Macroeconomic Advisers by IHS Markit

Chart 5. Risk of overheating - Boom/Bust



Source: Federal Reserve, Macroeconomic Advisers by IHS Markit

ports and weaker GDP. The broad-based decline in aggregate demand reduces employment sufficiently to push the unemployment rate to 7.2%.

Once equity values begin to fall sharply and the economy tips over into recession, the Federal Reserve quickly reverses course and lowers the target range for the federal funds rate all the way back to 0-0.25%. Long-term yields also fall dramatically and the yield curve steepens. The sharp rise and subsequent fall in interest rates is shown in chart 5.

We view this Boom/Bust scenario as a highly plausible way for the current expansion to end. On top of an economy that was already near or beyond full employment and growing above trend, we will soon see the effects of the boost to growth from the tax cut and spending increases recently enacted. A significant upshift in growth, beyond what we have incorporated into our base forecast, is possible. A decline in the unemployment rate below 2½% would surely risk a sharper rise in inflation than is evident in our base projection. The Federal Reserve is already moving to normalize policy, with our base forecast expecting four quarter-point rate hikes this year. Sharply higher GDP growth and inflation and a significantly lower unemployment rate would move the Fed to tighten policy more aggressively. Given the currently somewhat rich valuations of equities, a sharp break in equity values in the face of sharply rising interest rates and a slowing economy is quite plausible. So we view the makings of both a boom and potential bust as already in place. Whether this scenario can be avoided will depend on considerable luck and the adept adjustment of monetary policy. The table below shows some additional details of this Boom/Bust scenario.

																		Q4 / Q4 % change or level at Q4					
	2018.1	2018.2	2018.3	2018.4	2019.1	2019.2	2019.3	2019.4	2020.1	2020.2	2020.3	2020.4	2021.1	2021.2	2021.3	2021.4	2018	2019	2020	2021	2022	2023	2024
Real GDP*																							
Base Solution	1.8	3.2	3.3	3.3	3.1	2.7	2.5	2.3	2.1	2.1	1.9	1.9	1.8	1.8	1.6	1.8	2.9	2.7	2.0	1.7	1.7	1.6	1.6
Boom/Bust scenario	2.1	3.2	4.1	5.2	5.1	4.0	3.2	1.6	-0.7	-3.8	-4.7	-3.0	-0.6	1.0	0.8	2.0	3.7	3.5	-3.1	0.8	2.4	2.9	2.7
Difference	0.3	0.0	0.9	1.9	2.0	1.2	0.7	-0.7	-2.8	-6.0	-6.6	-4.9	-2.4	-0.8	-0.8	0.2	0.8	0.8	-5.1	-1.0	0.7	1.3	1.1
Unemployment Rate**																							
Base Solution	4.1	4.0	3.9	3.7	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.6	3.7	3.5	3.5	3.6	3.8	4.1	4.4
Boom/Bust scenario	4.1	4.0	3.8	3.5	3.0	2.6	2.4	2.4	2.6	3.4	4.4	5.3	6.1	6.6	7.0	7.2	3.5	2.4	5.3	7.2	6.8	5.7	4.9
Difference	0.0	0.0	0.0	-0.2	-0.5	-0.8	-1.1	-1.2	-0.9	-0.1	0.9	1.8	2.6	3.1	3.5	3.6	-0.2	-1.2	1.8	3.6	3.0	1.6	0.5
Core PCE Inflation*																							
Base Solution	2.3	1.9	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.4	2.3	2.3	2.4	2.4	2.4	1.9	2.0	2.3	2.4	2.3	2.2	2.1
Boom/Bust scenario	1.8	2.0	2.2	2.4	2.7	2.9	2.8	2.7	2.5	2.4	2.1	1.8	1.7	1.6	1.7	1.5	2.1	2.8	2.2	1.6	1.4	1.4	1.9
Difference	-0.4	0.1	0.4	0.6	0.8	0.9	0.8	0.5	0.2	0.0	-0.2	-0.5	-0.7	-0.7	-0.7	-0.8	0.2	0.7	-0.1	-0.8	-0.9	-0.8	-0.3
Federal funds rate**																							
Base Solution	1.44	1.72	1.93	2.20	2.46	2.73	2.93	2.97	3.19	3.24	3.44	3.44	3.45	3.45	3.46	3.46	2.20	2.97	3.44	3.46	3.46	3.21	2.96
Boom/Bust scenario	1.44	1.72	2.00	2.54	3.32	4.32	5.12	5.44	5.44	5.04	4.24	3.36	2.41	1.53	0.80	0.18	2.54	5.44	3.36	0.18	0.18	0.18	1.20
Difference	0.00	-0.20	-0.17	0.33	0.87	1.58	2.19	2.47	2.25	1.80	0.80	-0.08	-1.04	-1.92	-2.66	-3.28	0.33	2.47	-0.08	-3.28	-3.28	-3.03	-1.76
10-year T-note yield**																							
Base Solution	2.78	2.94	3.12	3.27	3.40	3.49	3.55	3.60	3.64	3.68	3.71	3.72	3.72	3.72	3.72	3.71	3.27	3.60	3.72	3.71	3.69	3.67	3.67
Boom/Bust scenario	2.73	2.96	3.11	3.37	3.94	4.41	4.74	4.97	5.10	4.90	4.60	4.20	3.75	3.40	3.20	2.95	3.37	4.97	4.20	2.95	2.86	3.12	3.52
Difference	-0.05	0.02	-0.01	0.09	0.53	0.92	1.18	1.37	1.46	1.22	0.89	0.48	0.03	-0.32	-0.52	-0.77	0.09	1.37	0.48	-0.77	-0.82	-0.55	-0.15
S&P 500 Stock Index**																							
Base Solution	2714	2759	2726	2696	2674	2661	2655	2653	2655	2659	2666	2678	2691	2707	2724	2744	2696	2653	2678	2744	2831	2930	3038
Boom/Bust scenario	2668	2748	2803	2860	2859	2830	2547	2292	2063	1960	2390	2510	2643	2734	2783	2917	2860	2292	2067	2582	2789	2900	2987
% Difference	-1.7	-0.4	2.8	6.1	6.9	6.4	-4.0	-13.6	-22.3	-26.3	-10.4	-6.3	-1.8	1.0	2.1	6.3	6.1	-13.6	-22.8	-5.9	-1.5	-1.0	-1.7
Home Prices (CoreLogic)*																							
Base Solution	5.9	4.8	4.7	4.6	4.2	4.1	4.1	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	5.0	4.0	3.0	3.0	3.0	2.6	1.7
Boom/Bust scenario	5.1	4.0	3.7	3.7	2.0	1.0	-4.0	-5.0	-1.0	-1.8	-1.1	-0.9	-0.3	0.4	1.0	1.6	4.1	-1.5	-1.2	0.6	2.4	2.8	3.1
Difference	-0.8	-0.8	-1.0	-1.0	-2.2	-3.1	-8.1	-8.5	-4.0	-4.9	-4.0	-3.9	-3.3	-2.6	-2.0	-1.4	-0.9	-5.5	-4.2	-2.4	-0.6	0.2	1.4
Broad trade-weighted dollar**																							
Base Solution	117.6	117.8	118.2	118.6	119.1	119.4	119.7	119.7	119.6	119.4	119.3	119.2	119.1	119.0	118.9	118.8	118.6	119.7	119.2	118.8	118.0	117.8	118.3
Boom/Bust scenario	117.0	118.4	120.1	121.7	123.5	125.5	127.3	127.5	127.4	126.9	126.3	125.7	124.8	123.5	122.0	120.2	121.7	127.5	125.7	120.2	117.1	114.9	114.8
% Difference	-0.5	0.5	1.6	2.6	3.7	5.1	6.3	6.6	6.5	6.2	5.9	5.5	4.8	3.8	2.6	1.2	2.6	6.6	5.5	1.2	-0.8	-2.5	-3.0

*** Q4 to Q4 percent change**
**** Q4 average**

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