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Risk Implication of Unemployment and Underemployment

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This article summarizes some key points of the research paper entitled Risk Implication of Unemployment and Underemployment. The paper can be found at *http://www.soa.org/Research/Research-Projects/Risk-Management/2015-risk-implications-unemployment-underemployment.aspx.*

The labor market is a critical part of the economic system. Labor is one of the key factors of production, and the employment income earned by labor resources is an important source of income. It affects many aspects of the economy, including consumption, savings, real interest rates, and fiscal policies. Unemployment, as one of the key issues that macroeconomic policies address, is a reflection of the mismatch between supply and demand in the labor market. It has a direct impact on consumption, savings, production, and investment. The unemployment rate is used by policy makers to measure economic activities and social stability. The term "underemployed," which is not included in the standard unemployment rate, refers to involuntary part-time workers or overqualified workers. Like unemployment, underemployment reflects the labor market oversupply, and because of its impact the insurance industry, as part of the economic system, is exposed to the uncertainty of labor market.

For insurance companies, unemployment and underemployment are important not only because of their impact on the economic assumptions, but also their direct impact on the insurance business. **A deep understanding of unemployment and underemployment can help actuaries in economic forecasts, insurance assumptions and risk management.**

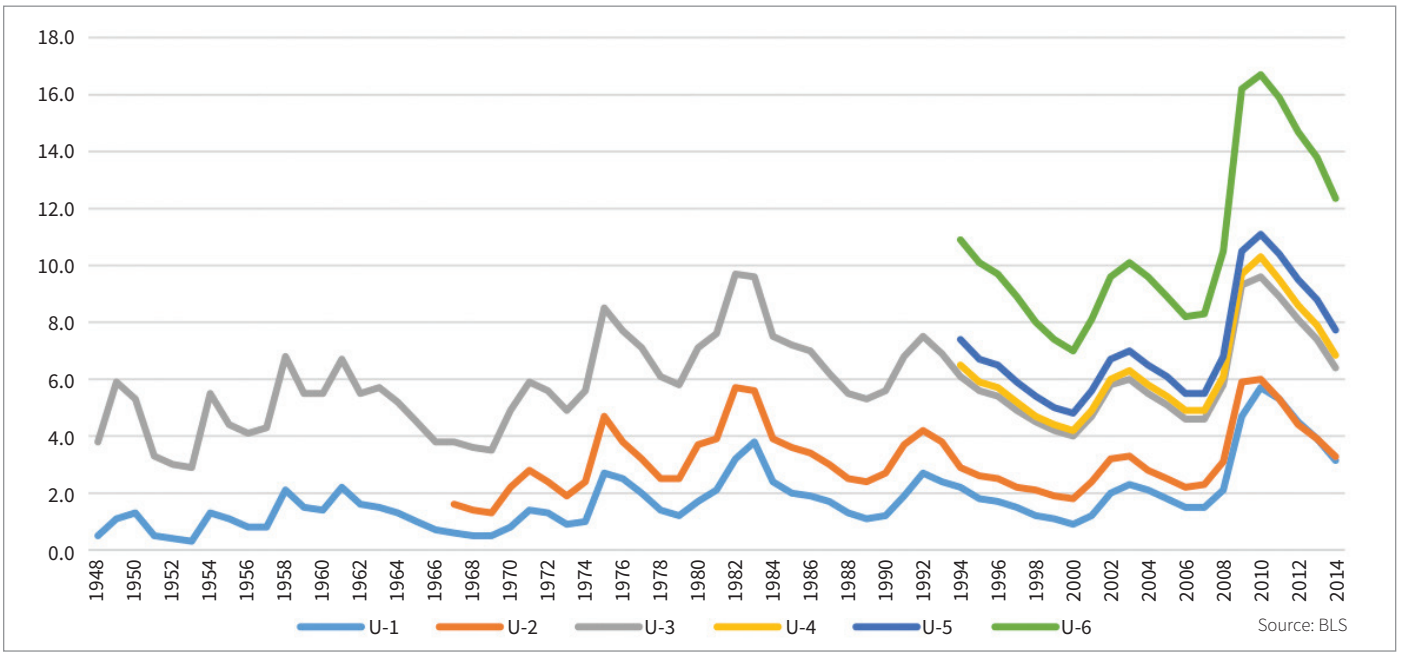
UNEMPLOYMENT RATE AND UNDER-EMPLOYMENT RATE

The Bureau of Labor Statistics (BLS) publishes six different measures of labor underutilization on a monthly basis:

1	U-1 Rate:	Persons unemployed 15 weeks or longer / Labor force
2	U-2 Rate:	Persons who lost jobs+ Persons who completed temporary jobs / Labor force
3	U-3 Rate:	Unemployed / Labor force), the official unemployment rate
4	U-4 Rate:	Unemployed+Discouraged workers[1] / Labor force+Discouraged workers
5	U-5 Rate:	Unemployed+Marginally attached workers[2] / Labor force+Marginally attached workers
6	U-6 Rate:	Unemployed+Marginally attached workers+Involuntary part time workers / Labor force+Marginally attached workers

Figure 1 shows the historical value of the six measures from 1948 to September 2014 when available. The difference between the U-6 rate and U-5 rate can be considered as a measure of time-related underemployment.

Figure 1
Alternative Measures of U.S. Labor Underutilization (Percent)



The six measures turn out to be highly correlated based on the experience data. Therefore, even though the official unemployment rate (U-3 rate) does not encompass everything we want, it can serve as an indicator of changes in other components.

CURRENT MODELING PRACTICE

A survey of unemployment and underemployment modeling practices in the actuarial community was conducted. The use of unemployment and underemployment information in assumption setting is limited, according to the survey result shown below.

Figure 2
Survey Result for Unemployment

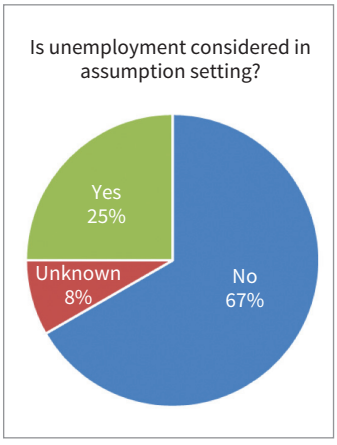
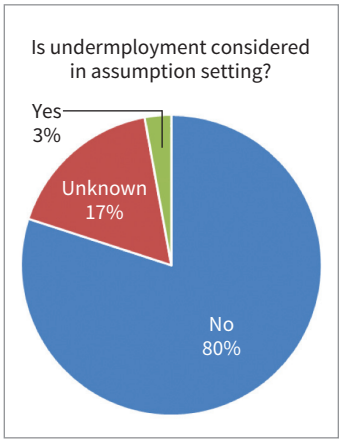


Figure 3
Survey Result for Undermployment



A possible explanation is the high correlation between the labor market and the overall economy. When considering other economic variables, the impact of unemployment and underemployment is incorporated implicitly to a certain extent. The lack of popularity of using information on unemployment and underemployment in actuarial modeling presents an opportunity for further improvement.

ECONOMIC ASSUMPTIONS

Determination of economic assumptions needs to consider the future condition of the labor market. The focus is not the cause-and-effect relationship because it is hard to say whether the labor market causes the changes in other economic variables or vice versa. For example, with a higher interest rate, people have more incentives to save rather than consume, which will cause a slowdown of investment and job openings. A higher unemployment rate is expected in this situation. On the other hand, a high unemployment rate may lead to central bank monetary policies that lower the interest rates.

During a recession, an increase in unemployment normally happens with widening credit spreads, decreasing interest rates and inflation rate, and increased stock market volatility. The unemployment rate and underemployment rate can be used as indicators for future changes in other economic variables. During an economic expansion, the relationship is unclear.

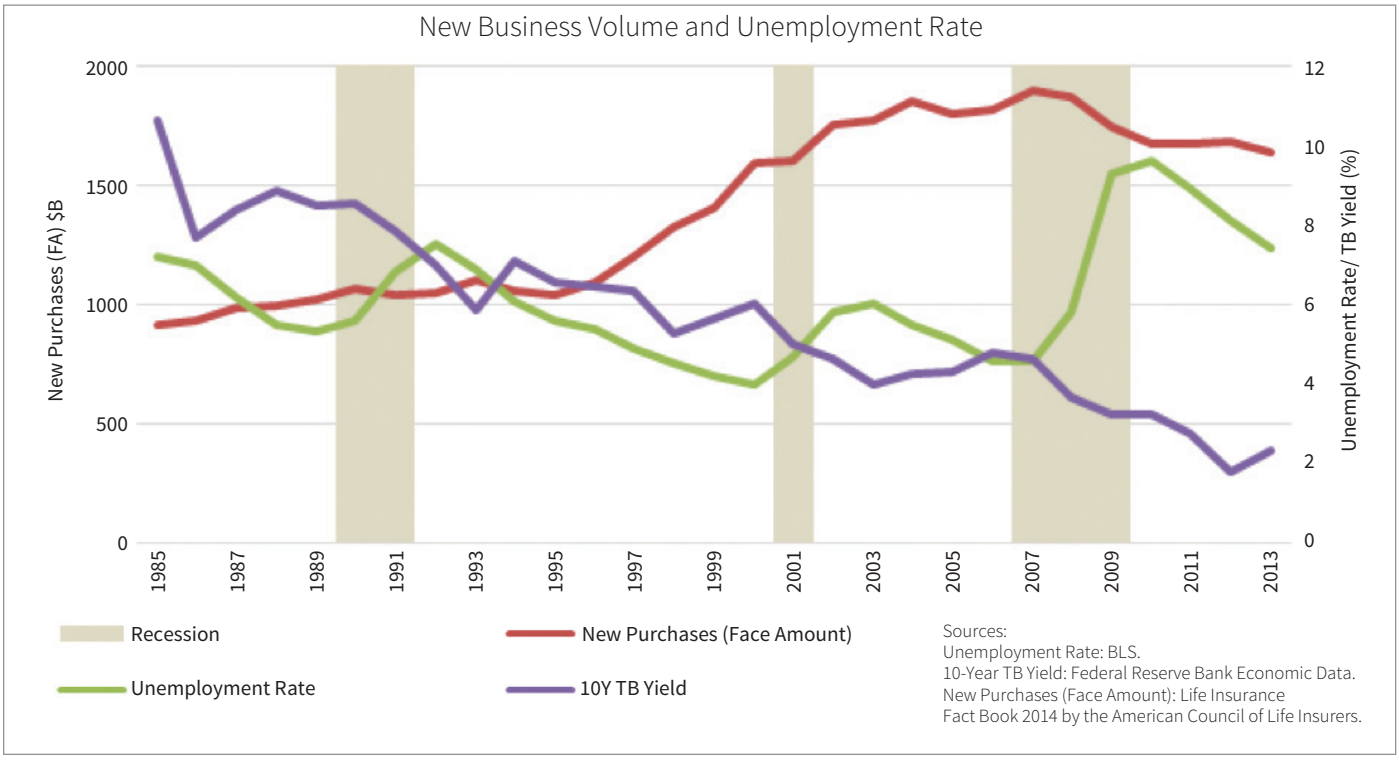
INSURANCE EXPERIENCE

Besides the general economic assumptions, unemployment and underemployment can also affect the experience of products that pay unemployment benefits. They reflect the potential loss of household income. Reduced income may cause policy lapses, reduced future premium payments, reduced new business volume, and so on.

Figure 4 shows U.S. individual life insurance new business volume in terms of face amount from 1985 to 2013. The gray areas are three periods of recession (1991, 2001, and 2007–2009). Unemployment rates and 10-year Treasury bond yields are also illustrated. During the recessions, new business growth slowed with increasing unemployment rate and decreasing Treasury bond (TB) yield. However, **the unemployment rate is better than the bond yield for predicting low business growth** for the following reasons:

1. An increase in the unemployment rate normally triggered a Fed rate reduction, not the other way around.
2. In the data period, an increase in the unemployment rate always triggered a slowdown of business growth. However, a decrease in the TB yield did not always coexist with a slowdown.
3. Around the time of the three recessions, the decreases in TB yield are about the same magnitude. However, during the first two recessions, the individual life insurance business growth rate was near zero. In the latest recession, new business volume decreased significantly. On the other hand, the increase of the unemployment rate was much higher in the latest recession than the previous two. This indicates that the size of change in the unemployment rate can help predict the size of change in business growth.
4. With the TB yield at a low level, if another recession happens in the near future, the room for yield reduction is limited. Therefore, the TB yield is less useful for predicting new business growth at the current level.

Figure 4
U.S. Individual Life Insurance New Business Volume (Face Amount)



The average annual new business volume growth rate measured by face amount is 2.1 percent during the period from 1985 to 2013. Table 1 lists business growth rates, changes in unemployment rate, and TB yield during the three recession periods. It is clear that changes in the unemployment rate have more prediction power than changes in bond yield.

Table 1
U.S. Individual Life Insurance
New Business Growth during Recession

Time Period	New Business Growth Rate (Face Amount)	Change in Unemployment Rate	Change in 10-year TB Yield
1991	−2.6%	1.2%	−0.7%
2001	0.4%	0.7%	−1.0%
2008-2010*	−11.5%	5.0%	−1.4%

*The rate and changes are not annualized for the entire 3-year period.

For prediction, the explained variable Y is the annualized deviation of new business growth rate from the average growth rate of 2.1 percent. The explanatory variable X is the annual change in the unemployment rate. Three data points for (X,Y) are (0.7, -1.7), (1.2, -4.8) and (1.7, -6.0) representing three time periods, 2001, 1997 and 2008-2010, respectively. Given this simple model, the new business growth rate can be projected based on a projected unemployment rate using linear interpolation. For example, if a 1 percent increase of unemployment rate is expected, the growth rate is expected to be -1.4 percent. During the process of business planning, consistency between the unemployment rate and new business growth rate can be achieved based on the fitted relationship.

STRESS SCENARIOS

Labor market instability can be a major cause of an economic crisis. Maintaining a low and sustainable unemployment rate is a major goal of economic policies. Stress scenarios highly related to the labor market can be constructed. The following example shows a stress scenario that starts with a surprising jump in the unemployment rate.

The 2008 financial crisis caused a surge of unemployment rate from a precrisis level of 5 percent to the highest rate of 9.6 percent in 2010. With a basket of economic incentive plans including quantitative easing and interest rate reductions, the unemployment rate dropped to 5.3 percent in July 2015.

However, the labor force participation rate dropped from 66 percent in 2006 to 62.6 percent in July 2015. This can be explained partly by an aging population and partly by discouraged workers who give up on finding a job. Compared to a drop from 67 percent in 1997 to 66 percent in 2006, the recent sharp drop in the labor force participation rate is mainly caused by discouraged workers. The actual labor market conditions have not improved that much as implied by the decrease of the unemployment rate. For simplicity, out of the 3.4 percent drop (66 percent to 62.6 percent), 1 percent is attributed to aging population and 2.4 percent is attributed to discouraged workers.

The average duration of an economic cycle after World War II in United States is less than seven years. It has already been six years since the trough of the latest economic cycle in June 2009[3] and so the risk of having another recession in the near future is not low.

The Fed rate has dropped to a near-zero level for more than six years. A negative rate could be an option, but clearly the possibility and impact of a further reduction of interest rates are small.

Bear commodity markets, especially the oil market, caused job losses and a higher risk of a low inflation rate. At the same time, discouraged workers may come back to the job market. These factors together can cause an unexpected jump in the unemployment rate. Assuming that half of the 2.4 percent of discouraged workers return to the market, the unemployment rate can increase from 5.3 percent in July 2015 to 7.1 percent, which could lead to a series of challenges for insurance companies:

1. *Lower new business volume:* Using the simple linear interpolation model discussed above, a new business growth rate of –4.1 percent is expected given a 1.8 percent increase in the unemployment rate.

Labor market-related plausible stress scenarios are also useful to test a company's ability to take risk.

2. *Higher lapse rate:* More lapses are expected although the impact can be quite different by product lines. The U.S. individual life insurance lapse rate increased from 6.4 percent in 2007 to 7.6 percent in 2008 (American Council of Life Insurers 2014) and gradually decreased to a precrisis level. For simplicity, the same level of lapse rate percentage increase can be assumed for the stress scenario. The lapse rate is expected to increase by 19 percent.

3. *Low interest rate:* A low interest rate environment is expected to persist for a prolonged period.

4. The combination of low interest rates and a higher unemployment rate could make the recovery much more difficult: The next recession is expected to have a much longer duration. For simplicity, a recession period of five years can be assumed, which is twice the length of the 2008 financial crisis.

This possible stress scenario could be used for various purposes, including risk identification, risk appetite setting, capital management, and business planning.

CONCLUSION

The state of the labor market is important for insurance companies. As an indispensable component of the economic system, it affects other economic variables and therefore the economic environment. It also determines employment income, which affects consumption, policyholder behaviors, and new insurance sales. It is beneficial to analyze the impact of unemployment and underemployment. Labor market-related plausible stress scenarios are also useful to test a company's ability to take risk. ■

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ENDNOTES

1 Discouraged workers are defined by the BLS as "persons who are not in the labor force, want and are available for work, and had looked for a job sometime in the prior 12 months. They are not counted as unemployed because they had not searched for work in the prior 4 weeks, for the specific reason that they believed no jobs were available for them."

2 Marginally attached is defined by the BLS as "a group that includes discouraged workers. The criteria for the marginally attached are the same as for discouraged workers, with the exception that any reason could have been cited for the lack of job search in the prior 4 weeks."

3 *http://www.nber.org/cycles.html.*

4 (62.6% × 5.3% + 2.4%/2) / (62.6% + 2.4%/2).