



US Economic Perspectives

Jobless claims claim title for best recession indicator

- Last year was dominated by concerns that the US economy may be near the precipice of a recession. Despite these anxieties, the economy weathered global crosscurrents reasonably well. No place was this resilience more evident than in the unemployment rate, which fell to a fifty-year low, a testament to its reliability as a real-time indicator of recession risks. This lesson is embedded in the now well-known Sahm rule.
- In this note, we argue that because the unemployment rate lags, jobless claims are preferred as a real-time recession indicator, particularly at the onset of the downturn. To show this, we use a receiver operating characteristic (ROC) framework to assess the accuracy of various indicators. This approach shows clearly that both initial and continuing jobless claims are more reliable and timely real-time recession indicators than the unemployment rate. Claims also dominate other popular indicators including the ISM manufacturing index and yield curve slope.
- Our approach finds that continuing claims are the "optimal" indicator, and that a 11.5% rise relative to the minimum over the past year provides the most accurate signal. Historically, this indicator would have correctly identified each recession dating back to the 1960s an average of almost 2 months before the start date, roughly 6 months before the Sahm rule on average.

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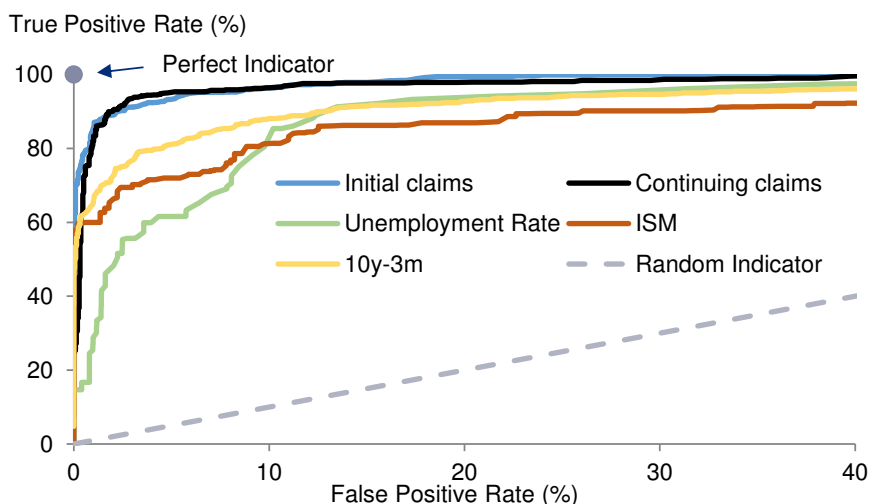
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Figure 1: ROC framework finds jobless claims are preferred recession indicators



Source : BLS, DoL, FRB, ISM, Haver Analytics, Deutsche Bank



Introduction

Last year was dominated by concerns that the US economy may be near the precipice of a recession. Among the signals promoting that possibility, key yield curve recession indicators became deeply inverted, the ISM manufacturing index plunged to sub-50 levels, C-suite confidence crumbled, and there were early signs that this business pessimism was spilling over to labor market decisions as average hours worked and wage growth dipped.

Despite these (at times) widespread anxieties, the economy weathered global crosscurrents reasonably well, no doubt helped by a dissipation of downside risks from trade policy and Brexit late in the year. No place was this resilience more evident than in the unemployment rate, which fell nearly half a percentage point over the year to a fifty-year low. The steady decline in the unemployment rate during a tumultuous period filled with mixed signals about the economy's fate speaks to its reliability as a real-time indicator of recession risks. Indeed, the unemployment rate's dependability is the foundation of the now well-known Sahm rule, which states that a half point rise in the unemployment rate from its low over the past year tends to signal a recession.¹

In this report we argue that jobless claims could well provide a better real-time indicator for recessions, particularly for the onset of a downturn, than the unemployment rate and provide a framework for assessing the performance of various variables for predicting recessions. This approach – a receiver operating characteristic framework – concludes that both initial and continuing jobless claims significantly outperform the unemployment rate in predicting the onset of recessions in a timely manner. We also find that jobless claims meaningfully outperform other popular measures such as the ISM manufacturing index and yield curve slope metrics. Our framework allows us to identify continuing claims as the preferred indicator for assessing real-time recessions risks, and conclude that a rise in continuing claims of 11.5% above the minimum level over the previous year provides the most accurate and timely signal of recession risks.

A case for claims as a real-time recession indicator

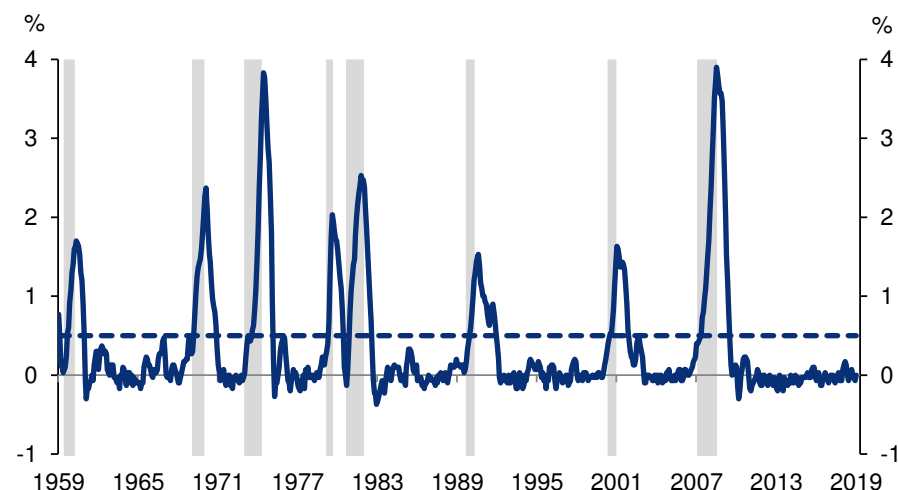
A reliable real-time recession indicator should have three features: (1) subject to minimal revision, (2) updates available in a timely manner, and (3) accurate (i.e., it should limit false positives and negatives). The unemployment rate, which is the foundation for the Sahm rule, satisfies these requirements: it is unrevised, updated at the beginning of each month as part of the BLS jobs report, and, given a proper transformation, can be an accurate indicator of recessions. Indeed, as Claudia Sahm showed, when transformed to consider the current three-month average of the unemployment rate versus the minimum level over the prior twelve months, a half percentage point rise turns out to be a reliable real-time indicator of recession risk. Every post-war recession has coincided with the unemployment rate rise reaching this threshold (Figure 2). This indicator also provides very few false positives, with only a temporary rise above the 0.5 level in November 1976 that did not coincide with a recession. There were two other close calls in 1967 and 2003 when the indicator rose to a level just short of this threshold (0.47) when recessions

¹ Specifically, the Sahm rule considers the three-month moving averages of the unemployment rate in these calculations. See: Sahm, Claudia (May 16, 2019), "Direct stimulus payments to individuals." Chapter three of Recession ready: Fiscal policies to stabilize the American economy, The Hamilton Project.



did not occur.

Figure 2: Sahm rule recession indicator with 0.5pp threshold



Source : FRB, Haver Analytics, Deutsche Bank

However, the unemployment rate is not without its shortfalls as a real-time recession indicator. Since the unemployment rate is a lagging indicator, its rise to the 0.5 percentage point mark typically occurs with some lag versus the start of a recession, as determined ex-post by the NBER. As shown in Figure 3, the Sahm threshold is typically breached about 4 months following the start of a recession, with a range of -1 (i.e., one month prior to the NBER recession date) to 5 months for recessions dating back to the late 1960s. For a similar reason, the unemployment rate does not act as a leading signal that the economy may be imminently entering a recession, a shortcoming that is likely more important from a market perspective.

It is important to note the intent of the Sahm rule was not to identify an optimal real-time recession indicator. Instead, it was aimed at finding a simple and reliable rule of thumb to use for triggering automatic countercyclical fiscal policies. Indeed, Sahm recognized the potential drawback of using the unemployment rate as a real-time recession indicator in her research, stating that “the unemployment rate tends to lag the business cycle, such that unemployment usually peaks after the recession has ended. The slow-moving nature of the unemployment rate implies that it gives little advance warning of recessions.”

Figure 3: Sahm rule tends to lag start of recessions

	Recession						
NBER	Dec-69	Nov-73	Jan-80	Jul-81	Jul-90	Mar-01	Dec-07
Sahm	Nov-69	Apr-74	May-80	Dec-81	Dec-90	Jul-01	May-08
Sahm lag (months)	-1	5	4	5	5	4	5

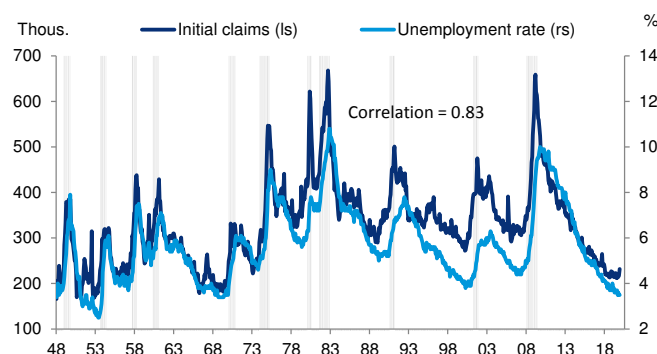
Note: We have reflected the fact that the unemployment rate for a given month is not made available until the following month. Source : Deutsche Bank

The nature of these shortcomings points to a natural alternative to the unemployment rate as a real-time indicator for recession risks – jobless claims. Like the unemployment rate, jobless claims are little revised, timely given that they are updated on a weekly basis, and are likely to be reliable given the high contemporaneous correlation with the unemployment rate (more than 80% at a monthly frequency). However, jobless claims also have the potential to provide a



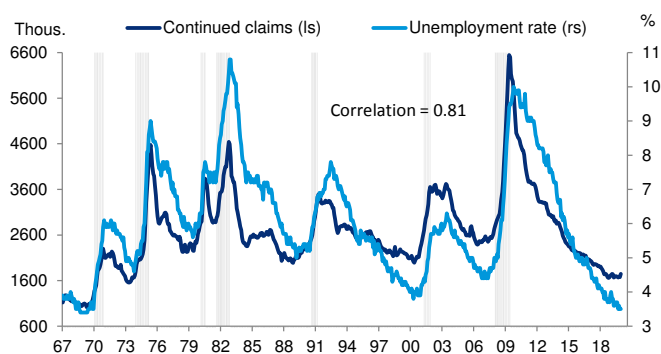
timelier indicator around the start of recessions. Claims tend to lead the unemployment rate, particularly around turning points, with the trough (peak) in claims typically occurring before the trough (peak) in unemployment (see Figures 4 and 5). For example, the contemporaneous correlation between initial jobless claims and the unemployment rate is 83%, but the correlation rises to 88% with a three-month lead for initial claims. Similarly the contemporaneous correlation between continued claims and the unemployment rate is 81%, which rises slightly to 83% with a two-month lead.

Figure 4: Initial jobless claims highly correlated with, and also leads, unemployment...



Source : BLS, DoL, Haver Analytics, Deutsche Bank

Figure 5: ...The same is true for continued jobless claims



Source : BLS, DoL, Haver Analytics, Deutsche Bank

There is a second sense in which jobless claims may provide a better real-time, or even leading, indicator than the unemployment rate. Because jobless claims are weekly, there is only a week lag between the time period of the data and the public release of the data. This compares with about a month between the time period of the unemployment rate and its public release.

Of course, considering jobless claims instead of the unemployment rate as a real-time indicator for the economy also has a potential downside. Claims can be more volatile, with weekly distortions occurring due to weather events, government shutdowns, and difficulties seasonally adjusting the data during certain periods – the floating Thanksgiving holiday is a well-known example. Consequently, to extract a reliable signal from jobless claims, some smoothing is likely required, which could offset some of the leading capabilities relative to the unemployment rate. In the next section we discuss a framework for assessing the performance of these and other potential recession indicators.

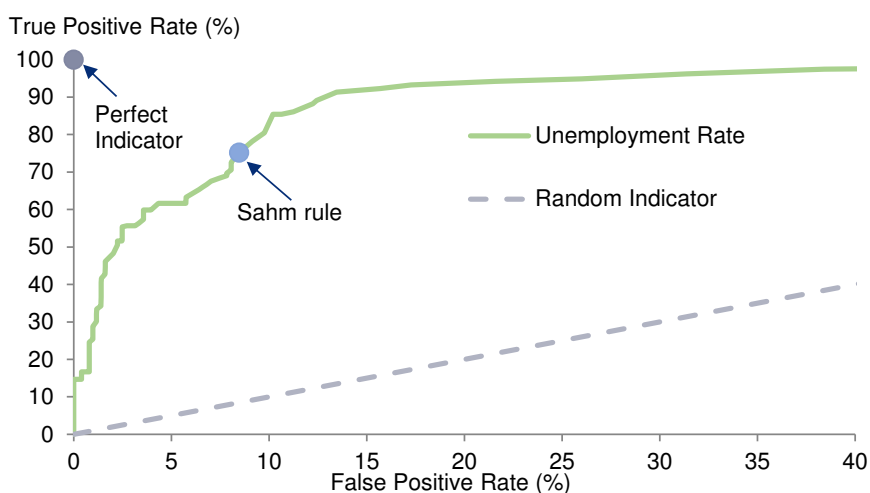
Choosing a metric: A modified receiver operating characteristic (ROC) framework

A recession indicator of the kind we discuss in this piece is essentially setting some threshold for which once the data series crosses that level, then we say the data points to a recession being currently underway. It is important to pick informative and timely data series to predict a recession for all the reasons discussed in the previous section. However, equally important is the level at which the threshold is set. If we set the threshold too liberally, then the data set will correctly predict all recessions but at the cost of many false positive signals. If we set the threshold too stringently, then we run the risk of not calling the recession at all.



Setting the threshold for a given data series involves a tradeoff between the true positive rate (TPR), which records the percentage of time in which we correctly call a recession, and the false positive rate (FPR), which records the percentage of time we incorrectly call a recession. Plotting the FPR on the x-axis versus the TPR on the y-axis for all possible threshold values traces out what is called that data series' receiver operating characteristic (ROC) curve.² By graphically showing the tradeoff between both calling a recession and being able to discern a non-recession correctly for all possible thresholds, the ROC curve very succinctly summarizes an indicator's accuracy.

Figure 6: ROC curve for the unemployment rate



Source : BLS, Haver Analytics, Deutsche Bank

We show the ROC curve for the three-month moving average of the unemployment rate in Figure 6. Each point along that curve represents the FPR and the TPR for a given threshold over the minimum over the past twelve months. For example, the indicated point on the graph corresponds to the Sahm rule, which says a recession is in effect when the three-month moving average of the unemployment rate is 50bps above the minimum level over the past 12 months. Another point on the curve would represent a different threshold, say 30bps above the minimum over the past 12 months, which would have a different predictive ability (FPR and TPR).

Clearly, the Sahm rule does have some significant recession indicating ability. Compared to randomly calling a recession 8.5% of the time (which would give a TPR and FPR of 8.5%), the Sahm rule is able to get a 75.2% hit rate. However, there may be some scope for improvement. As discussed above, the lower than perfect recession predicting power of the Sahm rule stems largely from it missing the start of recessions. Relative to the Sahm point in Figure 5, a better recession indicator would either be located above (a higher TPR for a given FPR) or to the left (accomplish a given TPR but with a lower FPR). The perfect recession indicator would be up in the top left corner with 100% TPR and 0% FPR. Therefore to evaluate a data series' recession indicating abilities as a whole across different thresholds, we want to look for ROC curves that hug the upper-left part of the graph.

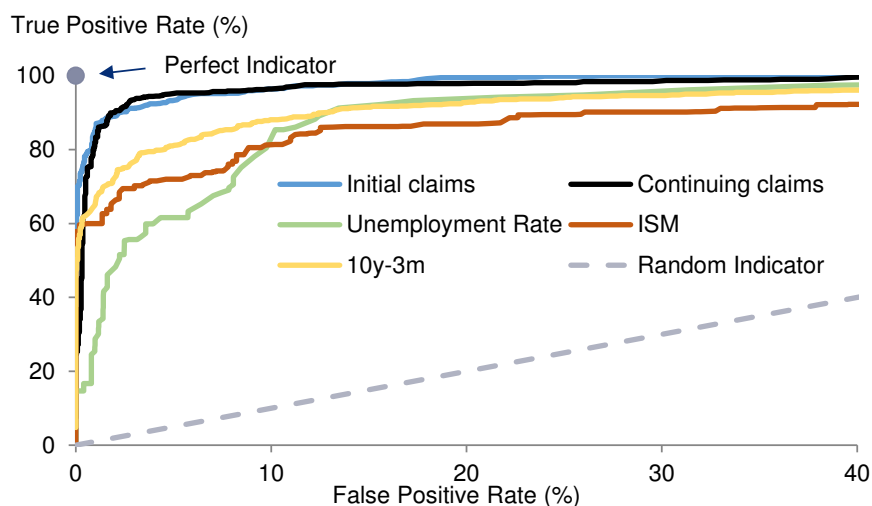
² We make a small modification to this framework in order to not overly penalize data series that have slight leading or lagging properties. For more details, please refer to Annex A.



Constructing ROC curves for different indicators

We construct ROC curves for several different indicators: the three-month moving average of the unemployment rate relative to its minimum over the past 12 months as discussed above; the 4-week moving average of initial unemployment claims relative to its minimum over the past 12 months; the 4-week moving average of continuing unemployment claims relative to its minimum over the past 12 months; the three-month moving average of the level of the manufacturing ISM; and the 4-week moving average of 10y-3m Treasury spread (lagged by 52-weeks to capture the leading properties of the yield curve).³

Figure 7: ROC curves for major indicators



Source : BLS, DoL, FRB, ISM, Haver Analytics, Deutsche Bank

We show the ROC curve for each of these series in Figure 7. Jobless claims, either initial or continuing, dominate the other series in terms of recession indicating ability in that they are able to achieve higher hit rates for a given level of false positives. This outperformance can be seen easily by the fact that these lines are uniformly closer to the upper-left part of the graph. Remember, this is not a statement about the relative accuracy of particular values for thresholds. For example, there exists some thresholds in which, for a given FPR, the ISM is a more accurate recession indicator than the unemployment rate. There are also thresholds where the reverse is the case. However, regardless of how sensitive we set our thresholds, jobless claims do a better job at indicating a recession than the unemployment rate, ISM, and the yield curve.

"Optimal" recession indicators

The analysis in the previous section provides a framework to determine which data series are generally better recession indicators. However, further narrowing the scope to the best threshold at which to declare a recession involves making a judgement about the tradeoff between false and true positives. For each indicator, we take the "optimal" threshold level to be that which has a TPR and FPR closest

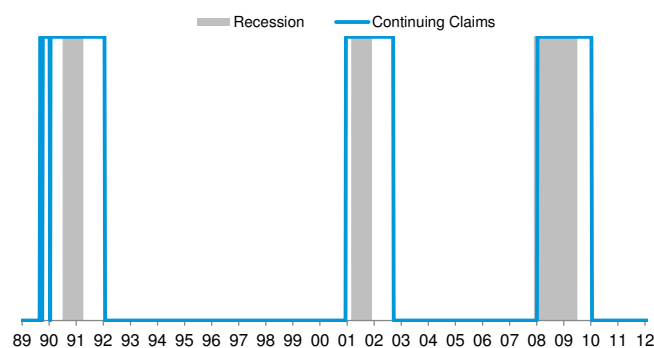
³ We could also change the lookback period over which the minimum is compared to. We generally found that a one-year lookback period performed the best.



to the perfect indicator point.⁴ This metric balances the tradeoff between true positives and false positives. Obviously, a metric that puts different weights on true versus false positives would yield different “optimal” thresholds.

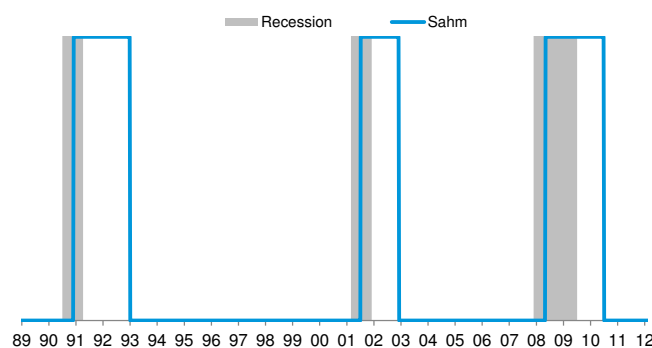
According to this metric, the optimal thresholds to declare a recession are when the 4-week average is 14.1% and 11.5% above the minimum over the last year for initial and continuing claims, respectively. These thresholds produce a 95.0% TPR with a 6.0% FPR for initial claims and 94.4% TPR and 3.7% FPR for continuing. For comparison, the TPR and FPR for the Sahm rule as mentioned above are 75.2% and 8.5%, respectively. Therefore, the ROC framework reveals that both initial and continuing jobless claims outperform the unemployment rate whether the threshold is set according to the Sahm rule.

Figure 8: Recession indication from continuing claims



Source : DoL, Haver Analytics, Deutsche Bank

Figure 9: Recession indication from Sahm rule



Source : BLS, Haver Analytics, Deutsche Bank

Interestingly, the optimal threshold for the unemployment rate is about 23bps, which produces a TPR and FPR of 91.3% and 13.5%, respectively. This suggests that the Sahm rule of 50bps is set somewhat too stringently in terms of indicating recessions. To be fair, the Sahm rule was not necessarily developed to accurately predict the onset of a recession. Rather, it was intended to be used as the trigger for automatic stabilizers that would be deployed when the economic situation became sufficiently dire. Having automatic stabilizers kicking in for only minor bumps may not be desirable from a policy design perspective, and thus may warrant setting a more conservative threshold.

To get a sense of exactly how jobless claims outperforms the Sahm rule, Figures 8 and 9 show the periods for which the recession indicator would be turned on for continuing claims (based on the optimal threshold) and the Sahm rule, respectively. While the Sahm rule tends to begin to predict a recession several months following the ex-post date declared by the NBER – which is not surprising given that earlier we noted the average lag was about four months – continuing claims has predicted a recession either contemporaneously with the ex-post NBER date or a few months prior to that date. While the signal from the unemployment rate would be more timely if we used the “optimal” threshold of a 0.23pp rise rather than the Sahm rule, the unemployment rate’s lagging properties would continue to point to a delayed signal, and a lower threshold results in the indicator remaining turned “on” for too

4 We use the Euclidean distance from the point (0,100). For a point (FPR, TPR), this is $\sqrt{(FPR-0)^2 + (TPR-100)^2}$.



long after the conclusion of the recession (Figure 10).

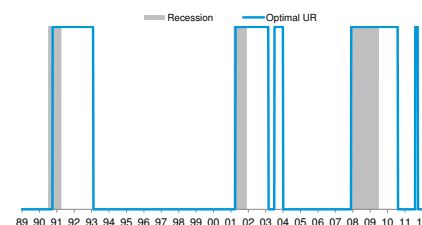
Figure 11 takes Figure 2 and adds the recession indicating ability of initial and continuing claims. The claims data seems to a better job at accurately indicating a recession. While on average the Sahm rule indicates a recession about 4 months too *late*, initial claims indicates a recession about a month early on average, with continuing claims sounding a warning even earlier (almost two months).⁵

Figure 11: Claims data a better real-time indicator of recession

	Recession						
NBER	Dec-69	Nov-73	Jan-80	Jul-81	Jul-90	Mar-01	Dec-07
Sahm	Nov-69	Apr-74	May-80	Dec-81	Dec-90	Jul-01	May-08
Sahm lag (months)	-1	5	4	5	5	4	5
Initial claims	Nov-69	Nov-73	Jul-79	Sep-81	Aug-90	Nov-00	Dec-07
Initial claims lag (months)	-1	0	-6	2	1	-4	0
Cont. claims	Nov-69	Dec-73	Sep-79	Nov-81	Sep-89	Dec-00	Jan-08
Cont. claims lag (months)	-1	1	-4	4	-10	-3	1

Source : BLS, DoL, Haver Analytics, Deutsche Bank

Figure 10: Recession indication from optimal unemployment rate threshold



Source : BLS, Haver Analytics, Deutsche Bank

Conclusion: The case of continuing claims

The preceding analysis concludes that initial and continuing jobless claims are superior recession indicators. Between the two, we prefer continuing claims for several reasons, despite initial claims having a marginally higher TPR. First, in analysis not shown here, continuing claims proved to be the more robust indicator across several "look back" windows, with its relative accuracy properties maintained even if the window for calculating the minimum was shortened to six months. Second, continuing claims tend to be less volatile than initial claims, which as noted above, can be significantly distorted by weather events, government shutdowns, and seasonal adjustment issues. Third, continuing claims seems to be a more efficient indicator in that it is able to generate roughly the same TPR as initial claims, but with half the false positives.

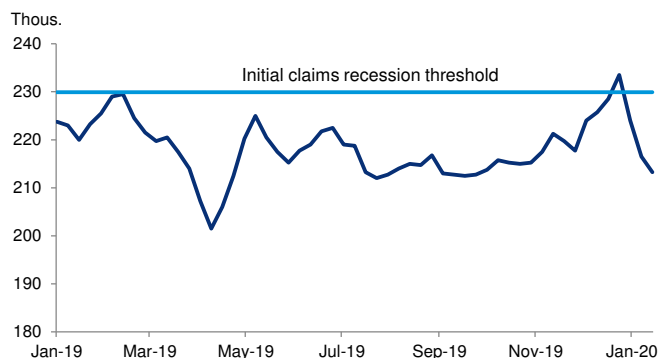
A final reason to prefer continuing claims is that, in our view, it currently presents a more sensible picture of recession risks. The current recessionary levels based on the optimal thresholds are 230k for initial claims and 1854k for continuing claims. While initial claims breached this level in December 2019 due to difficulties seasonally adjusting the data around the moveable Thanksgiving holiday, the most recent four-week moving average of continuing claims of 1758k remains well below its recessionary level (Figures 12 and 13).

⁵ Because the recession indicators can flip between on and off, how you define the start of recession could impact the timing of the recession signal. We use a rule of thumb that the start of the recession signal from an indicator is when it continuously (on a monthly basis) signals a recession through the NBER-defined start date.

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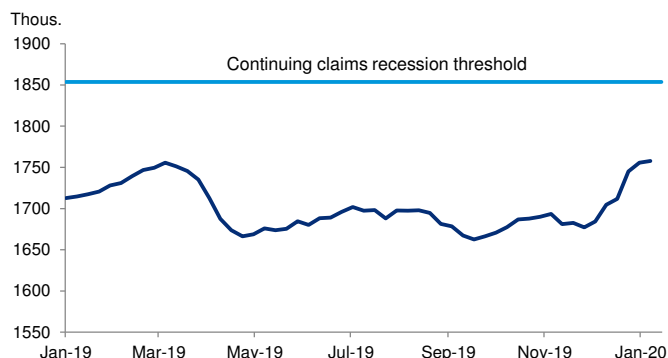


Figure 12: Initial claims breached recession threshold...



Source : DoL, Haver Analytics, Deutsche Bank

Figure 13: ...but continuing claims remain well shy of their threshold level



Source : DoL, Haver Analytics, Deutsche Bank

Looking ahead, our analysis suggests that continuing claims should receive significantly more attention as a real-time indicator of the economy's health. In this context, persistently low continuing claims points to a continuation of this record-long expansion over the coming quarters.

Annex A

The standard ROC framework is depicted in Figure 14. This framework takes an instrument that is making a prediction, recession or no recession, and compares it to what actually happens, recession or no recession. Based on the combinations of predictions and actuality, there are four possible combinations, we correctly call a recession (True Positive), we correctly call a non-recession (True Negative), we incorrectly call a recession (False Positive), or we incorrectly call a non-recession (False Negative). The standard ROC curve summarizes these combinations by plotting the False Positive Rate (FPR) versus the True Positive Rate (TPR). The former is the amount of time we incorrectly call a recession relative to the total amount of time in which there is not a recession, and the latter is the amount of time we correctly call a recession relative to the total amount of time that there is a recession.

Figure 14: Standard ROC Framework

		Actual	
		Recession	No Recession
Predicted	Recession	True Positive	False Positive
	No Recession	False Negative	True Negative

Source : Deutsche Bank

There are a couple reasons why this framework is not fully satisfying for our purposes. The first is that the NBER Recession Dating Committee does not really have a set criterion as to what constitutes a recession: "The Committee applies its judgment based on the above definitions of recessions and expansions and has no fixed rule to determine whether a contraction is only a short interruption of an expansion, or an expansion is only a short interruption of a contraction." As such, there is some uncertainty around the start and ending of a recession. We should, therefore, not necessarily penalize an indicator for flashing red if there is some chance that a recession is actually triggered in that particular period.

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Second, a recession indicator that goes off (somewhat) early is ex ante not necessarily a bad thing. While the point of the exercise is to generate an accurate sense of whether the economy is currently in a recession, forewarned is forearmed. For example, we might prefer an indicator that gives some false positives a month or so early rather than one that gives false negatives a couple months into a recession. Similarly, given that the last three recessions have been followed by so-called "jobless recoveries", we may not want to sound the all clear as soon as the NBER Recession Dating Committee does. Despite the label of no recession, the first couple months into a jobless recovery could look a lot like a recession.

As such, we make a small modification to the standard ROC framework, which is summarized in Figure 15. The situation in a recession and during the bulk of an expansion are identical to the standard ROC framework. However, we make adjustments six months on either side of a recession. For our modified True Positive Rate, we take the sum of True, Early, and Delayed Positives as a share of that and False Negatives. For our modified False Positive Rate, we take the False Positives as a share of False Positives and True Negatives.

Figure 15: Modified ROC Framework

		Actual			
		Recession	Recession w/in 6mo	No Recession Recession < 6m ago	Other
Predicted	Recession	True Positive	Early Positive	Delayed Positive	False Positive
	No Recession	False Negative	True Negative	True Negative	True Negative

Source : Deutsche Bank

In the modified ROC framework, it is still most ideal for an indicator to perfectly predict recessions. However, relative to the standard framework, "false" positives up to six months before or after a recession are punished less than the false positives that occur in the middle of an expansion.

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Appendix 1

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*Other information available upon request

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Derivative transactions involve numerous risks including market, counterparty default and illiquidity risk. The appropriateness

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