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The Month-of-the-year Effect in the Australian Stock Market: A Short Technical Note on the Market, Industry and Firm Size Impacts

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Abstract
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Abstract

This short note examines the month-of-the-year effect in Australian daily returns using a regression-based approach. The results indicate that marketwide returns are significantly higher in April, July and December combined with evidence of a small cap effect with systematically higher returns in January, August, and December. The analysis of the sub-market returns is also supportive of disparate month-of-the-year effects. However, only in the case of small cap firms and the telecoms industry do these coincide with the higher returns associated with the January effect as typified in work elsewhere.

1. INTRODUCTION

A consistent theme in the market efficiency literature has concerned the presence of calendar anomalies or seasonality in stock market returns. One of the more common findings of this work, particularly in the US, is higher returns on trading days in some months of the calendar year. Its most prevalent manifestation is, of course, the so-called January effect [see, most recently, Fountas and Segredakis (2002), Mehdian and Perry (2002), Tonchev and Kim (2004), Rosenberg (2004), Al-Saad and Moosa (2005) and Marquering et al. (2006)].

The purpose of this short note is to re-examine the month-of-the-year effect in the Australian stock market. While it resembles previous international research conducted in this area, though rarely in this context, it complements existing work by

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including marketwide, industry and small cap returns, thereby providing a more detailed understanding of the month-of-the-year effect in all its manifestations. The remainder of the paper is divided into four main areas. Section 2 provides a description of the data employed in the analysis. Section 3 discusses the empirical methodology used. The results are dealt with in Section 4. The paper ends with a brief conclusion.

2. DESCRIPTION AND PROPERTIES OF THE DATA

Twelve different stock indices are used to test for the month-of-the-year effect in the Australian stock market. Each index series starts on 9 September 1996 and provides 2,635 end-of-day observations on the Australian Stock Exchange (ASX). This is the longest period over which daily prices are available. All data is sourced from Global Financial Data.

Table 1

Selected descriptive statistics

Market/industry	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
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
Transport	0.0427	11.2631	0.0135	1.1310	-0.3924	9.2485	4341.03

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. 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. 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.

The natural log of the relative price is calculated to produce a time series of daily continuously compounded returns, such that $r_t = \log(p_t / p_{t-1}) \times 100$, where p_t and $p_{t\text{-}1}$ 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.

3. EMPIRICAL METHODOLOGY

The approach used to test the month-of-the-year hypothesis is a regression-based approach. The following model is specified:

$$R_t = \sum_{i=1}^{12} \alpha_i M_{it} + \varepsilon_t \qquad (1)$$

where M_i is a dummy variable taking a value of one for a trading in month i and zero otherwise (where i = 1,2…12), α are parameters to be estimated and ε is the error term. The hypothesis tested is

$H_0 : \alpha_1 = \alpha_2 = \alpha_3 = \alpha_4 = \alpha_5 = \alpha_6 = \alpha_7 = \alpha_8 = \alpha_9 = \alpha_{10} = \alpha_{11} = \alpha_{12}$ against the alternative that not all α are equal. If the null hypothesis is rejected, then the returns exhibit month-of-the-year seasonality.

4. 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 of the month-of-the-year regressions for the marketwide All Ordinaries index indicate significantly higher returns in April, July and December. The mean return of the All Ordinaries Index on any given day of the year is .0288 percent. The mean daily returns in April, July and December are .0846 percent, .0670 percent and .0956 percent respectively. Conversely, the Small Ordinaries index displays a significant January effect. The mean return of small cap firms over the sample period studied is .0160 percent, whereas the mean return in January is .0853 percent. August (0.0631) and December (0.0790) also display significantly higher returns than other months of the year. A likely explanation for the small cap effect include the portfolio rebalancing hypothesis as portfolio re-balancing is common at the turn of the year.

There are significantly abnormal monthly returns in nine of the ten industry indices shown in Table 2 (the media industry is the exception). The banking industry displays significantly higher April and October returns, the healthcare industry exhibits significantly higher August and December returns, the insurance industry shows significantly higher returns in December and significantly negative returns in January, the materials industry displays significantly higher December returns, and there are significantly higher returns during June and November in the diversified financials industry.

The energy industry regression results presents significantly higher returns in March, April, May, June and September and the retail industry exhibits higher November returns and significantly lower January returns. Since cash flows in the energy and retail industry are relatively seasonal, it is thought that this may reflect peak energy demand periods in Australia and the slowdown in retail sales in January

Table 2

Estimated coefficients and standard errors

		January	February	March	April	May	June	July	August	September	October	November	December
All Ordinaries	Coefficient	0.0412	-0.0033	0.0179	**0.0846**	0.0287	0.0188	**0.0670**	0.0010	-0.0341	0.0191	0.0064	**0.0956**
	Std. error	0.0328	0.0378	0.0394	0.0392	0.0385	0.0337	0.0399	0.0384	0.0404	0.0471	0.0430	0.0389
Small Ordinaries	Coefficient	**0.0853**	-0.0147	-0.0546	-0.0159	-0.0263	0.0534	0.0391	**0.0631**	-0.0057	0.0038	-0.0131	**0.0790**
	Std. error	0.0347	0.0385	0.0526	0.0614	0.0586	0.0564	0.0474	0.0445	0.0658	0.0643	0.0398	0.0424
Banking	Coefficient	0.0818	0.0080	0.0348	0.1508	0.0611	0.0681	-0.0784	-0.0558	0.0316	0.1462	0.0974	0.0662
	Std. error	0.0590	0.0613	0.0624	0.0626	0.0649	0.0590	0.0646	0.0580	0.0741	0.0778	0.0650	0.0571
Diversified Financials	Coefficient	0.0506	-0.0315	-0.0038	0.0014	-0.0045	**0.1145**	0.0038	-0.0084	-0.0171	0.0732	**0.1179**	0.0766
	Std. error	0.0560	0.0533	0.0680	0.0611	0.0623	0.0581	0.0642	0.0698	0.0797	0.0917	0.0621	0.0521
Energy	Coefficient	0.0642	-0.1251	**0.1689**	**0.1019**	**0.1094**	**0.0978**	0.0460	-0.0487	**0.1003**	-0.0635	0.0645	0.0261
	Std. error	0.0801	0.0836	0.0798	0.0812	0.0799	0.0810	0.0799	0.0799	0.0782	0.0784	0.0814	0.0796
Healthcare	Coefficient	-0.0705	0.0045	-0.0483	-0.0278	0.0049	0.1416	0.0416	0.1197	0.0593	0.0094	0.1047	0.1085
	Std. error	0.0592	0.0950	0.0578	0.0768	0.0680	0.0963	0.0583	0.0722	0.0708	0.0767	0.0684	0.0614
Insurance	Coefficient	-0.1473	0.0029	0.0978	0.1057	-0.1226	0.0866	-0.0553	0.0641	-0.0472	0.0815	0.0849	0.1534
	Std. error	0.0721	0.0747	0.0917	0.0745	0.1039	0.1556	0.0679	0.0905	0.1030	0.0700	0.0668	0.0679
Materials	Coefficient	-0.0183	0.0239	-0.0142	0.0820	-0.0676	0.0716	0.0290	-0.0465	0.1093	-0.0855	0.0557	0.1792
	Std. error	0.0863	0.0767	0.0711	0.0949	0.0965	0.0849	0.0883	0.0862	0.1099	0.1153	0.0830	0.0696
Media	Coefficient	0.1303	0.0174	-0.0308	0.0712	0.0030	0.0813	-0.0320	-0.1158	-0.0334	0.0621	0.1443	0.0258
	Std. error	0.1260	0.1186	0.1196	0.1429	0.0925	0.1248	0.0853	0.1218	0.1117	0.1384	0.1178	0.1022
Retail	Coefficient	**-0.0895**	0.0811	-0.0197	-0.0190	0.0125	0.0915	0.0637	0.0853	0.0704	0.0663	0.1105	0.0505
	Std. error	0.0636	0.0781	0.0733	0.0707	0.0805	0.0691	0.0687	0.0765	0.0772	0.0918	0.0670	0.0571
Telecoms	Coefficient	**0.1200**	-0.0687	-0.0092	-0.0627	-0.1018	0.0366	0.0564	-0.0739	-0.0918	0.0282	0.1330	0.0779
	Std. error	0.0595	0.0936	0.0858	0.0641	0.0866	0.0960	0.0686	0.0813	0.0833	0.0772	0.0940	0.0632
Transport	Coefficient	0.0334	-0.0257	-0.0375	**0.1833**	0.0800	0.0630	0.0410	-0.0474	0.0640	0.0349	0.0286	0.0931
	Std. error	0.0756	0.0861	0.0664	0.0735	0.0599	0.0701	0.0586	0.0717	0.0799	0.0887	0.0910	0.0592

as consumers tend to have less disposable income after heavy spending during the holidays. In contrast, the telecommunications industry has significantly higher January returns and the transportation industry has significantly higher April returns.

5. CONCLUDING REMARKS

This study examines the presence of the month-of-the-year effect in the Australian market and industry returns. In only two instances (small cap and retail firms) are the results consistent with the oft-found manifestation of monthly seasonality in stock returns: namely, significantly higher January returns. At the market level, evidence is found of significantly higher returns in April, July and December (up to nearly three times higher than average returns across all months). The impact for small cap firms is even more pronounced with January, August and December returns being 5.3, 3.9 and 4.9 times higher than mean returns throughout the year. At the sub-market level, month-of-the-year effects are found in the diversified financials, energy, retail, telecommunications and transport industries, but not in the banking, healthcare, insurance, materials and media industries. Of these, the most substantial month-of-the-year effects at the industry level relative to mean industry returns are January returns in the retail industry which are more than twice as low as returns in other months of the year and in the telecommunications industry where they are more than thirty-three times higher.

The high level of observed monthly seasonality implies that the Australian stock market overall is not weak-form efficient. A number of hypotheses would appear to be appropriate in explaining this seasonality, in particular the tax-loss selling and liquidity constraint hypotheses in small cap firms and company announcement effects elsewhere. The latter appears to be particularly pertinent to the energy and retail industries where the abnormal returns appear to closely coincide with known seasonal variation in cash flows. Since these represent unexploited profit opportunities and violations of market efficiency, interesting opportunities for research then 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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Table 2

Estimated coefficients and standard errors

		January	February	March	April	May	June	July	August	September	October	November	December
All Ordinaries	Coefficient	0.0412	-0.0033	0.0179	**0.0846**	0.0287	0.0188	**0.0670**	0.0010	-0.0341	0.0191	0.0064	**0.0956**
	Std. error	0.0328	0.0378	0.0394	0.0392	0.0385	0.0337	0.0399	0.0384	0.0404	0.0471	0.0430	0.0389
Small Ordinaries	Coefficient	**0.0853**	-0.0147	-0.0546	-0.0159	-0.0263	0.0534	0.0391	**0.0631**	-0.0057	0.0038	-0.0131	**0.0790**
	Std. error	0.0347	0.0385	0.0526	0.0614	0.0586	0.0564	0.0474	0.0445	0.0658	0.0643	0.0398	0.0424
Banking	Coefficient	0.0818	0.0080	0.0348	0.1508	0.0611	0.0681	-0.0784	-0.0558	0.0316	0.1462	0.0974	0.0662
	Std. error	0.0590	0.0613	0.0624	0.0626	0.0649	0.0590	0.0646	0.0580	0.0741	0.0778	0.0650	0.0571
Diversified Financials	Coefficient	0.0506	-0.0315	-0.0038	0.0014	-0.0045	**0.1145**	0.0038	-0.0084	-0.0171	0.0732	**0.1179**	0.0766
	Std. error	0.0560	0.0533	0.0680	0.0611	0.0623	0.0581	0.0642	0.0698	0.0797	0.0917	0.0621	0.0521
Energy	Coefficient	0.0642	-0.1251	**0.1689**	**0.1019**	**0.1094**	**0.0978**	0.0460	-0.0487	**0.1003**	-0.0635	0.0645	0.0261
	Std. error	0.0801	0.0836	0.0798	0.0812	0.0799	0.0810	0.0799	0.0799	0.0782	0.0784	0.0814	0.0796
Healthcare	Coefficient	-0.0705	0.0045	-0.0483	-0.0278	0.0049	0.1416	0.0416	0.1197	0.0593	0.0094	0.1047	0.1085
	Std. error	0.0592	0.0950	0.0578	0.0768	0.0680	0.0963	0.0583	0.0722	0.0708	0.0767	0.0684	0.0614
Insurance	Coefficient	-0.1473	0.0029	0.0978	0.1057	-0.1226	0.0866	-0.0553	0.0641	-0.0472	0.0815	0.0849	0.1534
	Std. error	0.0721	0.0747	0.0917	0.0745	0.1039	0.1556	0.0679	0.0905	0.1030	0.0700	0.0668	0.0679
Materials	Coefficient	-0.0183	0.0239	-0.0142	0.0820	-0.0676	0.0716	0.0290	-0.0465	0.1093	-0.0855	0.0557	0.1792
	Std. error	0.0863	0.0767	0.0711	0.0949	0.0965	0.0849	0.0883	0.0862	0.1099	0.1153	0.0830	0.0696
Media	Coefficient	0.1303	0.0174	-0.0308	0.0712	0.0030	0.0813	-0.0320	-0.1158	-0.0334	0.0621	0.1443	0.0258
	Std. error	0.1260	0.1186	0.1196	0.1429	0.0925	0.1248	0.0853	0.1218	0.1117	0.1384	0.1178	0.1022
Retail	Coefficient	**-0.0895**	0.0811	-0.0197	-0.0190	0.0125	0.0915	0.0637	0.0853	0.0704	0.0663	0.1105	0.0505
	Std. error	0.0636	0.0781	0.0733	0.0707	0.0805	0.0691	0.0687	0.0765	0.0772	0.0918	0.0670	0.0571
Telecoms	Coefficient	**0.1200**	-0.0687	-0.0092	-0.0627	-0.1018	0.0366	0.0564	-0.0739	-0.0918	0.0282	0.1330	0.0779
	Std. error	0.0595	0.0936	0.0858	0.0641	0.0866	0.0960	0.0686	0.0813	0.0833	0.0772	0.0940	0.0632
Transport	Coefficient	0.0334	-0.0257	-0.0375	**0.1833**	0.0800	0.0630	0.0410	-0.0474	0.0640	0.0349	0.0286	0.0931
	Std. error	0.0756	0.0861	0.0664	0.0735	0.0599	0.0701	0.0586	0.0717	0.0799	0.0887	0.0910	0.0592