ABSTRACT

I establish the existence of seasonality in 42 popular risk factors in the asset pricing literature. I document extensive empirical evidence for the Keloharju et al. (2016) hypothesis that seasonalities in individual asset returns stem from their exposures to risk factors. It is the seasonal patterns in risk factors that lead to the seasonalities in individual asset portfolios. The empirical findings show that seasonalities are widely present among individual asset portfolios. However, both the all-factor model and the Fama-French (2014) five-factor model demonstrate that these patterns greatly disappear after I eliminate their exposures to the corresponding risk factors. Overall, 76.17% of the returns on 235 test equal-weighted portfolios I examine contain seasonality. My key finding is that 48.68% of equal-weighted portfolio returns with seasonalities no longer contain seasonality after I control for their exposures to all risk factors. Only 52.08% of the equal-weighted portfolio Fama-French five-factor model residual obtain substantial seasonal patterns in the Wald test.

Regarding to seasonalities in risk factors, specific seasonal patterns include the January effect, higher returns during February, March, and July, and autocorrelations at irregular lags. The Wald test, a stable seasonality test, the Kruskal-Wallis chi-square test, a combined seasonality test, Fisher’s Kappa test, and Bartlett’s Kolmogorov-Smirnov test are used to identify the seasonal patterns in individual risk factors. Fama-French SMB
(the size factor) and HML (the value factor) in the three-factor model, Fama-French
RMW (the operating profitability factor) in the five-factor model, earnings/price, cash
flow/price, momentum, short-term reversal, long-term reversal, daily variance, daily
residual variance, growth rate of industrial production (value-weighted), term premium
(equal-weighted and value-weighted), and profitability display robust seasonalities.
Therefore, the first part of the research confirms that risk factors possess substantial
seasonal patterns.
TABLE OF CONTENTS

DECLARATION ................................................................................................................. i
ABSTRACT ......................................................................................................................... ii
ACKNOWLEDGEMENTS ...................................................................................................... iv
TABLE OF CONTENTS ..................................................................................................... vi
LIST OF TABLES ............................................................................................................... viii
1. Introduction .................................................................................................................. 1
2. Literature Review ......................................................................................................... 6
   2.1. The Keloharju et al. (2016) Hypothesis ................................................................. 6
   2.2 The January Effect ................................................................................................. 9
   2.3 The Halloween Effect ............................................................................................ 10
   2.4 The Same-Calendar-Month Effect ........................................................................ 11
3. Risk factors and test assets ........................................................................................ 12
   3.1 Kenneth French Data Library Factors ................................................................... 12
   3.2 Other Factors ......................................................................................................... 13
   3.3 Test Assets ............................................................................................................. 13
4. Methodology ................................................................................................................ 15
   4.1. Stable seasonality test ........................................................................................ 15
   4.2. Kruskal-Wallis Chi-square test .......................................................................... 16
   4.3. Combined Test of Identifiable Seasonality ......................................................... 17
   4.4. Fisher’s Kappa test .............................................................................................. 19
   4.5. Bartlett’s Kolmogorov Smirnov test .................................................................. 19
   4.6. Wald test ............................................................................................................. 20