



## Impact of Macro-economic Factors on the Hemline Cycles

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The economic system of any nation has business cycles that have alternating recession and expansion periods. A recession is a period between a peak and a trough of a business cycle and can last from a few months to more than a year. During a recession, there is a drop in gross domestic product (GDP) and high unemployment. Some media and fashion-related industries are interested in hemline theory introduced by George Taylor in 1926. Hemline theory stipulates that hemlines on women's dresses fluctuate with the national economy, which is measured by stock price index or GDP. It means women are likely to wear shorter skirts or dresses in economic prosperity, and longer hemlines prevail during a recession. Conversely, others contradict hemline theory by their own observation, and Dorcherty and Hann (1994) claimed that hemline changes do not move in accordance with economic cycles. There are several supporting studies on hemline theory, but they were either outdated (e.g., Mabry, 1971) or were conducted in a foreign country (Baardwijk & Franses, 2012). Even though the two studies contributed to fashion theory capturing relationships between economy and style changes in women's clothing, there are some flaws respectively. For example, Mabry (1971) did not consider removing a linear trend and existence of autocorrelation of stock price in time series to find correlation between hemline changes and stock price changes. Also, Baardwijk and Franses (2012) analyzed French fashion magazines and U.S. recession data as "the world business cycle"; and they did not report statistically significant evidence of lag effects on hemlines. This current study is to investigate whether the relationships between hemline and macro-economic factors – rGDP, recession, and unemployment – are applicable now; and to analyze time lags reflecting economic factors on hemline index using U.S. data. The hemline theory and fashion cyclical theory were applied to propose the relationships studied.

The data for the hemline measurements of women's day-wear were obtained from US Vogue spring and fall editions from 1950 to 2014. Data were standardized by dividing the length from shoulder to hemline (e.g., shoulder to knee for a knee-length skirt) by the length from the shoulder to ankle. Therefore, higher values of the hemline measurements indicate the hemline is longer, and lower values mean the hemline is shorter. Of 2260 samples, 1300 obtained from 20 samples per each year, were selected by the stratified sampling method in order to make the dataset robust and reliable. Hemline data were aggregated to create a yearly average. The macro-economic variables used were rGDP, the recession index from National Bureau of Economic Research (NBER), and unemployment rates of USA from 1950 to 2014. NBER values were based on the number of months in recession per year and assigned a value of 0.1 to 1.1. For example, a value of 0.1 was assigned to a year with none to one month period in a recession and a value of 1.1 for 11 to 12 consecutive months in a recession.

The Dickey-Fuller test results showed that the time series data of rGDP and unemployment has a unit root respectively. Therefore, both variables were transformed into their

year-to-year differences ( $Z_{t+1} - Z_t$ ) to remove any linear trend and make each value a random step away from the previous value. Breusch-Pagan and Cook-Weisberg test for heteroskedasticity and Durbin-Watson's d-statistic for serial correlation in residuals were used. Assumption of heteroskedasticity of variance in the residuals and independency of error terms were satisfied in the testing models.

The hemline was regressed on the previous year's hemline values and four consecutive previous year values of NBER to identify any lead effects of recession on hemline. The model was statistically significant ( $R^2 = .49$ ,  $F(5, 55) = 10.70$ ,  $p < .001$ ). The hemline of the previous year and NBER of the previous year together explained 49% of the total variance in hemline. The hemline was statistically significantly predicted by the NBER of the previous year ( $B = 5.38$ ,  $p = .03$ ). To find the relationships between unemployment and the hemline, the same procedure was performed. The model was statistically significant ( $R^2 = .46$ ,  $F(5, 54) = 9.15$ ,  $p < .001$ ). The hemline of the previous year and unemployment of the previous year together explained 46% of the total variance in the hemline. The hemline was not statistically significantly predicted by the unemployment of the previous year, but was very close to the significant level ( $B = 1.13$ ,  $p = .09$ ). The relationships between rGDP and hemline were not significant.

Based on the analysis of chronological data on hemline and economic factors from 1950 to 2014, the economic cycle and unemployment influenced hemline length for four years in a positive direction. Furthermore, the previous year of recession significantly impacted positively on the current hemline, and the effect of previous unemployment on the current hemline was very close to the significant level. This finding supports the hemline theory that a recessionary economy is related to longer hemlines and hemlines become shorter in flourishing economic periods (Mabry, 1971; van Baardwijk & Franses, 2012). Hemline theory can be used to explain why longer skirt lengths occurred in 2009 after the first year of the most recent recession (December 2007 to June 2009) and gradually became shorter after the recession was officially over in 2010. This statistical tool can be very useful to fashion companies who need to make design decisions regarding hemline lengths at least a year in advance of releasing a line.

## References

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