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The evolution and cross-section of the day-of-the-week effect

Shlomo Zilca

Correspondence:
shlomo.zilca@gmail.com
10 Aharonovich St., Holon, Tel Aviv, Israel

Abstract

We study the day-of-the-week effect across size deciles and in three 18-year subperiods. The results show a decline in the magnitude of the day-of-the-week effect, but the effect did not vanish. We find that the decline in the magnitude of the effect is larger in the larger market capitalization deciles. We also find substantial evidence that the day-of-the-week effect is characterized by a pattern of monotonically improving returns during the week, but the pattern is interrupted as market capitalization increases. The behavioral explanation for the day-of-the-week effect, based on monotonically improving mood throughout the week, is therefore a stronger candidate in smaller-market capitalization deciles.

Keywords: Day-of-the-week effect, Monday effect, Behavioral finance

Introduction and literature review

The day-of-the-week effect relates to the observation of returns that vary across days of the week in a persistent way. The first documented evidence of the day-of-the-week effect (henceforth the effect) is provided by Kelly (1930), who reports that returns on Mondays are lower than returns on other days of the week. Several other practitioners have confirmed the existence of a day-of-the-week effect, including Fields (1931), Hirsch (1968), and Cross (1973).

Interest in the effect within academic circles begins with French (1980), who documents negative returns on Mondays and positive returns on other days of the week. Subsequent research verified the existence of this effect[1] and identified that its magnitude is larger in small market capitalization stocks[2].

This paper makes two contributions to the literature on the day-of-the-week effect. The first contribution is to describe the development of the effect over time and across size deciles. Analysis of the effect in three subperiods suggests that the magnitude of the effect has declined over time. The decline in the magnitude of the effect is not uniform, but rather it is inversely related to size. As part of this decline, in the last subperiod, the largest market capitalization decile and the value-weighted (VW) portfolio display no signs of a day-of-the-week effect.

The second contribution of the paper is the documentation of a pattern of improving returns during the week. These results are consistent with the behavioral hypothesis of the day-of-the-week effect, which relates the pattern of improving returns to the pattern of improving mood during the week. Farber (1953) and

Golder and Macy (2011), among others, document a pattern of improving mood during the week. Cole et al. (1998) and Bader (2005) document a relationship between mood and increased prudence. Increased prudence during periods of low mood may explain the findings of Pettengill (1993), who shows that investors have a higher tendency to take financial risks before the weekend and lower tendency to take risks after the weekend. Higher levels of prudence may also explain the increased tendency of individual investors to sell stocks on Monday (e.g., Abraham and Ikenberry 1994; Brockman and Michayluk 1998; Brooks and Kim 1997; Lakonishok and Maberly 1990).

Rystrom and Benson (1989), Jacobs and Levy (1988), and Markese (1989) are the first to propose the behavioral hypothesis as a possible explanation for the day-of-the-week effect. Some empirical support for the behavioral explanation is provided by Gondhalekar and Mehdian (2003), who find that the negative returns on Mondays are intensified during periods of investor pessimism. More recently, Hirshleifer et al. (2017) study the effect of mood on the cross section of returns by using mood-mimicking returns and find that mood is a valid explanation of the day-of-the-week effect. Further support for the behavioral explanation of the day-of-the-week effect is recently provided by Birru (2017).

Alternative explanations of the day-of-the-week effect

Several theories attempt to explain the day-of-the-week effect. Three of the prominent theories are information-timing, short-sellers activity around the weekend, and the previously discussed behavioral hypothesis.

The information-timing hypothesis suggests that bad news is more likely to reach the markets during the weekend or on Mondays. Defusco et al. (1993) and Dyl and Maberly (1988) find support for this theory in studies of announcements at the firm level. Pettengill and Buster (1994), however, reach conclusions that are at odds with the information-timing hypothesis. Other researchers concentrating on a limited universe of dividend and earnings announcements find weak support for the theory at best (e.g., Damodaran 1989; Fishe et al. 1993; Schatzberg and Datta 1992). Chang and Pinegar (1998) examine the effect of macroeconomic news on the Monday effect and find that macroeconomic news is an important factor in explaining the Monday returns of small stocks.

Chen and Singal (2003) propose the short-sellers hypothesis. This theory suggests that the positive abnormal return on Friday and negative on Monday are generated by short sellers who close their position before the weekend and reestablish them on Monday. This creates excess demand on Friday and excess supply on Monday, leading to positive and negative abnormal returns on these days, respectively.

Full period analysis of the day-of-the-week effect, 1953–2006

The sample used in this paper includes all stocks listed on the NYSE, AMEX and NASDAQ exchanges in the Center for Research in Security Prices (CRSP) daily data file. In 2005, CRSP extended the daily data file from 1965 back to 1926. Because U.S. exchanges moved from a six-day to a five-day trading week in the middle of 1952, we analyze data from 1953 to 2006. Using continuously compounded returns, we analyze the day-of-the-week effect in the equally weighted (EW) portfolio, VW portfolio, and 10 deciles sorted by market capitalization (with 1 being the smallest capitalization decile and 10 being the largest).

Figure 1 presents the average abnormal return of the EW and VW portfolios on each day of the week in the 1953–2006 period, where average abnormal return is defined as the average return of a portfolio on a particular day minus the average return across all week days for that portfolio. Figure 1 shows a pattern of improving returns in the EW portfolio. However, the pattern is disrupted by the fact that Wednesday's average abnormal return is larger than Thursday's. In the VW portfolio, the disruption is even larger since Wednesday's return is larger than both Thursday's and Friday's.

Before we turn to analyzing the average abnormal returns, it is important to determine whether returns across days of the week are homoscedastic. The existing evidence suggests that return variances across days of the week are not homoscedastic (e.g., Aggarwal and Schatzberg, 1997; Connolly, 1989). Panel A of Table 1 provides information on the standard deviations of daily returns from Monday to Friday across the various deciles and portfolios. The evidence in Table 1, Panel A, suggests substantial variation in the standard deviations across days of the week, with Mondays exhibiting the highest standard deviations and Fridays the lowest.

Using a chi-square distribution Panel A of Table 1 also reports *p*-values for the null hypothesis $\sigma_{ij}^2 = \sigma_i^2$, where σ_{ij}^2 is the variance of portfolio i on day j and σ_i^2 is the variance of portfolio i across all days. The evidence in Table 1, Panel A, strongly rejects the null hypothesis that the variance of a particular day is equal to the variance of all weekdays, except for two cases: deciles 1 and 10 on Tuesday (for which the *p*-values are 7.2% and 10.4%, respectively).

Panel B of Table 1 provides results of the Levene (1960) and Brown-Forsythe (1974) tests for the joint null hypothesis that variances across days of the week are all equal. The results of these tests strongly reject the hypothesis of homoscedasticity, as p-values are practically zero in all cases. Following the evidence provided in Table 1, our analysis proceeds under the assumption of heteroscedasticity.

Table 2 reports statistical analysis of the daily abnormal returns across days of the week in the full 1953–2006 period. Table 2, Panel A, presents the results for single-day

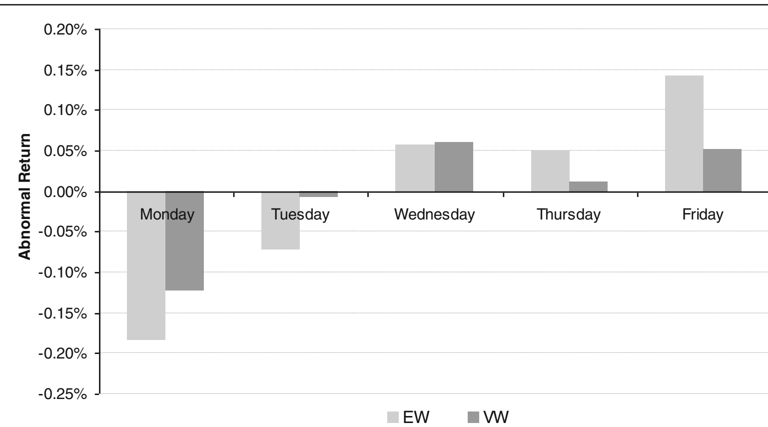

Fig. 1 Day-of-the-week effect for the EW and VW portfolios 1953–2006

Table 1 Are variances equal across days of the week?

	Portfolio/Decile											
	EW	VW	1	2	3	4	5	6	7	8	9	10
Panel A: Standard deviation of daily returns and their *p*-values												
All days	0.71%	0.85%	0.71%	0.71%	0.73%	0.74%	0.77%	0.80%	0.82%	0.82%	0.82%	0.88%
Monday	0.83%	1.16%	0.89%	0.82%	0.85%	0.86%	0.90%	0.93%	0.94%	0.95%	0.96%	1.03%
p-value	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Tuesday	0.67%	0.83%	0.76%	0.69%	0.70%	0.71%	0.74%	0.77%	0.79%	0.79%	0.79%	0.87%
p-value	0.0%	2.3%	7.2%	1.2%	0.3%	0.3%	0.2%	0.4%	1.1%	0.6%	0.7%	10.4%
Wednesday	0.68%	0.87%	0.75%	0.68%	0.69%	0.69%	0.74%	0.77%	0.79%	0.78%	0.78%	0.84%
p-value	0.2%	0.1%	0.2%	0.0%	0.0%	0.0%	0.1%	0.2%	0.5%	0.1%	0.1%	0.1%
Thursday	0.67%	0.82%	0.72%	0.67%	0.68%	0.69%	0.73%	0.75%	0.78%	0.78%	0.77%	0.83%
p-value	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Friday	0.63%	0.81%	0.71%	0.63%	0.64%	0.66%	0.69%	0.72%	0.75%	0.75%	0.75%	0.82%
p-value	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Panel B: Joint tests of equality of variances across days of the week												
Levene												
Test statistic	18.6	10.1	15.7	17.5	15.9	20.1	19.1	18.4	15.9	18.0	16.8	9.0
p-value	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Brown-Forsythe												
Test statistic	17.0	9.7	15.6	16.6	14.8	18.8	17.2	16.7	14.6	16.0	15.4	8.8
p-value	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Table 1 provides information on standard deviations of returns across days of the week for the EW, VW, and size decile portfolios in the 1953–2006 period. Panel A provides the standard deviation for the relevant day and portfolio/decile, and the corresponding p-value for the null hypothesis $\sigma_{ij}^2 = \sigma_i^2$, where σ_{ij}^2 is the variance of portfolio i on day j and σ_i^2 is the variance of portfolio i across all days of the week. The results in Panel A suggest substantial variation in the variances across days of the week, with Monday displaying the highest variance and Friday the lowest. Panel B provides the results of two statistical tests, the Levene and Brown-Forsythe tests, for the more general null hypothesis $\sigma_{i,Mon}^2 = \sigma_{i,Tue}^2 = \sigma_{i,Wed}^2 = \sigma_{i,Thu}^2 = \sigma_{i,Fri}^2 = \sigma_i^2$. The results in Panel B suggest that the null hypothesis of homoscedasticity is rejected for all portfolios/deciles

average abnormal returns and their respective p-values. The null hypothesis in these tests is $\mu_{ij} = 0$, where μ_{ij} is the average abnormal return for portfolio i on day j. The results in Table 2, Panel A, show a pattern of improving returns during the week in deciles 1 through 4. In deciles 5 through 9, and in the EW portfolio, the pattern of improving returns is disrupted, however, by the fact that Wednesday's average abnormal return is higher than Thursday's. In decile 10, and in the VW portfolio, the violation of the pattern is even larger since Wednesday's average abnormal return is larger than that of Thursday's and Friday's. The results in Table 1, Panel A, also show that the statistical significance of the single-day average abnormal daily return is impressive – the average abnormal return is statistically significant in all cases but two (decile 10 on Tuesday and Thursday).

Panel B of Table 2 provides results for the joint hypothesis that average abnormal returns are equal across all days of the week. The tests that are used for this purpose are standard analysis of variance (ANOVA) and ANOVA adjusted for heteroscedasticity (Welch 1951). The results show that the null hypothesis – that average abnormal returns are equal across all days of the week – is strongly rejected as all *p*-values in Panel B of Table 2 (both the homoscedasticity and heteroscedasticity cases) are close to zero.

Table 2 The day-of-the-week effect, 1953–2006

	Portfolio/Decile											
	EW	VW	1	2	3	4	5	6	7	8	9	10
Panel A: Average daily abnormal returns and their *p*-values												
Monday	−0.184%	−0.122%	−0.160%	−0.189%	−0.197%	−0.198%	−0.201%	−0.193%	−0.182%	−0.171%	−0.161%	−0.111%
p-value	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Tuesday	−0.071%	−0.008%	−0.142%	−0.119%	−0.102%	−0.093%	−0.075%	−0.066%	−0.054%	−0.042%	−0.036%	0.003%
p-value	0.0%	30.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	0.8%	42.0%
Wednesday	0.057%	0.060%	0.025%	0.041%	0.047%	0.051%	0.064%	0.068%	0.069%	0.074%	0.069%	0.058%
p-value	0.0%	0.0%	4.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Thursday	0.050%	0.012%	0.062%	0.063%	0.062%	0.059%	0.055%	0.055%	0.050%	0.040%	0.039%	0.004%
p-value	0.0%	21.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.4%	0.4%	40.5%
Friday	0.142%	0.052%	0.211%	0.198%	0.184%	0.174%	0.150%	0.129%	0.110%	0.092%	0.082%	0.040%
p-value	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.5%
Panel B: Joint tests of equality of averages across days of the week												
Standard ANOVA												
F-statistic	89.3	19.9	107.9	129.8	117.8	106.9	86.0	70.6	55.9	47.0	40.7	14.7
p-value	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
ANOVA adjusted for heteroscedasticity (Welch)												
F-statistic	81.3	16.4	108.4	127.5	112.1	99.7	78.1	62.9	49.2	40.5	34.5	12.1
p-value	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Panel A of Table 2 shows average abnormal returns and corresponding p-values for the EW, VW, and 10 size decile portfolios across days of the week in the 1953–2006 period. Average abnormal return is defined as the average return for the relevant day and portfolio/decile minus the average return of the portfolio/decile across all days. Panel A of Table 2 also reports *p*-values for the null hypothesis, where μ_{ij} is the average abnormal return of portfolio/decile i on day j. The results in Panel A show a pattern of improving returns throughout the week in size deciles 1 through 4, but the pattern is less monotonic in the larger capitalization deciles. Panel B provides results for the more general null hypothesis of equal averages across all days of the week. The results in Panel B reject the null hypotheses, using both standard ANOVA and ANOVA adjusted for heteroscedasticity

The evolution of the day-of-the-week effect

In this section, we analyze the evolution of the day-of-the-week effect in three 18-year subperiods: 1953–1970, 1971–1988, and 1989–2006. The purpose of this analysis is to examine the evolution of the day-of-the-week effect over time. Figure 2 displays the average abnormal returns for the EW and VW portfolios across days of the week in the three subperiods.

We begin the subperiod analysis by testing for heteroscedasticity in the three subperiods. The results of the heteroscedasticity tests are reported in Table 3.

The results in Table 3 indicate that heteroscedasticity is present in the large majority of the cases. The sizes of the F-statistics suggest, however, a decline in the magnitude of heteroscedasticity to the degree that, in terms of statistical significance, heteroscedasticity has disappeared in some of the largest capitalization deciles during the recent 1989–2006 period. Nevertheless, the bulk of the evidence in Table 3 rejects the null

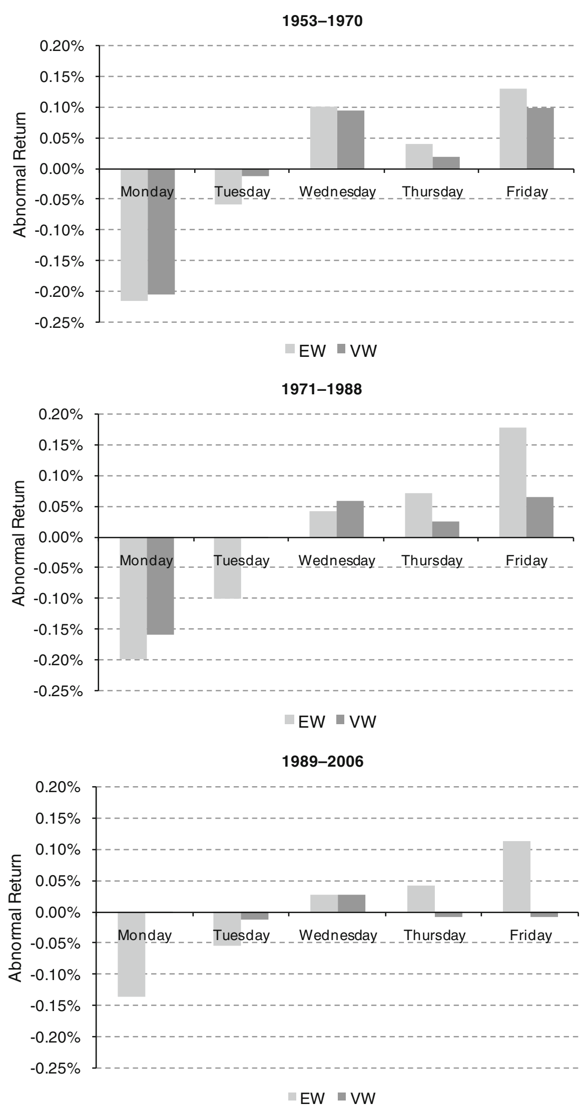

Fig. 2 Day-of-the-week effect for the EW and VW portfolios in three subperiods

Table 3 Are variances equal across days of the week? Subperiod analysis

	Portfolio/Decile											
	EW	VW	1	2	3	4	5	6	7	8	9	10
Panel A: Standard deviation of daily returns and tests of variance equality 1953–1970												
Monday	0.81%	0.78%	0.94%	0.88%	0.89%	0.87%	0.89%	0.87%	0.82%	0.80%	0.77%	0.79%
Tuesday	0.62%	0.65%	0.75%	0.72%	0.71%	0.68%	0.70%	0.67%	0.65%	0.61%	0.60%	0.68%
Wednesday	0.65%	0.65%	0.75%	0.69%	0.71%	0.70%	0.73%	0.71%	0.68%	0.64%	0.62%	0.68%
Thursday	0.64%	0.59%	0.75%	0.71%	0.72%	0.71%	0.72%	0.69%	0.66%	0.62%	0.59%	0.60%
Friday	0.57%	0.55%	0.75%	0.65%	0.66%	0.63%	0.65%	0.61%	0.59%	0.55%	0.53%	0.56%
Levene												
Test statistic	11.4	11.8	6.3	10.6	9.7	10.1	10.8	11.1	10.7	12.9	12.4	11.0
p-value	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Brown-Forsythe												
Test statistic	9.5	10.7	6.2	10.2	8.5	8.7	9.0	9.3	9.3	10.6	11.0	10.4
p-value	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Panel B: Standard deviation of daily returns and tests of variance equality 1971–1988												
Monday	0.87%	1.16%	0.81%	0.86%	0.90%	0.93%	0.95%	0.97%	0.99%	1.01%	1.04%	1.22%
Tuesday	0.68%	0.83%	0.69%	0.70%	0.73%	0.76%	0.77%	0.79%	0.79%	0.78%	0.78%	0.89%
Wednesday	0.68%	0.87%	0.64%	0.67%	0.69%	0.71%	0.75%	0.76%	0.79%	0.77%	0.80%	0.92%
Thursday	0.64%	0.82%	0.64%	0.65%	0.68%	0.69%	0.72%	0.73%	0.75%	0.74%	0.75%	0.87%
Friday	0.63%	0.81%	0.60%	0.63%	0.65%	0.68%	0.69%	0.71%	0.73%	0.72%	0.74%	0.85%
Levene												
Test statistic	7.1	5.4	6.1	5.7	4.8	6.6	6.8	7.3	6.5	8.9	6.6	5.1
p-value	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Brown-Forsythe												
Test statistic	6.8	5.3	6.1	5.5	4.5	6.4	6.3	6.7	6.2	8.3	6.3	4.9
p-value	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%
Panel C: Standard deviation of daily returns and tests of variance equality 1989–2006												
Monday	0.79%	1.01%	0.91%	0.72%	0.74%	0.78%	0.85%	0.93%	1.01%	1.03%	1.04%	1.04%
Tuesday	0.70%	0.97%	0.84%	0.65%	0.65%	0.68%	0.75%	0.83%	0.91%	0.94%	0.94%	1.00%
Wednesday	0.70%	0.89%	0.85%	0.66%	0.65%	0.67%	0.75%	0.83%	0.89%	0.91%	0.90%	0.91%
Thursday	0.72%	0.94%	0.75%	0.65%	0.65%	0.67%	0.76%	0.83%	0.91%	0.93%	0.93%	0.96%
Friday	0.69%	0.96%	0.77%	0.61%	0.62%	0.66%	0.73%	0.83%	0.90%	0.92%	0.92%	0.99%
Levene												
Test statistic	2.5	1.1	4.5	2.9	2.8	4.3	3.1	2.7	2.4	2.2	2.9	1.2
p-value	4.4%	35.2%	0.1%	2.0%	2.3%	0.2%	1.5%	3.1%	4.9%	6.7%	2.1%	31.4%
Brown-Forsythe												
Test statistic	2.3	1.1	4.6	2.7	2.8	4.3	2.9	2.6	2.2	2.0	2.7	1.2
p-value	5.4%	35.1%	0.1%	2.7%	2.6%	0.2%	2.3%	3.7%	6.3%	8.8%	3.0%	31.8%

Table 3 provides information on standard deviations of returns across days of the week for the EW, VW, and 10 size decile portfolios in three subperiods: 1953–1970 (Panel A), 1971–1988 (Panel B), and 1989–2006 (Panel C). We use the Levene and Brown-Forsythe tests to examine the joint null hypothesis that variances are equal across days of the week. The null hypothesis is rejected in all cases in the first two subperiods. In the third subperiod, the null hypothesis is rejected in deciles 1 through 6 and 9 hypothesis of homoscedasticity, and therefore the subperiod analysis below proceeds under the assumption of heteroscedasticity.

Table 4 reports the analysis of the daily abnormal returns in the three subperiods. Table 4, Panel A, reports the results for the first subperiod; Table 4, Panel B, reports results for the second subperiod; and Table 4, Panel C, reports results for the third subperiod. The first part in each panel reports the average abnormal returns and their statistical significance, and the second part reports results for the Welch ANOVA.

Examination of the average abnormal returns in Table 4 suggests that the pattern of improving returns throughout the week is also present in the subperiods. However, as in the full-period analysis, Wednesday's return seems too high and violates the pattern in many cases.

The results in Table 4 also suggest that the magnitude of the day-of-the-week effect has declined over time. This can be observed in the size of the F-statistics in the EW and VW portfolios. In the VW portfolio, the F-statistic is 26.92 in the first subperiod, 6.51 in the second subperiod, and 0.30 in the third subperiod. In the EW portfolio, the F-statistics are 34.72, 37.25, and 15.00, respectively. Hence, although not entirely smooth in the EW portfolio, there is a general tendency of decline in the magnitude of the day-of-the-week effect. Note also that, as part of this decline, the effect disappeared in the last subperiod in the largest capitalization decile (decile 10) and in the VW portfolio. In decile 9, the effect became borderline significant. The effect remains, however, statistically significant in all other 8 deciles and in the EW portfolio in the last subperiod. Consistent with other studies, we conclude that these results show a decline in the magnitude of the effect over time (see, for example, Brusa et al. 2000; Gu 2004; Kohers et al. 2004; Mehdian and Perry 2001; Kamara 1997). The evidence, however, does not suggest that the effect has vanished.

Conclusion

We study the day-of-the-week effect across size deciles and over time. Full period analysis (1953–2006) of the day-of-the-week effect shows that returns are monotonically increasing during the week in the four smallest capitalization deciles.

However, the pattern of increasing returns is interrupted in the EW and size deciles 5 through 9 by the fact that Wednesday's average abnormal return is higher than Thursday's. In decile 10 and in the VW portfolio, the interruption of the pattern is even larger since Wednesday's average abnormal return is larger than that of both Thursday's and Friday's.

The behavioral explanation of the day-of-the-week effect is based on empirical findings that mood tends to improve throughout the week. Thus, if the behavioral explanation is true, we should expect returns to improve throughout the week. Our evidence thus suggests that the behavioral hypothesis is a stronger candidate in the smaller capitalization deciles.

We also examine the evolution of the day-of-the-week effect in three subperiods, 1953–1970, 1971–1988, and 1989–2006. We find that the day-of-the-week effect has contracted with the decline inversely related to market capitalization. As part of this decline, analysis in the recent 1989–2006 period shows that the day-of-the-week effect disappeared in the VW portfolio and in decile 10.

Table 4 The magnitude and consistency of the day-of-the-week effect, subperiod analysis

	Portfolio/Decile											
	EW	VW	1	2	3	4	5	6	7	8	9	10
Panel A: Average daily abnormal return and Welch ANOVA 1953–1970												
Monday	−0.216%	−0.205%	−0.182%	−0.212%	−0.234%	−0.231%	−0.235%	−0.230%	−0.217%	−0.206%	−0.198%	−0.204%
p-value	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Tuesday	−0.058%	−0.011%	−0.131%	−0.105%	−0.077%	−0.082%	−0.056%	−0.044%	−0.037%	−0.027%	−0.019%	−0.002%
p-value	0.2%	29.7%	0.0%	0.0%	0.1%	0.0%	0.8%	2.5%	4.4%	9.3%	16.9%	45.7%
Wednesday	0.101%	0.095%	0.089%	0.096%	0.108%	0.090%	0.120%	0.114%	0.106%	0.106%	0.093%	0.092%
p-value	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Thursday	0.039%	0.019%	0.061%	0.049%	0.048%	0.051%	0.034%	0.039%	0.035%	0.019%	0.025%	0.015%
p-value	3.3%	16.3%	0.7%	1.9%	2.3%	1.5%	7.5%	4.4%	5.5%	17.5%	10.2%	22.5%
Friday	0.132%	0.099%	0.162%	0.171%	0.153%	0.170%	0.134%	0.118%	0.111%	0.105%	0.096%	0.096%
p-value	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Welch ANOVA, full week												
F-statistic	34.72	26.92	29.99	37.19	35.45	38.66	31.85	30.22	29.30	28.61	26.63	24.66
p-value	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Panel B: Average daily abnormal return and Welch ANOVA 1971–1988												
Monday	−0.200%	−0.159%	−0.150%	−0.190%	−0.200%	−0.212%	−0.232%	−0.231%	−0.219%	−0.214%	−0.209%	−0.144%
p-value	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Tuesday	−0.101%	0.000%	−0.143%	−0.155%	−0.142%	−0.145%	−0.125%	−0.115%	−0.098%	−0.078%	−0.059%	0.021%
p-value	0.0%	49.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	1.1%	24.0%
Wednesday	0.042%	0.060%	−0.006%	0.016%	0.021%	0.045%	0.050%	0.056%	0.061%	0.065%	0.071%	0.058%
p-value	2.8%	1.9%	39.3%	23.7%	17.4%	2.5%	1.9%	1.2%	0.9%	0.5%	0.3%	2.7%
Thursday	0.071%	0.025%	0.052%	0.085%	0.085%	0.087%	0.085%	0.086%	0.079%	0.078%	0.066%	0.012%
p-value	0.0%	18.2%	0.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.4%	34.4%

Table 4 The magnitude and consistency of the day-of-the-week effect, subperiod analysis *(Continued)*

	Portfolio/Decile											
	EW	VW	1	2	3	4	5	6	7	8	9	10
Friday	0.180%	0.066%	0.243%	0.239%	0.230%	0.217%	0.213%	0.195%	0.169%	0.141%	0.120%	0.046%
p-value	0.0%	0.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5.3%
Welch ANOVA, full week												
F-statistic	37.25	6.51	54.61	57.53	49.92	45.74	43.14	37.32	29.37	23.94	18.90	4.53
p-value	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%
Panel C: Average daily abnormal return and Welch ANOVA 1989–2006												
Monday	−0.136%	0.001%	−0.146%	−0.164%	−0.157%	−0.149%	−0.134%	−0.118%	−0.109%	−0.090%	−0.075%	0.019%
p-value	0.0%	49.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.5%	1.8%	29.1%
Tuesday	−0.055%	−0.013%	−0.150%	−0.096%	−0.089%	−0.052%	−0.043%	−0.039%	−0.026%	−0.022%	−0.030%	−0.008%
p-value	0.8%	34.4%	0.0%	0.0%	0.0%	0.9%	4.2%	7.9%	19.2%	24.0%	16.5%	40.0%
Wednesday	0.028%	0.028%	−0.007%	0.014%	0.015%	0.020%	0.022%	0.036%	0.043%	0.052%	0.045%	0.025%
p-value	10.9%	17.1%	39.8%	25.9%	24.4%	18.5%	18.4%	9.2%	6.9%	4.0%	6.4%	20.6%
Thursday	0.041%	−0.007%	0.073%	0.055%	0.055%	0.041%	0.046%	0.039%	0.035%	0.022%	0.026%	−0.015%
p-value	4.1%	40.7%	0.2%	0.6%	0.5%	3.3%	3.3%	7.8%	12.2%	23.9%	20.2%	31.7%
Friday	0.114%	−0.009%	0.226%	0.184%	0.169%	0.134%	0.101%	0.075%	0.050%	0.032%	0.030%	−0.020%
p-value	0.0%	39.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.3%	4.7%	15.1%	16.1%	27.5%
Welch ANOVA, full week												
F-statistic	15.00	0.30	34.13	38.23	31.90	19.41	11.42	6.68	4.24	2.90	2.33	0.41
p-value	0.0%	88.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	2.1%	5.4%	80.5%

Table 4 provides information on the statistical significance of the day-of-the-week effect on a day-by-day basis and jointly across days of the week in three subperiods: 1953–1970 (panel A), 1971–1988 (panel B), and 1989–2006 (panel C). The sizes of the F statistics of the Welch ANOVA in the VW and EW portfolios suggest that the magnitude of the effect has declined over time. The results also show tendency for returns to improve during the week in many cases, although in some cases this pattern is interrupted by a high abnormal return on Wednesday

Endnotes

[1]See, for example, Gibbons and Hess (1981), Keim and Stambaugh (1984), Lakonishok and Smidt (1988), Abraham and Ikenberry (1994), Aggarwal and Schatzberg (1997), Pettengill (2003).

[2]See, for example, Liano and Lindley (1995), Kohers and Kohers (1995), Keim and Stambaugh (1984), Gibbons and Hess (1981).

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Author's information
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