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Rethinking the Value of Initial Claims as a Forecasting Tool

Margaret M. McConnell

The weekly numbers on initial claims for unemployment insurance convey key information about the labor market. But how reliable are claims in predicting changes in the much anticipated monthly employment report? According to a simple forecasting model, claims consistently send an accurate signal about employment during recessions but not during expansions.

At approximately 8:30 a.m. each Thursday, the Employment and Training Administration of the U.S. Department of Labor releases a report on the number of U.S. workers who filed an initial claim for unemployment insurance in the previous week.[1] Analysts pay close attention to what these weekly numbers might imply for the monthly employment report: A surge in the number of claims is thought to signal a rise in layoffs and a weakening employment picture.[2] By contrast, a decline in claims is interpreted as an indication that the employment situation may be improving.

At first glance, the use of initial claims—a timely measure of layoffs—to assess the health of the job market seems to make sense. And in some instances, initial claims do reveal much about the upcoming employment report. Over the years, however, initial claims have also been known to send misleading signals about employment. One notable example of a prolonged breakdown in the claims-employment relationship occurred in 1996. Early in that year, a slowing in employment growth was preceded by reports of relatively low initial claims. Then, after employment had begun to recover, initial claims started to rise. A more recent example occurred with the release of the February employment numbers in March of this year; despite reports of low levels of initial claims in most of February, employment dropped by 36,000 jobs.

Do such episodes occur randomly, or is there a pattern to claims' failure to predict employment fluctuations? This edition of *Current Issues* compares the accuracy of a simple forecasting model that incorporates initial claims with the accuracy of a forecasting model that excludes initial claims. Interestingly, we find that the reliability of claims in predicting employment fluctuations depends on the state of the business cycle. In our model, claims serve as a useful tool for forecasting employment during recessions. Very early on in economic expansions, however, our model loses its predictive power, and claims actually worsen forecast accuracy.

Given the composition of the employment numbers, this finding is not altogether surprising. Unemployment claims are an important measure of layoffs. However, changes in employment depend on both layoffs *and* hiring. During a recession, these variables appear to be related in a significant way. In particular, when hiring falls early in a recession, layoffs tend to rise, and toward the end of a recession, when hiring begins to recover, layoffs generally fall. During an expansion, however, this inverse relationship between layoffs and hiring disappears, and hiring becomes the most important factor in determining changes in employment. Accordingly, the power of claims to predict employment changes is likely to be relatively weak during periods of sustained growth.

The Cyclical Nature of the Claims-Employment Relationship

As a starting point for our statistical analysis, we look at a plot of initial claims and the change in payroll employment over the 1952-97 period (Chart 1). A superficial look at the chart shows that at many points the two series move inversely—when claims are falling, the change in employment is rising, and when claims are rising, the change in employment is falling. This apparent inverse relationship suggests that claims may be a useful tool for forecasting employment fluctuations.

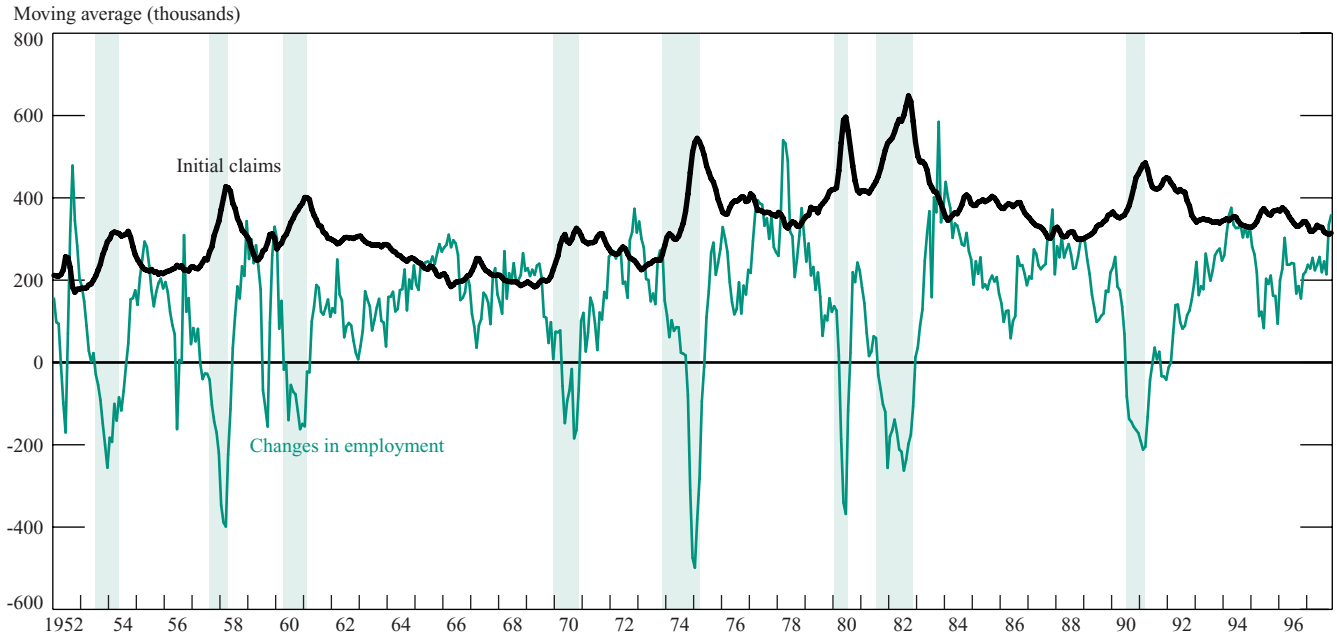
By thinking about our sample in terms of recessions and expansions, however, we can see that the strength of this inverse relationship appears to be linked to the state of the economy. During recessions, spikes in claims and troughs in employment tend to coincide (Chart 1, shaded areas). In contrast, when we track the employment-claims relationship during expansionary periods alone, it is difficult to discern any clear pattern in the relative movements of the two series. If no such pattern exists, then we would not expect initial claims to be a useful predictor of employment fluctuations during expansions.

Is there evidence beyond our casual observation to support the hypothesis that the predictive power of claims varies according to the business cycle? To answer this question, we compare the accuracy of a forecasting model of employment growth in which employment fluctuations are predicted only by past values of employment fluctuations with the accuracy of a model in which employment fluctuations are predicted by past values of employment *and* the current value of initial claims.[3] (To predict employment changes in a particular month, we include claims released during that month.) If our hypothesis is correct, we would expect the addition of claims to lower forecast accuracy during expansions and increase forecast accuracy during recessions.

When we track the employment-claims relationship during expansionary periods alone, it is difficult to discern any clear pattern in the relative movements of the two series.

Our measure of accuracy for each forecasting model is the root-mean-squared error (RMSE) of the model.[4] The RMSE is a means of summarizing the magnitude of forecast "misses"—that is, the extent to which the variable's forecasted value deviates from its actual value—over time. The variable we are forecasting in each

Chart 1
Initial Claims for Unemployment Insurance and Changes in Payroll Employment



Source: U.S. Department of Labor, Employment and Training Administration and Bureau of Labor Statistics.

Notes: The chart plots the three-month centered moving averages of seasonally adjusted data. The shaded areas denote periods designated recessions by the NBER.

Initial Claims as a Forecasting Tool

	Root-Mean-Squared Error		
	Full Sample	Expansions	Recessions
Forecast without claims	169.3	166.4	182.8
Forecast with claims	172.9	177.4	148.6
Difference (with claims – without claims)	-3.6	-11.0	34.2
Memo:			
Probability that difference is due to random chance (percent)	56	9	1

Note: The memo section of the table reports the statistical significance of the difference in the root-mean-squared error for each of the three cases.

model is the change in monthly employment (in thousands of workers), so the RMSE provides us with a measure of how close, on average, our forecasts come to predicting the actual value of this change.

For the full sample, we find that the inclusion of claims worsens the accuracy of the forecast slightly (see table). The magnitude of error in the forecast that includes claims is higher than the magnitude of error in the forecast that does not—172.9 compared with 169.3, or a difference of 3.6 (column 1). As noted, the variable being forecast is the change in the number of workers in thousands, so that the inclusion of claims lowers the accuracy of the forecast for the full sample by about 3,600 jobs. Given that the average monthly change in employment over the full sample is roughly 138,000 workers, this reduction in accuracy seems small. Nonetheless, this finding provides support for those who question the predictive power of initial claims.[5]

Next, we determine whether the forecasting performance of the two models depends on whether the economy is in a period of recession or in a period of expansion. By calculating the RMSE for all months belonging to expansionary periods and for all months belonging to recessions, we find strong evidence that the predictive power of claims varies over the course of the business cycle.[6] For expansions alone, the use of initial claims makes the forecast substantially less reliable—the root-mean-squared error rises from 166.4 to 177.4—a forecast miss of about 11,000 jobs (column 2). During recessions, however, the inclusion of initial claims in the forecast proves useful—the root-mean-squared error drops from 182.8 to 148.6. This reduction improves the forecast by about 34,000 jobs, a fairly sizable increase in accuracy.

A crucial step in any empirical exercise is to assess the statistical significance of the results. In other words, what is the probability that the differences in forecasting power uncovered during expansions and recessions are attributable to random chance or sampling error?[7] A probability of greater than 10 percent indicates that the result is not reliable, while a probability of 10 percent or less suggests that the result is reliable.[8]

We evaluate the statistical significance of the results for all three of our RMSE calculations—the full sample, expansions alone, and recessions alone. For the full sample, there is a probability of 56 percent that the reduction in forecast accuracy caused by using claims is due to random chance or sampling error (memo section of table). This finding means that there is little we can say with certainty about the usefulness of claims in forecasting employment over the full sample; while claims do not aid in the forecast, neither do they hurt it in a statistically significant way.

For the periods of recession and expansion considered separately, however, the changes in accuracy caused by including claims in the employment forecast are in fact statistically significant. During expansions, the probability that the reduction in forecast accuracy is due to random chance or sampling error is only 9 percent. We uncover even stronger support for the finding that claims are a valuable tool in forecasting employment fluctuations during recessions—the chance that the improvement in the forecast is attributable to random error is only 1 percent.

We uncover [strong] support for the finding that claims are a valuable tool in forecasting employment fluctuations during recessions—the chance that the improvement in the forecast is attributable to random error is only 1 percent.

According to our model, then, relying on claims to predict employment changes is only advisable during recessions. At these times, forecasters will learn more about the upcoming employment report by looking at claims than they will learn by looking at the past behavior of employment itself. Using claims during expansions, however, is likely to be much less informative. In fact, for our simple specification of the employment forecast, the use of claims actually adds noise to the forecast and therefore reduces its accuracy.[9] Of course, it is possible that our results may not be robust to more complicated specifications. The model, however, does suggest that a certain degree of skepticism about claims' predictive power is warranted.

An Economic Explanation

To pinpoint why claims weaken our forecast of employment fluctuations during expansions but improve it during recessions, we look at the sources of change in employment. Employment can fluctuate for one of three reasons: firms are hiring workers, firms are laying off workers, or workers are quitting of their own accord.[10] To simplify matters, assume that relatively few workers quit and thus that employment fluctuates only as a result of hiring or layoff activity.[11]

Claims provide us with a glimpse into the layoff side of the labor market. To complete the employment picture, however, we need to analyze the behavior of the labor market's other main component—hiring—over the course of the business cycle. To this end, we construct a plot of hiring and claims over our sample (Chart 2).[12] Note that during recessions claims are generally rising while hiring is falling, and vice versa. Essentially, during these periods both variables "tell the same story" about the labor market, and the effects of layoffs on employment are not being offset by new hires. Because of this strong inverse relationship between claims and employment changes during recessions, the model that includes claims provides valuable information about the upcoming employment report.

During upturns, however, the systematic relationship between claims and hiring found during recessions virtually disappears, suggesting that layoffs are being driven by factors that differ from those driving hiring decisions. In addition, the chart shows that hiring fluctuates much more than claims, indicating that movements in hiring are the dominant force behind fluctuations in employment. Because hiring overshadows claims and because claims move independently from hiring, claims alone cannot tell us much about the upcoming employment report.

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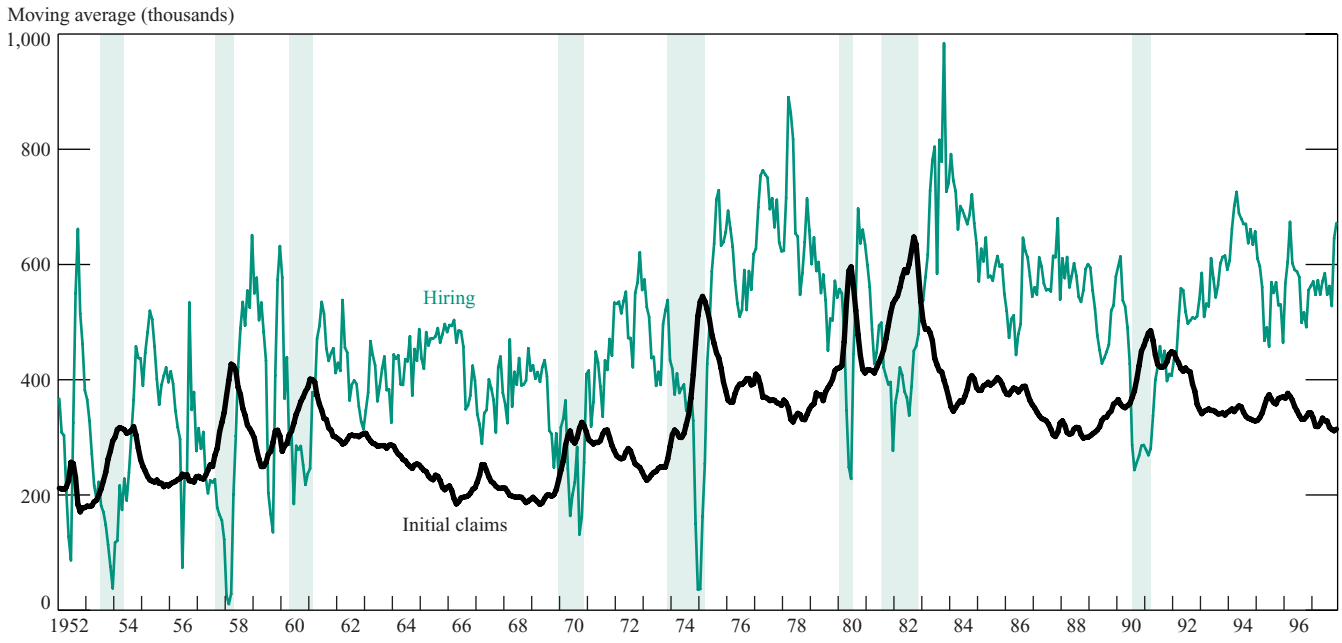
Economic theory offers one possible explanation for the fact that claims and hiring are closely related during downturns but not during upturns. Because training new employees can be expensive, firms are often reluctant to fire workers as a way to cut costs and will tend to do so only when no other option is available (Fay and Medoff 1985; Burnside, Eichenbaum, and Rebelo 1993). During

Chart 2
Hiring and Initial Claims for Unemployment Insurance



Source: U.S. Department of Labor, Employment and Training Administration and Bureau of Labor Statistics.

Notes: The chart plots the three-month centered moving averages of seasonally adjusted data. The shaded areas denote periods designated recessions by the NBER.

expansions, when hiring rates are high, firms are more likely to adjust to a slowdown in economic activity by hiring fewer workers than by laying off existing workers. This is not to say that layoffs do not occur during upturns. Such layoffs, however, are likely to be the result of the poor performance of individual workers or firms and thus will tend to be unrelated to overall trends in the labor market. The episodic nature of layoffs during expansions turns initial claims into a noisy and unreliable predictor of employment fluctuations.[13]

By contrast, during recessions, many firms seek to reduce the number of employees on their payrolls. In implementing such cutbacks, these firms will be forced to hire fewer (if any) new workers and to lay off part of their existing workforce. Thus, during these periods, hiring and claims generally move inversely. Because of this close relationship, claims will provide valuable information about the upcoming employment report.

Conclusion

Overall, initial claims do not reliably predict changes in monthly payroll employment in our simple statistical model. Only during recessions do initial claims appear to be valuable in forecasting employment. In the specification used here, the inclusion of claims in the forecast of employment during expansions actually decreases the accuracy of the forecast in a statistically significant way.

One plausible explanation for this result is that hiring activity tends to be high during upturns. Consequently, firms are more likely to respond to a slowdown in activity by hiring fewer workers than by laying off workers. As a result, movements in layoffs are generally not related to hiring. Moreover, hiring is more variable than layoffs during expansions and therefore accounts for the bulk of labor market activity. During downturns, however, firms that have already slowed hiring considerably, or even ceased to hire, are likely to respond to declines in demand by firing or laying off workers. At these times, claims prove to be a good predictor of monthly employment fluctuations.

The implications of our results are fairly straightforward. Initial claims, as a timely measure of layoffs, supply analysts with useful information about the labor market throughout the business cycle. Nonetheless, some discretion in interpreting the numbers is in order. During recessions, month-to-month movements in claims are closely linked to month-to-month changes in payroll employment. During expansions, however, claims are much less likely to send an accurate signal about the upcoming employment report.[14]

Notes

1. The weekly initial claims report indicates the number of people who have requested unemployment insurance, rather than the number who have actually been approved. Certain restrictions relating to the size of the former employer, the nature and length of the contract between the worker and employer, the location of the employer, and other factors affect eligibility. As a general rule, however, an individual is entitled to collect unemployment insurance if he or she has been laid off involuntarily.

2. The release of the monthly payroll employment report often generates sizable fluctuations in the prices of bonds, stocks, and foreign exchange. Fleming and Remolona (1997) show that the announcement of the monthly employment report affects both bond prices and trading activity more dramatically than do other types of announcements. Harris and Zabka (1995) discuss the attention given the U.S. employment report in foreign exchange markets.

3. The precise specifications for the one-month-ahead forecasts are $\Delta Emp_t^{f1} = \beta_0 + \sum_{i=1}^{12} \beta_i \Delta Emp_{t-i} + \varepsilon_t$, and

$$\Delta Emp_t^{f2} = \alpha_0 + \sum_{i=1}^{12} \alpha_i \Delta Emp_{t-i} + \gamma Claims_t + \upsilon_t.$$

The forecasts are computed using revised monthly data on both claims and employment over the period from January 1952 to November 1997. The use of revised data is not strictly correct; forecasters do not have this revised data at the time they compute their forecasts. No attempt was made to construct a real-time data set with unrevised data because such an exercise is extremely costly and is unlikely to affect the qualitative nature of the results. Finally, ours is an admittedly simple specification, and it is possible that the results may not be robust to alternative or more complicated specifications.

4. The RMSE is defined in the following way: $RMSE = \sqrt{\frac{1}{T}\sum_{t=1}^{T}(Y_t^f - Y_t^a)^2}$, where Y_t^f is the forecasted value of employment changes and Y_t^a is the actual value of employment changes.

5. One journalist's description of initial claims as a "a closely watched if not always reliable gauge of the strength of the labor market" is indicative of this measure's uncertain reputation (*Wall Street Journal*, December 20, 1996, p. A2).

6. To compute separate RMSEs for expansions and recessions, we take the forecast errors computed for each time period and separate them according to whether they belong to a period of expansion or a period of recession.

7. To statistically compare the accuracy of the employment model including claims with the accuracy of the model excluding claims, we use a test described in Diebold and Mariano (1995).

8. The choice of 10 percent, while typical, is subjective.

9. As a robustness check, two alternative specifications were considered. First, we repeated the exercise using the average value of claims for the middle two weeks of the month, since the employment survey is taken during the pay period that includes the twelfth of the month. Second, we repeated the exercise using seasonally unadjusted data. In these alternative specifications, claims

Note 9 continued
continued toreduce forecast accuracy during expansions, but the result was no longer statistically significant.

10. For the purposes of this article, the term "layoff" is defined as any employment termination that allows a worker to file an initial claim.

11. Unfortunately, we lack the data necessary to determine how small quits are relative to hiring. However, quits are likely to be very small during recessions because workers are presumably less confident of their ability to find a new job.

12. The change in employment equals hirings minus firings. To arrive at a rough measure of hiring, we added the number of initial claims back into the change in employment.

13. Other factors may add to the unreliability of claims as a predictor of employment. For example, seasonal layoffs and state-level changes in the eligibility requirements for filing an initial claim affect claims. In addition, both claims and employment are adjusted using different seasonal factors. These considerations, however, are not likely to influence claims on a cyclical basis.

14. One key question is whether the economy is in an expansion or a recession. A possible area for future analysis is whether changes in the tracking ability of the employment model presented can be used as a cyclical indicator. Conceivably, an improvement in the model associated with a rising trend in claims and a falling trend in employment may suggest the onset of a recession. Conversely, a degradation in the model associated with a falling trend in claims and a rising trend in employment may suggest the start of an expansion. Fleshing out this hypothesis to see if it is useful for the forecaster, however, would involve reworking the model with real-time data rather than the revised series used here.

References

Burnside, Craig, Martin Eichenbaum, and Sergio Rebelo. 1993. "Labor Hoarding and the Business Cycle." *Journal of Political Economy* 101, no. 2 (April): 245-73.

Diebold, Francis X., and Roberto S. Mariano. 1995. "Comparing Predictive Accuracy." *Journal of Business and Economics Statistics* 13, no. 3 (July): 253-63.

Fay, John, and James Medoff. 1985. "Labor and Output over the Business Cycle: Some Direct Evidence." *American Economic Review* 75, no. 4 (September): 638-55.

Fleming, Michael J., and Eli M. Remolona. 1997. "What Moves the Bond Market?" Federal Reserve Bank of New York *Economic Policy Review* 3, no. 4 (December): 31-50.

Harris, Ethan S., and Natasha M. Zabka. 1995. "The Employment Report and the Dollar." Federal Reserve Bank of New York *Current Issues in Economics and Finance* 1, no. 8.

About the Author

Margaret M. McConnell is an economist in the Domestic Research Function of the Research and Market Analysis Group.

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