

1. Consider a household who faces uninsured income risk of the following form:

--At the beginning of each period, the household learns that it is either employed or unemployed. Employed households receive income w ; unemployed receive zero.

--Employment status follows a Markov process: if a household is employed in period t , then it will remain employed in period $t+1$ with a probability α , and become unemployed with probability $1-\alpha$. If a household is unemployed in period t , it will remain unemployed in period $t+1$ with probability λ , and will become employed with probability $1-\lambda$. Assume that both α and λ are strictly between zero and one.

Note that the parameter α governs the *incidence* of unemployment; a high value of this parameter means that employed workers are unlikely to lose their jobs and thus have a low incidence of unemployment. Meanwhile, the parameter λ governs the *duration* of unemployment; a high value of this parameter means that unemployed workers are unlikely to find new jobs and thus stay unemployed for a long time. Assume that households are infinitely lived and have quadratic utility and rational expectations; assume that there is frictionless risk-free borrowing and lending at a rate r that satisfies $\beta(1+r)=1$, where β is the time discount factor; and assume that there are no nonnegativity constraints on consumption.

(a) Solve for a closed-form expression for the impact of unemployment on consumption, defined as the difference at any point in time between optimal consumption of an employed household and consumption of an unemployed household with the same level of assets (notice that employment status is determined at the beginning of the period, while assets are predetermined; therefore, the impact of employment status on consumption can be measured holding assets constant). This expression should involve at most four parameters: w , α , λ and β .

In the real world, some workers have higher incidence of unemployment than others, and other workers have higher duration of unemployment than others; numerous existing studies have shown that duration and incidence are related to variables such as age, education and occupation. For instance, young workers tend to have a high incidence of unemployment, but short unemployment durations; highly educated workers tend to have low incidence and low durations; and so on.

(b) Suppose you have data measuring the drop in consumption for a group of households who have just lost their jobs. Suppose that we observe variables like age, education and occupation for these households, and assign each household measures of expected unemployment incidence and duration, based on the experiences of workers with similar age, occupation and education in other studies; note that these measures will vary across households. According to the model, how should the incidence and duration of unemployment affect the size of the drop in consumption in your sample? Provide an intuition for these comparative static predictions of the model.