Friday the 13th: international evidence

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The Friday the 13th anomaly discussed by Kolb and Rodriguez in 1987 is revisited in an international context. Using the FTSE world indices over the period 1988–2000, for 19 countries, it is found that there is some evidence that returns on Friday the 13th are statistically different from, and generally greater than, returns on other Fridays.

I. INTRODUCTION

It is now over a decade since the work of Kolb and Rodriguez (1987), Dyl and Maberly (1988) and Chamberlain *et al.* (1991), addressed the issue of superstition in the stock market, via the examination of the putative Friday 13th effect. Kolb and Rodriguez , based on an examination of the CRSP equal and value weighted indices, concluded that the mean return for Friday 13th was significantly lower than that for other Fridays. However, this finding was quickly disputed, with Dyl and Maberly's and Chamberlain *et al.*'s examination of the SandP 500 index. Dyl and Maberly in fact conclude that the mean return on Friday 13th is higher than that of other Friday's, while Chamberlain *et al.* concluded that the statistical evidence for differential Friday returns is a function of the turn of the month effect of Ariel (1987). However, it is worth noting that Chamberlain *et al.* also show (Table 1, panel A) that mean Friday 13th returns are in fact negative.

Since then, a large number of papers on various aspects of daily market returns have emerged, but the Friday the 13th issue has not been re-examined in any detail. Agrawal and Tandon (1994) present a chart (Fig. 5, p. 101) showing Friday 13th versus other Fridays, for their sample of 20 countries across a wide range of dates. They state, in their commentary, without providing evidence, that while the typical Friday 13th return is positive it is statistically insignificant. They also note that the standard deviations of the two sets of Fridays are similar. More recently, Mills and Coutts (1995) examining the FTSE indices over the 1986–1992 period and Coutts (1999) examining the FT-30 index over the period 1935–1994, find a higher mean return on Friday 13th compared to all other Fridays.

II. MOTIVATION

Appealing to Lakonishok and Smidt (1988), Dyl and Maberly (1988) argue that an anomaly cannot be accepted as being real until the phenomena has been duplicated across different data sets and time periods to those in which it appears initially. Their analysis is an attempt to investigate the phenomena along those lines. However, one difficulty is that it is not clear that the CRSP equal and value-weighted indices are in fact strictly comparable to the SandP 500 index. While Agrawal and Tandon (1994) have examined the phenomena across national markets, their data set comprises a series of national stock indices. These necessarily differ markedly in terms of composition method, coverage and technical detail. Unlike the Dyl and Maberly (1988) and Agrawal and Tandon (1994) papers, this note utilizes a data set designed for comparability, enabling a comparison of the phenomena over common time periods across 19 different national markets.

Equally importantly, the evidence on daily seasonality in the stock market indicates that while subtly different manifestations of this seasonality appear in different exchanges a certain degree of commonality in patterns exists. (See for example Agrawal and Tandon (1994) Chang *et al.*(1993), Balaban *et al.* (1998), Lucey (2000).) Thus, examination of a putative anomaly across different exchanges can throw light on its prevalence or otherwise. Again, this paper utilizes an international data set.

Finally, it is by now well accepted that security returns do not follow a normal distribution. The implications of this non-normality for classical *t*- and F-tests are also well known. Despite this, the tendency in the literature is still for authors to rely perhaps excessively on standard classical

Table 1. *Descriptive daily percentage returns for regular Fridays[1], all Fridays and Friday the thirteenth: 1988–2000; two tailed t-test*

		Mean	Std. Dev.	t-test[2]	Marginal Sig.	K–W test[3]	Marginal Sig.
AUSTRALIA	Regular Friday	− 0.0001	0.0108				
	Friday the 13th	0.0044	0.016				
	All Fridays	0.0001	0.011	− 1.335	0.195	1.503	0.22
AUSTRIA	Regular Friday	0.0001	0.0114				
	Friday the 13th	0.0024	0.0096				
	All Fridays	0.0002	0.0114	− 1.111	0.277	0.798	0.372
BELGIUM	Regular Friday	0.0002	0.0103				
	Friday the 13th	0.0036	0.0085				
	All Fridays	0.0003	0.0102	− 1.88	0.072	2.291	0.13
CANADA	Regular Friday	0.0006	0.0084				
	Friday the 13th	0.0015	0.0099				
	All Fridays	0.0006	0.0084	− 0.418	0.68	0.669	0.413
DENMARK	Regular Friday	0.0001	0.0096				
	Friday the 13th	0.0016	0.0104				
	All Fridays	0.0002	0.0096	− 0.649	0.522	0.126	0.723
GERMANY	Regular Friday	− 0.0003	0.0123				
	Friday the 13th	0.0036	0.0098				
	All Fridays	− 0.0002	0.0122	− 1.842	0.078	3.398	0.065
HONG KONG	Regular Friday	0.0014	0.0149				
	Friday the 13th	0.0015	0.0172				
	All Fridays	0.0014	0.015	− 0.031	0.975	0.201	0.654
IRELAND	Regular Friday	− 0.0004	0.011				
	Friday the 13th	0.0057	0.0084				
	All Fridays	− 0.0002	0.011	− 3.383	0.002	8.58	0.003
ITALY	Regular Friday	0.0005	0.0132				
	Friday the 13th	0.0074	0.0129				
	All Fridays	0.0007	0.0132	− 2.525	0.019	4.461	0.035
JAPAN	Regular Friday	− 0.0002	0.0142				
	Friday the 13th	0.006	0.0172				
	All Fridays	0	0.0143	− 1.712	0.1	3.078	0.079
NETHERLANDS	Regular Friday	− 0.0001	0.0103				
	Friday the 13th	0.0036	0.0094				
	All Fridays	0	0.0103	− 1.848	0.077	3.086	0.079
NORWAY	Regular Friday	0.0009	0.0127				
	Friday the 13th	0.0069	0.0117				
	All Fridays	0.0011	0.0127	− 2.43	0.023	5.364	0.021
SINGAPORE	Regular Friday	0.0001	0.0144				
	Friday the 13th	0.0011	0.0153				
	All Fridays	0.0002	0.0144	− 0.288	0.776	0.315	0.575
SOUTH AFRICA	Regular Friday	0.0005	0.0163				
	Friday the 13th	− 0.0032	0.0156				
	All Fridays	0.0003	0.0163	1.117	0.275	0.759	0.384
SPAIN	Regular Friday	0.0005	0.0117				
	Friday the 13th	0.0065	0.0083				
	All Fridays	0.0007	0.0116	− 3.345	0.003	8.552	0.003
SWEDEN	Regular Friday	0.0014	0.0126				
	Friday the 13th	0.0072	0.0141				
	All Fridays	0.0016	0.0127	− 1.951	0.063	2.909	0.088
SWITZERLAND	Regular Friday	0.0003	0.0107				
	Friday the 13th	0.0041	0.0103				
	All Fridays	0.0004	0.0107	− 1.763	0.091	1.733	0.188
UK	Regular Friday	0.0003	0.0102				
	Friday the 13th	0.0035	0.0067				
	All Fridays	0.0004	0.0101	− 2.218	0.036	3.275	0.07
USA	Regular Friday	0.0006	0.0097				
	Friday the 13th	0.0011	0.0156				
	All Fridays	0.0006	0.01	− 0.15	0.882	1.645	0.2

1 Regular Friday is a Friday that is not a Friday the 13th
2 Two-tailed *t*-test for equality of means of regular and Friday the 13th Fridays
3 Kruskal–Wallis H statistic for equality of means of regular and Friday the 13th Fridays

statistical techniques. The difficulty of using classical techniques in small samples is also well known. Despite this all papers noted above which have examined the Friday 13th issue have chosen to employ these standard classical tests, casting some doubt on the statistical reliability of their results. This note utilizes the classical techniques, but supplements them with non-parametric methods.

III. DATA AND HYPOTHESES TESTING

The data set consists of daily Thursday close to Friday close returns on the FTSE World Indices from January 1988 to May 2000, for 19 countries. This gives a data set of 698 Fridays, including 23 occurrences of Friday 13th. The FTSE world indices are calculated to allow international and inter-sectoral comparisons, and as such provide an ideal data set for the investigation of return phenomena across sectors and markets. The returns are measured in local currency terms, which eliminates the potential for conflation of potential Friday the 13th effects in the stock and foreign exchange returns. The time period includes the market correction of Friday 13 October 1989, when markets worldwide exhibited significant declines.

In addition to the standard classical *t*-test for differences in means, given the small sample numbers a non-parametric test is used. The Kruskal–Wallis H test statistic provides a powerful alternative to classical F-tests. It allows a check as to whether the mean returns from the two sets of Friday returns, those for Friday the 13th and those from other Fridays, are in fact equal.

IV. RESULTS

There is no theoretical or empirical reason to assume that the Friday the 13th returns will be lower or higher than those of Fridays that fall on other days of the month. Thus, a two-tailed *t*-test would seem appropriate.

Table 1 shows some distributional statistics as well as the results of the various statistical tests. It is immediately apparent that there is no evidence, apart from South Africa, that returns are poor or negative for Friday 13th. Thus, the result of Kolb and Rodriguez (1987) finds no support internationally. Indeed, apart from South Africa, the reverse is true. Friday the 13th returns are considerably greater. No clear pattern emerges with regard to standard deviation.

As was found by Dyl and Maberly (1988) for the USA, the tendency is for returns on Friday 13th to be substantially greater than those on other Fridays. This is confirmed statistically, with 11 out of the 19 countries, including UK, Japan and Germany showing a statistically significant

difference based on the two-tailed *t*-test at 10%. If the statistical criteria is tightened to 5% the number falls to 5, still including the UK. Based on non-parametric results nine countries including the UK, Japan and Germany show statistically significant differences, with four countries showing significance at 5%, albeit not including the UK or Japan. In neither case, parametric nor non-parametric, does the USA show statistically significant results.

V. CONCLUSION

Dyl and Maberly (1988) concluded that there was no Friday the 13th effect. The evidence presented here is that in the narrow Kolb and Rodriguez (1987) taxonomy they are correct. However, internationally almost without exception, and in many cases statistically significantly, there is a Friday the 13th anomaly. Returns on that day are higher than returns on other Fridays. Why this should be so is unclear.

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