IV. Pandemics and the U.S. Stock Market

We briefly compare our results with the outcomes of the two major 20th century pandemics, the 1918-1920 and 1957-1958 outbreaks. These calculations require numerous naive assumptions, such as a linear impact of our flu measures on stock returns, stability in how the flu impacts the stock market, and so on. However, we provide them because they may roughly illustrate the magnitudes involved.

While detailed data on the U.S. markets is not available from either of the prior 20th century pandemics, we can examine return behavior around those time periods and see whether it is roughly consistent with our estimates from seasonal flu variation. We therefore compare several months after the onset of the flu in each of the prior pandemics with stock returns over that time period. We use the historical NYSE stock return data from Schwert (1990).

The 1918-1920 pandemic had a less virulent outbreak in the U.S. during the Spring of 1918; however, the more lethal form of the disease reached the U.S. in September of 1918. The duration of the outbreak in the U.S. was relatively short (Barry, 2004). Approximately 500,000 deaths attributable to the flu occurred in the U.S. (U.S. Department of Health and Human Services, 2004).[12] The U.S. stock market over the September to December 1918 period rose by 0.22%, or 2.7% on an annualized basis. It should be noted that this time period also coincided with the end of World War I.

The 1957-1958 pandemic is typically dated in the U.S. from June 26, 1957, when a conference at Grinnell College suffered a severe outbreak. The disease then spread quickly across the U.S. Approximately 69,800 deaths occurred in the U.S. (U.S. Department of Health and Human Services, 2004). The U.S. stock market declined by 10%, or 23% on an annualized basis, from July 1, 1957 to December 1, 1957.

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[12] The 1918 flu was more fatal to young adults than typical flu outbreaks.

On average, approximately 36,000 people died annually in the U.S. from flu or flu-related complications in the 1990's (see Thompson et al. 2003).[13] Normalizing the fatality rates from the flu by the populations in the U.S. for 1918, 1957, and 1995 (103, 172, and 267 million, approximately) gives approximate fatality rates of 0.00485, 0.00041, for the two pandemics and 0.00014, for an average year in the 1990's. Thus the 1957 pandemic had roughly three times the usual fatality rate, and the 1918 pandemic had roughly 36 times the usual fatality rate.

Since our flu variables are measured in percentage changes, significant increases in flu levels due to a pandemic would increase growth rates in the incidence of flu by approximately the difference between the log of the number of flu in the pandemic year and the log of the number of flu in a normal year. Given the roughly three times higher fatality rate in the 1957 pandemic, this corresponds to a 2.2 standard deviation change in the U.S. flu variable ($2.2 = 1.10/0.50$, as $\ln(3)$ is 1.10 and one standard deviation in U.S. flu in our sample is 0.50), and this would imply an additional -0.08% weekly return ($-0.08\% = -0.037\% \times 2.2$, as each one standard deviation increase in the U.S. flu variable corresponds to a 0.037% decrease in weekly returns) over the duration of the illness using our estimate with weekly dummies and national flu incidence shown in Table VI. A pandemic as severe as the 1918-1920 outbreak would be on the order of seven standard deviations away from the mean. This would imply a -0.26% decrease in stock returns per week.

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[13] See also http://www.cdc.gov/flu/about/disease/us_flu-related_deaths.htm.