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Abstract
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Keywords
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An empirical note on the holiday effect in the Australian stock market, 1996-2006

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This note examines the holiday effect in Australian daily stock returns at the market and industry levels and for small capitalisation stocks from Monday 9 September 1996 to Friday 10 November 2006. The eight annual holidays specified are New Years Day, Australia Day (26 January), Easter Friday and Easter Monday, ANZAC Day (25 April), the Queen's Birthday (second Monday in June), Christmas Day and Boxing Day. A regression-based approach is employed. The results indicate that the Australian market overall provides evidence of a pre-holiday effect in common with small cap stocks. However, the market level effect appears to be solely the result of a strong pre-holiday effect in the retail industry. No evidence is found of a post-holiday effect in any market or industry.

JEL classification: C12; C22; G14
Keywords: calendar effects; market anomalies; market efficiency

I. Introduction

A consistent theme in the market efficiency literature concerns the presence of calendar anomalies or seasonality in stock market returns. If, and as hypothesised, readily identifiable seasonal patterns occur there are, amongst other things, the possibility of abnormal returns through market timing strategies. Within this burgeoning literature, one of the more well-known calendar anomalies comprises a holiday effect, most characteristically a pre-holiday effect, where abnormally high returns accrue to stocks the day before a holiday. First identified as early as Fields (1934), the holiday effect is arguably one of the oldest and most consistent of all seasonal regularities. Some research has even shown that the holiday effect accounts for some 30 to 50 percent of the total return on the US market in the pre-1987 period (Lakonishok and Smidt 1988).

Arguably, the most promising explanation for the holiday effect lies in investor psychology (Brockman and Michayluk 1998; Vergin and McGinnis 1999). This hypothesis suggests that investors tend to buy shares before holidays because of 'high spirits' and 'holiday euphoria'.

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Unfortunately, this hypothesis has proven difficult to test directly, notwithstanding the empirical contradictions involved in indirect testing. For example, there is little evidence of a market correction as holiday spirits subside, since a negative post-holiday return would serve to add weight to the holiday euphoria hypothesis as investor spirits become more depressed.

In the US, the seminal study on holiday effects is by Lakonishok and Smidt (1988). Lakonishok and Smidt (1988) define holidays as eight public holidays on which the market is closed [Labour Day (first Monday in September), President's Day (third Monday in February), Memorial Day (last Monday in May), Independence Day (4 July), Thanksgiving Day (fourth Thursday in November), New Year's Day, Christmas and Good Friday]. Using the Dow-Jones Industrial Average from 1897 to 1986, Lakonishok and Smidt (1988) found that the average pre-holiday rate of return was 0.22 percent, compared with a regular daily rate of return of less than 0.01 percent. This meant that pre-holiday returns were about twenty-two times larger than returns on normal days, with some 63.9 percent of all returns being positive on the day before holidays.

These results were subsequently mirrored by Ariel (1990) in a study of CRSP equal-weighted and value-weighted indices from 1963-1982. Kim and Park (1994) and Brockman and Michayluk (1998) likewise found a US holiday effect using market indicators from the New York Stock Exchange, AMEX and NASDAQ from 1963-1987 and 1987-1993, respectively. However, more recent work in the US suggests that the holiday effect is fading. Vergin and McGinnis (1999), for example, tested for pre-holiday strength using the S&P500 and the NYSE composite indices (as proxies for stock returns on large corporations) and NASDAQ and AMEX composite indices (as proxies for stock returns on smaller corporations. Vergin and McGinnis (1999) found that the holiday effect has largely disappeared for large corporations but persists for small corporations; though even the magnitude of the small cap effect has diminished over time. This conclusion is similar to US findings elsewhere [see, for instance, Chong et al. 2005; Keef and Roush 2005; Marquering et al. 2006)].

The holiday effect has also received an increasing amount of attention outside the US (Cadsby and Ratner 1992; Agrawal and Tandon 1994; Chan and Khanthavit 1996; Arsad and Coutts 1997; Tonchev and Kim 2004; Chong and Hudson 2005). One of the earlier international studies of the holiday effect was by Cadsby and Ratner (1992). They considered Canada, Japan, Hong Kong and Australia from 1962 to 1989 and tested for local holidays, US holidays and joint (local-US) holidays using market indices from each country. The results indicated significant pre-holiday effects in all of the sample markets, with the highest returns appearing on days just prior to joint holidays.

Kim and Park (1994) provided further evidence of international holiday effects in their study of the Nikkei (Japan) and the Financial Times (UK) indexes, confirming Cadsby and Ratner's (1992) findings for Japan and presenting new evidence of a holiday effect in the UK. Interestingly, Kim and Park (1994) also noted a firm-size effect in these markets. In a broader study, Agrawal and Tandon (1994) tested for pre-holiday strength in seventeen national markets. The results indicated significant pre-holiday strength in 65 percent of the sample markets.

Research in South-East Asia has also identified the presence of a Chinese New Year effect. This refers to higher returns on days immediately preceding and, in some cases, following the Chinese Lunar New Year (Wong et al. 1990; Cadsby and Ratner 1992; Tong and Wildon 1992; Yen and Shyy 1993; Chan et al. 1996). Yen and Shyy (1993), for example, found evidence of significant excess returns prior to Chinese New Year in Hong Kong, Japan, Malaysia, Singapore, South Korea and Taiwan; Wong et al. (1990) identified both a Chinese New Year and an Aidilfitri (the festival ending the fast of Ramadan) effect on the Kuala Lumpur stock exchange; and Chan et al (1996) confirmed the Chinese New Year effect in Thailand, Singapore and Malaysia along with a mild Hindu holiday effect in Singapore and Malaysia.

The purpose of this note is to examine the holiday effect in the Australian stock market. While it resembles previous research including Australian markets, notably Cadsby and Ratner (1992), it complements and updates existing work by including marketwide, industry and small cap returns, thereby providing a more detailed understanding of the holiday effect. The remainder of the paper is divided into four main areas. Section II provides a description of the data employed in the analysis. Section III discusses the empirical methodology used. The results are dealt with in Section IV. The paper ends with a brief conclusion in Section V.

II. Description and Properties of the Data

Twelve different stock indices are used to test for the holiday effect in the Australian stock market. Each index series runs from 9 September 1996 to 10 November 2006 providing 2,635 end-of-day observations on the Australian Stock Exchange (ASX). Unfortunately, the sample period is the longest period over which daily prices are available for all twelve series. This is because the ASX in association with Standard and Poor's (S&P) introduced new indices based upon the Global Industry Classification Standard (GICS) in April 2000. While the daily price series for the market as a whole spans this change in classification, only a small number of sub-market series have been created by Global Financial Data (2006) using the post-April 2000 ASX/S&P series and the earlier ASX series. All data is sourced from Global Financial Data (2006).

To start with, the capitalisation-weighted All Ordinaries index is used to measure marketwide returns. Currently, the index includes the top ASX-listed stocks by capitalization, covering about 92 percent of domestic companies by market value. To be included in the index stocks must have an aggregate market value of at least 0.02 percent of all domestic equities, and maintain an average turnover in excess of 0.5 percent of quoted shares each month. Following this, the Small Ordinaries index is used to measure the returns on small capitalisation stocks. This index is composed of companies included in the S&P/ASX300 (top-three hundred companies by capitalisation), but not in the S&P/ASX100 (top-one hundred companies by capitalisation), and covers approximately 7 percent of the ASX. Because the Small Ordinaries index does not contain any of the hundred largest stocks it is a better proxy for small firms.

Finally, ten ASX/S&P industry indices are used to measure returns in different industries. The industries selected are banking, diversified financials, energy, healthcare, insurance, materials, media, retailing, telecommunications and transportation. Each index consists of fifty stocks in business areas within the industry. First, the banking, diversified financials and insurance indices contain companies involved in activities such as banking, mortgage finance, consumer finance, specialized finance, investment banking and brokerage, asset management and custody, corporate lending, insurance and financial investment and real estate. Second, the energy index comprises companies whose businesses are dominated by either of the following activities: the construction or provision of oil rigs, drilling equipment and other energy related service and equipment, including seismic data collection; or, companies engaged in the exploration, production, marketing, refining and/or transportation of oil and gas products, coal and other consumable fuels.

Third, the healthcare index encompasses two main industry groups. The first group includes companies who manufacture health care equipment and supplies or provide healthcare related services, and owners and operators of healthcare products, providers of basic healthcare services, and owners and operators of healthcare facilities and organizations. The second group includes companies primarily involved in the research, development, production and marketing of pharmaceuticals and biotechnology products. Fourth, the materials index encompasses a wide range of commodity-related manufacturing industries. Included in this index are companies that manufacture chemicals, construction materials, glass, paper, forest products and related packaging products, and metals, minerals and mining companies.

TABLE 1. *Selected descriptive statistics*

	Sample mean	Annualised mean	Median	Std. Dev.	Skewness	Kurtosis	Jarque-Bera
All Ordinaries	0.0333	8.6798	0.0348	0.7540	-0.6586	10.9597	7200.765
Small Ordinaries	0.0160	4.0807	0.0356	0.6691	-1.6818	31.8639	115019.2
Banking	0.0510	13.5948	0.0299	0.9532	-0.2755	5.5501	745.04
Diversified financials	0.0312	8.1110	0.0304	0.9718	-0.3633	9.0491	4033.73
Insurance	0.0261	6.7417	0.0000	1.2442	-1.3052	22.1254	40876.94
Energy	0.0459	12.1563	0.0371	1.1886	-0.2947	6.5117	1391.02
Healthcare	0.0373	9.7717	0.0033	1.0889	0.1773	13.8789	12997.83
Materials	0.0263	6.7950	0.0000	1.2837	-0.1147	7.7426	2473.31
Transport	0.0427	11.2631	0.0135	1.1310	-0.3924	9.2485	4341.03
Media	0.0261	6.7417	0.0000	1.7913	0.5310	13.6408	12507.61
Retail	0.0418	11.0131	0.0067	1.0880	-0.0718	7.6393	2363.48
Telecommunications	0.0036	0.9040	0.0000	1.2738	-0.1993	11.8887	8685.34

Notes: Sample period is Monday 9 September 1996 to Friday 10 November 2006. The means and medians are expressed as percentages; All Jarque-Bera statistics for normality are significant at the .01 level; critical values for significance of skewness and kurtosis respectively at the .05 level are 0.0935 and 0.1870. The annualised mean assumes 250 trading days per year.

Fifth, the transport index consists of companies involved in three main groups; manufacturers, suppliers and repairers of commercial vehicles including coaches and buses, and their components; transport operators engaged in the movement of freight; and public and private operators involved in the movement of passengers. Sixth, the media index contains companies involved with communication services as well as printing and publishing. Seventh, the retail index contains companies involved with clothing and footwear, miscellaneous manufacturing and retail trade. Lastly, the telecommunications index contains companies involved in communication services, internet service providers and manufacturing of communications equipment.

The natural log of the relative price is computed for the daily intervals to produce a time series of continuously compounded returns, such that $r_t = \log(p_t / p_{t-1}) \times 100$, where p_t and p_{t-1} represent the index price at time t and t-1, respectively. Table 1 presents a summary of descriptive statistics of the daily returns. The sample and annualised means, medians, standard deviations, skewness, kurtosis and Jacque-Bera statistics are reported.

By and large, the distributional properties of the twelve return series appear non-normal. Most series, with the exception of the healthcare and media industries, are significantly negatively skewed, indicating the greater probability of large deceases in returns than rises. The kurtosis, or degree of excess, in all return series is also significantly large, thereby indicating leptokurtic distributions with many extreme observations. Finally, the calculated Jarque-Bera statistics are used to test the null hypotheses that the daily distribution of returns is normally distributed. All *p*-values (not shown) are smaller than the .01 level of significance suggesting the null hypothesis can be rejected. None of these return series are then well approximated by the normal distribution.

III. Empirical Methodology

The approach used to test the holiday effect is a regression-based approach. The effect is examined on the basis of a trading time hypothesis whereby returns are created only on trading days during the week. As an alternative, Mills et al. (2000) proposed a calendar time hypothesis whereby returns are also created on non-trading days: that is, the return after a one-day holiday would be expected to be two times larger than returns on other days if the market efficiency null hypothesis holds. The following model is specified:

$$r_t = \lambda_0 + \lambda_1 PRE\_HOL + \lambda_2 POST\_HOL + \varepsilon_t \qquad (1)$$

where r_t is the daily market or industry return, PRE_HOL is a dummy variable representing the last trading day before a public holiday and zero otherwise, POST_HOL is a dummy variable representing the first trading day following a public holiday and zero otherwise, λ are coefficients to be estimated where λ_1 is the estimated return on the trading day before a holiday, λ_2 is the estimated return on days following a holiday, λ_0 is the estimated return on all other trading days and ε_t is a random error term. The hypothesis tested is $H_0 : \lambda_0 = \lambda_1 = \lambda_2$ against the alternative that not all λ are equal. If the null hypothesis is rejected, then the returns exhibit a form of holiday seasonality.

The eight national holidays specified are New Years Day (1 January), Australia Day (26 January), Easter Friday and Easter Monday, ANZAC Day (25 April), the Queen's Birthday (second Monday in June), Christmas Day (25 September) and Boxing Day (26 December).

While a number of other holidays are found in the various Australian states and territories (such as Melbourne Cup Day and Labour Day), these are the only holidays scheduled as non-trading and non-business weekdays by the ASX.

IV. Empirical Results

The estimated coefficients and standard errors of the parameters detailed in Equation (1) are presented in Table 2. Breusch-Godfrey Lagrange multiplier and White's heteroskedasticity tests (not shown) were initially used to test for higher-order serial correlation and/or heteroskedasticity in the least squares residuals, respectively. As expected, almost all of the least squares residuals displayed some form of both heteroskedasticity and serial correlation: the energy and retail industries models displayed only heteroskedasticity. Accordingly, all standard errors and *p*-values in Table 2 with the exception of the energy and retail industries incorporate corrections for heteroskedasticity and autocorrelation following Newey-West. The energy and retail industries models include corrections for heteroskedasticity only following White.

The results in Table 2 indicate significantly higher pre-holiday returns in the All Ordinaries market index. The pre-holiday return over the entire period is .1129 percent and the return on all other days of the year is .0236. This suggests that pre-holidays returns are nearly five times higher at the market level. The Small Ordinaries also displays a significantly high pre-holiday return. The average pre-holiday return on the Small Ords is .1188 percent whereas returns on any other day are .0166 percent. These results support the findings in Vergin and McGinnis (1999) who argued that the holiday effect was more prominent in small capitalisation stocks.

However, there is a little evidence of a holiday effect at the industry level with retail being the only industry displaying a significant holiday effect. As shown, retail industry returns average .2372 percent on pre-holidays and .035 percent on all other days: an almost sevenfold increase. This appears consistent with the strong seasonality found in most financial aspects of the retail industry. For instance, the high pre-holiday returns are most likely due to anticipated high sales turnover during the Christmas period. No evidence of a post-holiday effect is apparent in any industry.

TABLE 2. *Estimated coefficients and standard errors*

		CONS.	*PRE_HOL*	*POST_HOL*
All Ordinaries	Coefficient	**0.0236**	**0.1129**	0.1300
	Std. error	0.0115	0.0672	0.0818
Small Ordinaries	Coefficient	0.0116	**0.1188**	0.0799
	Std. error	0.0155	0.0613	0.0960
Banking	Coefficient	**0.0507**	-0.0081	0.0234
	Std. error	0.0190	0.1311	0.1349
Diversified Financials	Coefficient	**0.0321**	0.1077	-0.1494
	Std. error	0.0199	0.0995	0.1276
Energy	Coefficient	**0.0416**	0.1841	0.0197
	Std. error	0.0237	0.1606	0.1606
Healthcare	Coefficient	0.0316	0.1900	0.0884
	Std. error	0.0205	0.2654	0.1679
Insurance	Coefficient	0.0262	0.1021	-0.1524
	Std. error	0.0267	0.1290	0.1794
Materials	Coefficient	0.0219	0.1938	0.0194
	Std. error	0.0264	0.1387	0.1862
Media	Coefficient	0.0251	0.0822	-0.0385
	Std. error	0.0349	0.1675	0.3160
Retail	Coefficient	**0.0350**	**0.2372**	0.0616
	Std. error	0.0217	0.1457	0.1445
Telecoms	Coefficient	0.0031	0.0083	0.0183
	Std. error	0.0254	0.1753	0.1753
Transport	Coefficient	**0.0397**	-0.0410	0.1985
	Std. error	0.0218	0.1257	0.1495

Notes: Dependent variables are daily returns on the market or industry in the first column. Sample period is Monday 9 September 1996 to Friday 10 November 2006. All standard errors and p-values incorporate either White's corrections for heteroskedasticity of unknown form (energy and retail industries only) or Newey-West corrections for heteroskedasticity and autocorrelation of unknown form (all other industries and markets). Significant coefficients (p-value <.10) in bold.

V. Conclusion

This study examines the presence of the holiday effect in Australian market and industry returns over the period 1996 to 2006. Evidence is found of a holiday effect at the market level with pre-holiday returns typically five times higher than other days. A small firm effect is also supported with pre-holiday returns in small cap stocks more than ten times higher than other trading days. At the sub-market level, pre-holiday effects are only found in the retail industry. Bearing in mind the construction of the indices used in this study, it is very likely that the very strong holiday seasonality found in the retail industry is the main reason for the holiday seasonality in market and small cap returns. There is no evidence of a (negative) post-holiday effect in this particular industry and this calls into doubt whether the observed seasonality is indeed the result of 'high spirits' and 'holiday euphoria' or some rather more prosaic motivation.

The generally low level of observed holiday seasonality implies that the Australian stock market overall is weak-form efficient. A number of contributory factors are possible, including the growth in derivative markets, the increasing internationalisation and liberalisation of the domestic capital market, increased trading by institutional rather than individual investors, and the dramatic fall in transaction costs, especially those relating to brokerage, taxation and information procurement. However, strong pre-holiday effects are found in retail industry stocks. Since these represent unexploited profit opportunities and violations of market efficiency, interesting opportunities for research exist in terms of identifying whether market conditions such as liquidity and/or industry-specific operational factors represent the source of these anomalies.

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