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Overreaction Hypothesis and Aftermarket Performance of the U.K. IPOS

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〈요 약〉

本稿에서는 영국기업의 최초공모주를 이용하여 最初公募株 市場에 나타나는 3가지 異例現象 즉 短期에 있어 최초공모주의 低價發行現象, 長期에 있어 최초공모주의 低成果現象그리고 hot issue market 존재를 분석하고 있다. 이러한 분석은 주로 美國 發行市場을 대상으로 이루어져 왔는 바, 시장의 효율성 측면에서 비슷한 수준을 유지하고 있는 英國의 證券市場에서도 이러한 현상이 나타나는지를 조사해보는 것은 의미가 있을 뿐만아니라 이러한 현상이 다른 시장에서도 통상 나타나는 현상인지를 밝히는데도 의의가 있다고 보여진다.

英國의 最初公募株 市場에서의 3가지 異例現象을 분석하기 위해 우선 거래 첫날의 市場調整收益率을 계산하여 신규공모주가 시장가격에 비해 割引되어 발행되는지를 조사한 결과 시장가격에 비해 12.88% 정도 할인발행되고 있음이 밝혀졌다. 단기의 低價發行現象과는 달리 신규공모주가 시장에 상장된지 3년이 경과한 후 추정된 長期投資收益率은 12.05%의 負의 累積超過收益率을 시현하고 있는데 이는 過剩反應假說에 의해 설명되고 있다. 끝으로 1987년의 최초공모주가 다른 연도에 비해 다섯배 정도로 저가발행되고 있음을 밝힘으로써 英國發行市場에도 hot issue market 현상이 나타남을 분석하고 있다.

Ⅰ. Introduction

Many authors have documented that three anomalies appear in the initial public offerings(IPOs) markets. Of These, the first anomaly is that the new issues are underpriced in the short-run. Secondly, the hot issue market phenomenon appears. Thirdly, in the long-run, the initial public offerings of equities are

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overpriced[1].

In this paper we will investigate whether these three anomalies also appear in the UK new issues market. The evidence on the underpricing phenomenon of initial public offerings in the short-run will be examined first. Then the long-run performance of new issues will be analysed using cross-sectional and time-series analysis. Finally we will briefly examine the existence of the hot issue market in the UK IPOs market[2].

In fact to date, most of IPOs related studies have focused on explaining the phenomenon of the short-run underpricing of initial public offerings. We however will attempt to examine the long-term performance of initial public offerings, which is in contrast to the short-run performance, because the long-term performance shows negative returns based on CAAR by year 3. Such underperformance of new issues in the long-run will be explored in terms of the market overreaction hypothesis or theories of fads. In particular, the concurrent analysis of the short-run and long-run performance might provide the investor with investment strategies for dealing with initial public offerings.

This paper is organised as follows. Section Ⅱ gives a brief review of the previous studies on aftermarket performance in UK, US and others. Section Ⅲ describes the data and sample composition and the computation method of abnormal returns. The evidence of underpricing of new issues in the UK will be examined in section Ⅳ. Section Ⅴ deals with the long-term performance of the UK IPOs through observing the price behaviour of IPOs over the three years after listing on the stock market. Section Ⅵ presents the existence of the hot issue market, and section Ⅶ concludes.

Ⅱ. The Previous Studies on the Aftermarket Performance of IPOS

In this section, we will examine the results of the existing studies on the evidence of the short-run underpricing and long-run performance of initial public offerings.

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1) In recent studies, Aggarwal and Rivoli(1990) and Ritter(1991) have examined in depth the long-term performance of US IPOs. In addition, in the US the long-term investigation of the performance of initial public offerings has been partially conducted by stoll and curley(1970), Ibbotson(1975), and Stern and Bornstein(1985). On the other hand, in the UK Levis(1993) is the only related paper on the long-term performance. More recently, Aggarwal, Leal and Hernandez(1993) analysed the long-run performance of IPOs in Brazil, Chile and Mexico.

2) Studies focusing on examining the hot issue markets are as follows:SEC(1963), Ibbotson and Jaffe(1975) and Ritter(1984b). Studies on the UK market have been partially carried out by Trundle and Jenkinson(1990) and Jenkinson and Espenlaub(1991).

Table 1. Previous Studies on Aftermarket Performance of IPOs

Study	Sample Description		Estimated Short Run	Estimated Long-Run
	Period	Size	Underpricing(%)	Performance(%)
Merrett, Howe & Newbould(1967):UK	1959-63	OS:149 PL:193	OS:13.7 PL:19.2	- -
Davis & Yeomans(1976):UK	1965-71	275	11	-
Buckland, Herbert & Yeomans(1981):UK	1965-75	297	9.7	-
Trundle & Jenkinson (1990):UK	1985-89	227	11.9	-
Levis(1993):UK	1980	712	14.30	-11.38(3years)
SEC(1963):US	1959-61	1,671	16	-
Ibbotson(1975):US	1960-69	120	11.4	-
Ritter(1984):US	1960-82 1977-82 1977-82 1980-81	5,000 1,028 703 325	18.8 26.5 16.3(Cold Issue) 48.4(Hot Issue)	-
Ibbotson, Sindelar & Ritter(1988):US	1960-87	8,668	16.37	-
Aggarwal & Rivoli(1990):US	1977-87	1,598	10.67	-13.73(1 year)
Ritter(1991):US	1975-84	1,526	14.32	-29.13(3 years)
Kim & Lee(1989):Korea	1984-86	41	37.0	-
Kim, Krinsky & Lee (1993):Korea	7/1988- 3/1990	177	57.54	-
Aggarwal, Leal & Hernandez (1993):Brazil	1980-90	62	78.5	-47.0(3 years)
Jog & Riding(1987):Canada	1971-83	100	11.0	-
Husson & Jacquillat (1989):France	1983-86	131	4.0	-
Uhlir(1989):Germany	1977-87	97	21.5	- 7.41(1 year)
McGuinness(1993): Hong Kong	1980-90	92	16.59	-18.26(2 years)
Hiraki(1985):Japan	1979-84	108	53.33	-2.33(1 year)
Dawson(1987):Malaysia	1978-83	21	166.6	18.2(1 year)
Koh & Walter(1989):Singapore	1973-87	66	27	-

Note: OS: offer for sales
PL: placings.

As can be seen in Table 1, many studies found that in the short-run the initial public offerings show the positive excess returns in all the new issue markets. Seeing the extent of underpricing of new issues by country, the advanced nations such as the UK, the USA, France, Canada exhibit relatively small excess return. However in Japan the excess returns realised at the first trading day show 53.3% and therefore the Japanese new issues are greatly underpriced compared to other advanced markets. In particular France, using tender offers, shows little underpricing of new issues.

On the other hand, the Magnitude of underpricing of IPOs in the emergining markets, including Korea, Brazil and singapore, is greater. Of the developing markets, in Hong Kong the initial public offerings are offered at less discount price, showing excess returns of 16.59%. In the Malaysian stock market displaying the average market adjusted return of around 167%, the shares of initial public offerings were priced very low relative to the expected market price.

The phenomenon of underpricing of new issues is well documented in numerous studies and then many authors put forward several theories to explain the underpricing of initial public offerings.

In the short-term, the shares of initial public offerings are found to be significantly underpriced, but more recently some studies have focused on examining the long-run performance of the shares of initial public offerings and have then documented that IPOs underperform in the long-term relative to the overall market. The results in Table 1 show that IPOs in all markets except Malaysia were overpriced in the context of the long-term performance. These findings might provide the investors with new perspective on IPO investment strategy. That is, it is desirable for the successful applicants to sell within a few weeks after lisiting on the stock market. Aggarwal and Rivoli (1990) and Ritter (1991) explained the underperformance of new issues in the long-run in terms of a fad theory or overreaction hypothesis. In recent analysis of the long-run performance of UK IPOs, Levis (1993) found that UK IPOs also show underperformance by the third anniversary of their public listing. The worst long-term performance is found among the group of new issues with the highest initial returns. This finding is line with the results of the US market studies such as Ritter (1991), etc.

Ⅲ. Sample Design and Methodology

1. Sample Design

The sample for an empirical investigation of aftermarket performance of initial public offerings in the U.K. was drawn from the firms which went public in the London Stock Exchange from 1985 to 1990.

Table 2. Sample for the UK IPOs Market Analysis

Year	Level of Market		Method of Issue		Total
	Official List	USM	Offer for Sale	Placing	
1985	28	74	33	69	102
1986	48	69	40	77	117
1987	53	56	10	99	109
1988	40	61	11	90	101
1989	21	42	5	58	63
1990	9	11	1	19	20
Total	199	313	100	412	512

During that period a total of 1,526 new firms[3] were admitted to the main market (Official List), the USM and third market of the London Stock Exchange. Our sample was restricted to companies which were listed on the main market and USM by an offer for sale or placing. The companies which employed the methods of introduction, offer for sale by tender and subscription were excluded because the first one did not raise any new funds and the remaining two were rarely used.

We excluded initial public offerings of companies which involved a joint offer and placing and only considered ordinary share flotations for UK trading companies (excluding some financial companies such as investment trust). Initial public offerings of 512 UK companies were identified (see Table 2).

The list of initial public offerings of sample companies was identified from 'Companies Newly Admitted to Listing' of #Quality of Market Quarterly Review# of the London Stock Exchange and the column of "New Issues" in the #Investors Chronicle.# Basic data such as issuing date, method of issue, offer price, market value, identification of industry (by SE classification) and proceeds were also collected from the above two sources. Daily share prices of sample companies were collected from DATASTREAM. FTA All-Share Index data used as an index for adjusting market movement were also collected from DATASTREAM.

2. Computation of Initial and Cumulative Abnormal Returns

We computed the underpricing of shares of initial public offerings in the following way. That is, the underpricing of initial public offerings was estimated by computing the post-issue abnormal

3) 206 new issues listed on the London stock market were overseas companies.

returns[4]. Using the market adjusted returns approach[5], the ex post abnormal returns of individual new issues, ARit, were estimated in the following way:

$$AR_{it} = R_{it} - R_{mt} \tag{1}$$

where, Rit is the realised rate of return of new issues of individual companies at time t and Rmt is the realised rate of return of market at time t. We used FTA-All Share Index as the proxy for the market index.

The market-adjusted returns of individual firms calculated by equation (1) are averaged across firms to compute average abnormal returns(AARt) (see equation (2)) · Cumulative abnormal returns (CARit) for each issuing firm and cumulative average abnormal returns (CAARt) across firms over time are calculated by equations (3) and (4), respectively. This market adjusted model assumes that the beta of the portfolio of sample firms is equal to that of the market portfolio. AARt and CAARt will be used to examine the underpricing of unseasoned new issues and to analyse the aftermarket performance of initial public offerings over time.

$$AAR_t = \frac{1}{n} \sum_{i=1}^{n} AR_{it} \tag{2}$$

$$CAR_t = \sum_{t=1}^{T} AR_{it} \tag{3}$$

$$CAAR_t = \frac{1}{n} \sum_{i=1}^{n} CAR_{it} = \frac{1}{n} \sum_{i=1}^{n} \sum_{t=1}^{T} AR_{it} \tag{4}$$

Ⅳ. Evidence on the Underpricing of the UK IPOs

The evidence on the underpricing of initial public offerings in the UK new issues market can be identified by estimating market-adjusted returns for 512 sample firms between 1985 and 1990. Market adjust-

4) The abnormal return for a given security in any time period it is defined as the difference between its realised ex post return and that which is predicted under the assumed return-generating process.

5) There are three general models in measuring abnormal performance:mean return approach, market adjusted return approach, and market and risk adjusted return model(Brown and Warner(1980), pp.207-208). In their empirical study, the market-adjusted model is used and this model is the most common approach employed in many studies.

Table 3. Descriptive Statistics for Initial Abnormal Return and Price Behaviour of IPOs

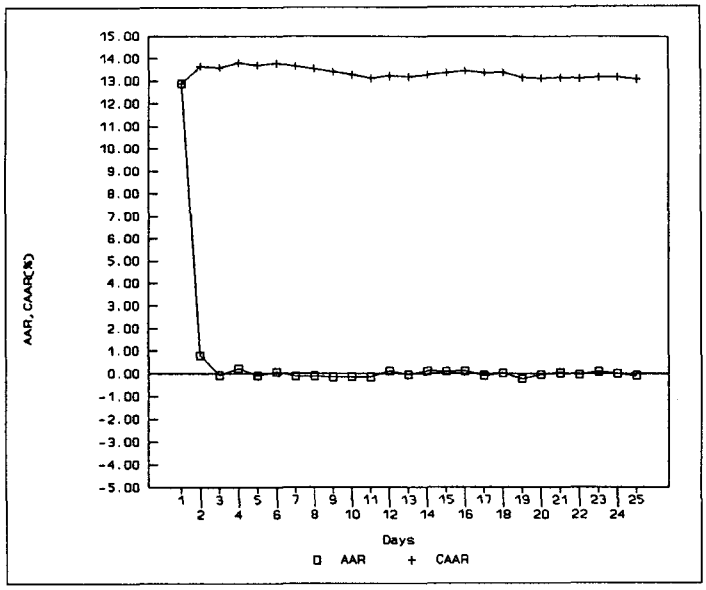
DAY	AAR	t(AAR)	CAAR	MEDIAN	STD	Q1	Q3
1	12.88	16.99	12.88	8.85	17.15	2.08	19.04
2	0.78	3.05	13.66	0.00	5.79	-1.09	1.46
3	-0.07	-0.6	13.59	-0.08	2.75	-0.90	0.88
4	0.22	1.96	13.80	-0.04	2.50	-0.78	0.81
5	-0.10	-0.81	13.70	-0.15	2.79	-1.00	0.56
6	0.07	0.57	13.77	-0.11	2.57	-0.83	0.64
7	-0.12	-1.35	13.65	-0.17	1.96	-0.87	0.41
8	-0.11	-1.23	13.55	-0.09	1.99	-0.84	0.53
9	-0.15	-1.61	13.40	-0.25	2.09	-0.91	0.63
10	-0.14	-1.55	13.26	-0.26	2.01	-0.90	0.52
11	-0.15	-1.76	13.11	-0.03	1.97	-0.82	0.58
12	0.11	0.86	13.21	-0.04	2.88	-0.83	0.60
13	-0.04	-0.41	13.17	-0.07	2.31	-0.70	0.64
14	0.10	0.93	13.27	-0.06	2.44	-0.75	0.67
15	0.09	0.96	13.36	-0.07	2.10	-0.75	0.65
16	0.09	1.18	13.46	-0.01	1.79	-0.70	0.65
17	-0.09	-1.07	13.37	-0.16	1.82	-0.79	0.52
18	0.01	0.15	13.38	-0.07	2.12	-0.79	0.71
19	-0.23	-2.45	13.16	-0.30	2.07	-1.00	0.37
20	-0.04	-0.48	13.12	-0.09	1.81	-0.86	0.61
21	0.03	0.36	13.15	-0.07	2.07	-0.71	0.59
22	-0.05	-0.54	13.11	-0.14	2.04	-0.76	0.72
23	0.07	0.85	13.18	0.00	1.91	-0.69	0.65
24	0.00	-0.02	13.17	-0.10	1.69	-0.73	0.53
25	-0.08	-0.87	13.09	-0.04	2.12	-0.80	0.62

ed returns[6] can be computed by various chosen time intervals relative to the offering or subscription date. We have used first day market-adjusted returns which are the difference between offer price and the first day price of trading.

As reported in Table 3, initial average market adjusted returns (AAR1) realised on first trading day

6) FTA All Share Index is used as a benchmark for computing market adjusted returns.

Figure 1. Change of AAR and CAAR for Initial Public Offerings for 25 Days

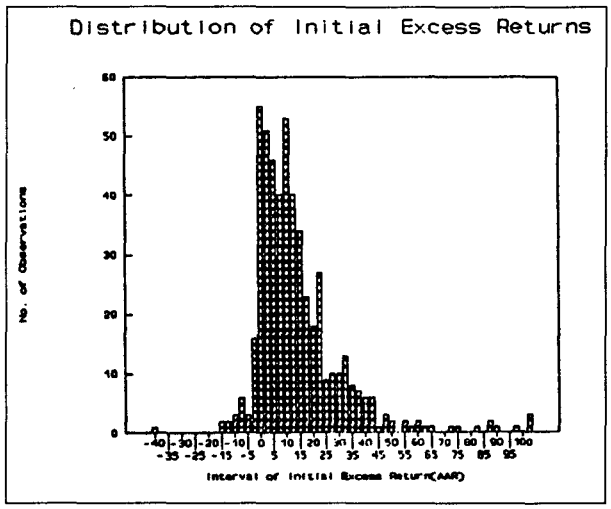


for the entire sample of 512 initial public offerings shows the positive abnormal return of 12.88 per cent. This extent of underpricing of initial public offerings is statistically significant. This pronounced abnormal return documents the phenomenon of underpricing of new issues as in the results of the existing studies concerning UK, US, Canada, France, Korea, among others. This extent is smaller than that of 16.37% estimated by Ibbotson, Sindelar and Ritter (1988) for 8,667 firms going public from 1960 to 1987. Such a large positive excess return indicates that if the investors had purchased each IPO on the offering date and sold on the first trading day, they could earn a rate of return of 12.88% in the short-run.

Such a great abnormal return shown on first trading day might raise questions about the efficiency of stock market. However, as presented in Table 3 and Figure 1, the price behaviour of new issues in the UK market is supportive of the efficient market hypothesis. For prices of new issues are adjusted immediately after the beginning of trading in the secondary market.

As presented in Figure 2, the distribution of first day market adjusted returns is positively skewed. This evidence is consistent with the results of previous researches on IPOs. Table 4, which classifies IPOs which experienced a positive initial return and those which experienced a negative initial return, confirms the positive skewness of distribution of initial returns. Of 512 IPOs, the number of firms which showed positive first day excess return is 424, corresponding to 82.8% of the entire sample firms of 512.

Figure 2. Distribution of First Day Abnormal Return for Initial Public Offerings

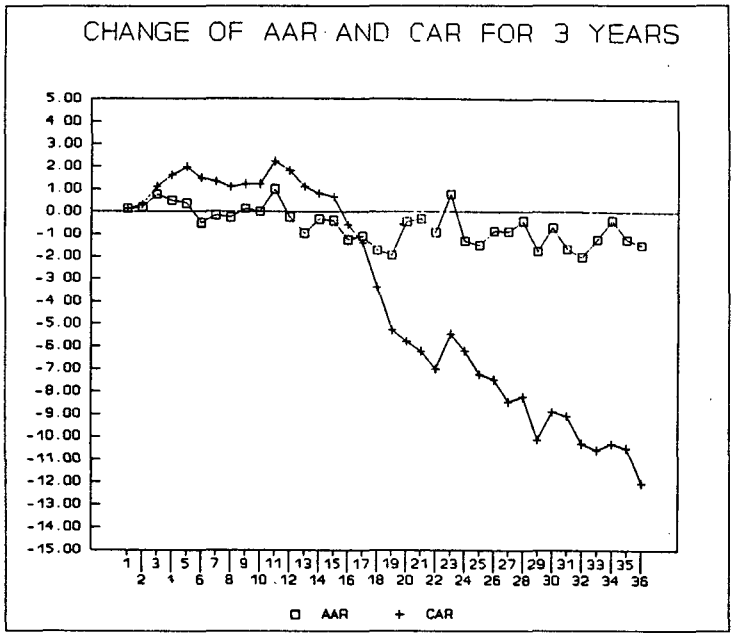


The average market adjusted return of those IPOs is 16.3% and this is greater than AAR of 12.9% for total sample IPOs. The remaining 88 firms, corresponding to 17.2% of the total sample IPOs, exhibited a negative first day return and the average market adjusted return of them is -3.62%. The phenomenon that some IPOs experienced negative market-adjusted returns suggests that successful applicants for these IPOs might face winner's curse. This evidence is supportive of Rock's model (1986).

Table 4. Analysis of IPOs which Experienced Positive or Negative Returns at the First Trading Day

Year	IPOs with Positive 1st Day Return		IPOs with Negative 1st Day Return	
	No. of Issues	Mean Return	No. of Issues	Mean Return
1985	71	13.11	31	-2.74
1986	83	12.83	34	-3.58
1987	108	27.30	1	-0.11
1988	90	11.51	11	-3.85
1989	55	15.53	8	-7.55
1990	17	6.83	3	-2.90
Total	424	16.30	88	-3.62

Figure 3. Change of AAR and CAAR for Initial Public Offerings for 3 years



Ⅴ. The Long-Term Performance of the UK IPOs

In the last section we examined the evidence on underpricing of initial public offerings on the basis of the first day market-adjusted returns computing the difference between offering price and the first day price of trading. This underpricing phenomenon is consistent with the previously published research results. In this section the cross-sectional and time-series investigation of the long-run performance of initial public offerings will be conducted.

1. Aftermarket Performance

As reported in Table 5, the phenomenon of the long-run performance over the 36 months after the offering date for the 512 sample IPOs is quite different from their short-run performance. Up to month 5 from listing, the average market-adjusted returns (AAR) are positive, but they are not statistically significant. From month 6, AAR begins to appear negative and from that point onwards all but four months (9, 10, 11 and 23) showed negative average market-adjusted returns. Twenty seven of the 36 monthly average market-adjusted returns are negative and around half of them have statistical significance at the conventional level of significance. The long-run underperformance of UK IPOs is pronouncedly illus-

Table 5. Change of Abnormal Returns of Initial Public Offerings for 3 Years

DAY	N	AAR	t(AAR)	CAAR	MEDIAN	STD	Q1	Q3
1	512	0.14	0.29	0.14	-1.44	10.75	-6.03	4.61
2	512	0.20	0.44	0.33	-0.80	10.04	-5.33	4.14
3	512	0.78	1.63	1.12	-0.33	10.82	-5.39	5.61
4	512	0.50	1.07	1.62	-0.51	10.62	-5.39	5.64
5	512	0.36	0.77	1.98	0.36	10.72	-5.10	5.29
6	512	-0.49	-0.98	1.49	-0.99	11.32	-6.65	4.86
7	512	-0.15	-0.29	1.34	-0.91	11.88	-6.98	4.65
8	512	-0.25	-0.51	1.09	-0.92	11.13	-6.44	5.19
9	512	0.13	0.25	1.22	-0.64	12.22	-6.18	5.37
10	512	0.01	0.01	1.23	-0.89	11.40	-6.36	5.47
11	512	1.00	1.40	2.23	-0.70	16.18	-5.86	6.10
12	512	-0.23	-0.43	1.83	-0.96	11.92	-6.22	5.70
13	511	-0.94	-2.01	1.12	-1.57	10.54	-7.00	4.31
14	511	-0.31	-0.66	0.81	-1.04	10.65	-6.27	4.80
15	510	-0.38	-0.78	0.67	-1.11	11.00	-5.81	5.53
16	510	-1.24	-2.25	-0.5	-0.67	12.38	-6.85	4.76
17	509	-1.07	-2.14	-1.38	-1.31	11.28	-7.60	4.39
18	507	-1.71	-3.16	-3.37	-2.12	12.20	-8.05	3.77
19	505	-1.93	-3.84	-5.27	-2.38	11.29	-7.95	4.17
20	503	-0.43	-0.76	-5.78	-0.77	12.76	-6.54	4.19
21	502	-0.32	-0.60	-6.21	-0.70	12.04	-6.67	4.98
22	499	-0.91	-1.81	-7.00	-1.63	11.29	-7.03	1.16
23	495	0.77	1.33	-5.45	-0.44	12.81	-5.33	4.53
24	492	-1.29	-1.72	-6.20	-1.61	16.63	-8.15	3.81
25	487	-1.49	-2.67	-7.23	-1.78	12.27	-6.91	3.52
26	482	-0.86	-1.55	-7.46	-1.34	12.23	-6.67	4.35
27	476	-0.87	-1.65	-8.43	-1.64	11.42	-6.17	4.20
28	473	-0.40	-0.66	-8.23	-0.86	13.23	-6.83	4.56
29	472	-1.77	-3.35	-10.13	-1.96	11.45	-7.59	3.05
30	462	-0.69	-1.34	-8.88	-0.85	11.05	-6.30	4.06
31	452	-1.67	-3.15	-9.09	-2.22	11.24	-7.61	3.14
32	445	-2.02	-4.12	-10.30	-1.68	10.36	-6.79	2.70
33	439	-1.23	-1.87	-10.59	-1.83	13.77	-6.35	3.75
34	435	-0.36	-0.55	-10.30	-0.66	13.64	-6.44	3.42
35	432	-1.22	-2.38	-10.49	-1.27	11.76	-5.52	3.53
36	429	-1.47	-3.29	-12.05	-1.17	9.27	-6.18	3.19

trated in Figure 3.

This reverse relation between initial excess return and long-run performance of IPOs might be explored through theories of fads[7] or market overreaction hypothesis. The result of Aggarwal and Rivoli (1990) on the long-run performance of IPOs is supportive of fads. Market overreaction hypothesis, suggested by De Bont and Thaler (1985 and 1987)[8] could also be a possible theory in explaining why there is the striking difference between initial return and long-run performance of IPOs. The evidence that IPOs accrued positive excess returns on the first trading day but showed negative returns in year 3 could support the market overreaction hypothesis. This overreaction will be investigated in some detail in the following section which will examine patterns of the short-run and long-run performances by certain categories such as method of issues, offer size, market, etc.

In particular, the average market-adjusted return cumulated for 36 months after the first trading day is -12.05%. In comparison with the results found in the existing studies, this underperformance is not so bad. The phenomenon of overall performance is similar to the results[9] of Aggarwal and Rivoli (1990), Ritter (1991) on the US IPOs market, Levis (1993) on the UK market and Aggarwal, Leal and Hernandez (1993) on Brazil, Chile and Mexico IPO markets.

2. Cross-Sectional and Time-Series Investigation of Long-Run Performance of IPOs

In this section we explore possible explanations of the long-run performance of initial public offerings through examining a variety of cross-sectional and time-series patterns by market, industry, offer method and offer price, among others.

(1) Aftermarket Performance by Method of Issue and by Market Level

Table 6 reports the initial excess return, ARR1[10] and long-run performance (measured as CAAR) of

7) A fad dould be defined as a mean-reverting deviation from intrinsic value caused by social or psychological forces(camerer(1989)).

8) This overreaction hypothesis implies that there exists an inverse relation between past and subsequent price movements. Their two major hypotheses on overreaction are as follows:First, extreme movements in share prices will be followed by subsequent price movement in the opposite direction(the directional effect). The second is that the more extreme the initial price movement, the greater will be the subsequent adjustment(the magnitude effect).(De Bont and Thaler(1985, p.795)).

9) Over the 36 months, Ritter(1991) and Levis(1993) reported respectively negative cumulative average market-adjusted returns of 29.13% for 1,526 IPOs going to the US market between 1975 to 1984 and 26.30% for 632 companies during 1980 to 1988 and Aggarwal and Rivoli(1990) reported cumulative average market adjusted return of -13.37% at day 250.

10) AARI is the average abnormal return of the first trading day which is estimated by the market-adjusted return approach.

Table 6. Initial Return and Long-Run Performance by Method of Issue

Method of Issue	AARI	CAAR			Sample Size		
		Year1	Year2	Year3	AARI & Yr1	Yr2	Yr3
Offer for Sale	7.52	7.98	11.73	16.83	100	99	94
Placings	14.18	0.34	-10.71	-20.16	412	393	335
Total	12.88	1.83	-6.20	-12.05	512	492	429

Note:1. AAR1 is average abnormal return based on market-adjusted return at the first trading day.

new issues in the UK by the method of issues: offers for sale and placements. Looking at AAR1 at the first trading day, the size of underpricing of IPOs of firms which went public by placements shows a positive magnitude of 14.18%, which is two times greater than that of IPOs of firms employing offers for sale. This evidence is similar to the results of the previous studies (Davis and Yeomans (1976), Jackson (1986), and Trundle and Jenkinson (1990)) on pricing or IPOs in the UK new issues market.

2. CAAR is cumulative average abnormal return of AAR over the 3 years after going public, excluding the first day return.

This result might be associated with different degree of uncertainty in two methods. In general the companies employing a placing are relatively smaller in size of firm and shorter in business history compared to companies going public by offers for sale[11]. The initial public offerings of those firms could be accepted as riskier companies by the participants in the new issues market. Therefore such companies should leave more money on the table so that their initial public offerings may successfully by difference of underpricing extent in both methods of issuescould be explained in terms of size effect.

On the other hand, $CAAR36$[12] for each method exhibits the opposite phenomenon[13] to the initial returns. That is, over 36 months after listing, offer for sales show positive CAAR36 of 16.38 per cent. In contrast, placings show negative CAAR36 of -20.16%.

In order to examine the difference by the level of market which new companies enter, we computed market adjusted returns for two major markets. Table 7 displays the first day return and CAAR of IPOs over 3 years by the level of the British new issues markets which are at large classified into two major

11) See Levis(1993).

12) $CAAR_{36}$ is cumulative average market-adjusted return over 36 months.

13) The difference of the rules of the stock Exchange on both of two methods might have an impact on the size of underpricing of IPOs in each method. In fact, in both methods, the major differences are the degree of risk that underwriters take and the process of distribution of new issues(see Trundle and Jenkinson(1990)).

Table 7. Initial Return and Long-Run Performance by Market Level

Market Level	AARI	CAAR			Sample Size		
		Year1	Year2	Year3	AARI & Yr1	Yr2	Yr3
Official List	12.06	2.11	-2.32	-2.86	199	190	169
USM	13.40	1.65	-8.64	-18.03	313	302	260
Total	12.88	1.83	-6.20	-12.05	512	492	429

Note:The official List is the Main market and USM stands for the Unlisted Securities Market.

markets: the official List (the main market) and the Unlisted Securities Market (USM)[14]. The extent of first day excess return is 12.06% in the main market and 13.40% in the USM[15], respectively, so the level in both markets is similar.

However, looking into the performance of IPOs of companies entering two markets by the third anniversary after listing, their performance shows the opposite phenomenon to their initial abnormal returns. The IPOs launched on the main market show a small negative return of -2.86%, while the IPOs introduced to USM exhibit a relatively large negative return of -18.03%. In this way, with the length of time since going public, the difference in the performance between two markets based on CAAR is getting bigger, therefore from the long-run investment perspective, the investment into IPOs of companies which have been listed on the main market might be better than the investment into IPOs of USM.

The differences in the magnitude of underpricing of initial public offerings and the long-run performance of two markets might also shed light on the relation between the degree of uncertainty and underpricing as has been found in the examination of method of issue, because relatively mature and sizable firms and admitted to the main market, compared to USM[16]. As time goes by from going public, the IPOs listed on the main market have been revealed to be less risky investment instruments through showing the small variation between initial return and CAAR. Investors could discern this by their own investigation and reflect it in their future decisions about investment into new issues, if he or she were a rational investor.

14) The admission requirements for two markets are a little different. In general, the requirements for the main market are more stringent compared to those of the USM.

15) There are some studies concerning the underpricing phenomenon of IPOs listed on Unlisted Securities Market. By Buckland and Davis(1989) the discount of 25.92% is estimated for 261 sample firms listed on USM between Nov. 1980 and Mar. 1985. And Jenkinson and Espenlaub(1991) estimates the underpricing of 15.6% for 357 sample firms admitted to USM during 1985 to 1989.

16) This phenomenon would be explained from the perspective of size effect.

Table 8. Initial Return and Long-Run Performance by Industry

Industry	AARI	CAAR			Sample Size		
		Year1	Year2	Year3	AARI & Yr1	Yr2	Yr3
Capital Goods(Ⅰ)	11.70	0.80	-5.22	-8.81	183	178	149
Consumer Goods(Ⅱ)	13.69	6.01	-0.63	-2.96	145	136	124
Other Group(Ⅲ)	13.20	0.22	-7.57	-20.68	140	135	120
Ⅰ+Ⅱ+Ⅲ	13.00	2.24	-4.53	-10.58	468	449	393
Finance	15.24	-0.75	-20.02	-29.50	39	39	33
Oil & Gas	5.25	-16.2	-58.54	-12.17	5	4	3
Total	12.88	1.83	-6.20	-12.05	512	492	429

(2) Aftermarket Performance by Industry

As in many other studies, we explored the differences of returns by industry and found that the magnitude of returns of IPOs is different according to the industries involved. This evidence is revealed in Table 8 where firms are segmented by industry on the basis of the industry classification of the London Stock Exchange and it reports the extent of initial abnormal returns and the long-term performance by industry.

First, looking at the extent of initial excess returns of each industry group, the finance industry is the highest followed by consumer goods. In contrast, the finance group had the worst performance with negative CAAR36 of -29.50% in the long-run. This is very different from the results of Ritter (1991) where the finance industry exhibited a smaller initial return and relatively outperformed over 3 years.

(3) Aftermarket Performance by offer size and offer Price

The evidence that size of firms going public would affect the extent of new issues has been documented by some authors(David and Yeomans(1976), Ritter(1991), etc). In this section, we will first explore the effect of size on the underpricing extent of initial public offerings. Table 9 indicates that there exists negative relation between the extent of short-run underpricing and size of issues. This result is similar to the findings of David and Yeomans(1976) and Levis(1993), where the degree of underpricing of new issues is negatively associated with the size of companies going to market. However, the long-term performance seems to be positively related to the size of gross proceeds. In the third anniversary, all cate-

Table 9. Initial Return and Long-Run Performance by Proceeds

Industry	AARI	CAAR			Sample Size		
		Year1	Year2	Year3	AARI & Yr1	Yr2	Yr3
Under 2.0	15.95	1.23	-0.37	-5.77	138	133	118
2.0-3.99	11.62	1.66	-7.70	-17.43	162	158	133
4.0-5.99	14.89	0.88	-14.03	-15.69	87	83	72
6.0-9.99	10.86	4.82	-7.23	-13.06	54	50	44
10.0-19.99	9.80	4.59	-2.29	-14.65	43	41	39
Over 20.0	7.74	-1.93	-7.94	-2.23	27	26	22
Total	12.88	1.83	-6.20	-12.05	511	491	428

Table 10. Initial Return and Long-Run Performance by offer Price

Offer Price (pence)	AARI	CAAR			Sample Size		
		Year1	Year2	Year3	AARI & Yr1	Yr2	Yr3
10-48	19.95	6.43	-8.84	-24.33	33	29	25
50-99	13.49	-3.38	-7.49	-15.14	150	146	125
100-147	12.68	2.74	-6.71	-14.87	235	228	201
over 150	9.92	6.25	-1.93	4.08	94	89	78
Total	12.88	1.83	-6.20	-12.05	512	492	429

gories of issue size display negative CAAR. The tendency that smaller offerings generate underperformance in the long-run is in contrast to the results that in the short-run, the smaller offers outperformed the larger offers. This inverse phenomenon in respect of both performance could be interpreted as evidence of the market overreaction documented by Ritter(1991).

In fact, a study on the effect of offer price on underpricing of IPOs has rarely been carried out, but two such studies are mentioned below. Chalk and Peavy(1987) found that there is a negative relation between offering price and the short-run underpricing of new issues[17]. As can be seen from Table 10 our findings on the short-run underpricing phenomenon are similar to those of Chalk and Peavy(1987). In a recent study, Aggarwal and Rivoli(1990) attempted to identify the fads phenomenon through exploring the price effect on the long-run performance of new issues. They divided their sample into two

17) Chalk and Peavy(1987) argue that the large excess returns in the low level of issue price might be caused by high transaction costs and the high risk of low-priced issues, etc(1987, pp.68-69).

Table 11. Long-Run Performance by Initial Returns

Initial Return(%)	AARI	CAAR			Sample Size		
		Year1	Year2	Year3	AARI & Yr1	Yr2	Yr3
-44.29--0.02	-3.62	2.14	-2.36	-4.62	88	85	77
0.16-4.96	2.47	0.14	-4.77	-16.48	97	90	80
5.02-9.92	7.64	7.36	-0.59	-1.62	93	87	73
10.01-14.96	12.38	-4.36	-8.22	-1.58	74	71	58
15.03-19.89	17.33	-5.08	-17.00	-11.68	41	40	32
20.21-29.61	47.57	1.69	-19.58	-48.84	63	63	59
over 30.00	47.57	1.69	-19.58	-48.84	63	63	59
Total	12.88	1.83	-6.20	-12.05	512	492	429

groups: the group with an offer price greater than US$5.0, and one with an offer price of less than US$5.0. They found that both groups showed a reverse relation between initial return and one year aftermarket returns. As presented in Table 10 the magnitude and direction of long-term returns appear to be opposite to the pattern of the short-run returns. This result might be supportive of market overreaction or the presence of fads.

(4) Aftermarket Performance by Initial Return and Standard Deviation

We categorised seven groups according to the extent of initial returns so that we could explore how the initial returns realised at the first trading day change over time.

As displayed in Table 11, it is difficult to find evidence to support the view that IPOs showing high initial returns tend to underperform in the long-run. However, there is a striking phenomenon in that the group with the highest initial return had the worst performanc ein year 3. In Ritter(1991) and Levis(1993), the extreme iverse relation between initial returns and aftermarket performance was pronouncedly revealed. Our findings also provide the possibility that the long-term underperformance could be explained in terms of market overreaction hypothesis or theories of fads. But the factor of risk should be considered in explaining the long-term underperformance.

In exploring the origins for underpricing of new issues, many authors attempted to explain the underpricing phenomenon in therms of uncertainty about firms going public[18]. Then as proxies of uncertainty, age of firms, standard deviation of returns for short-term after trading and sales volume, etc. have

18) See Ritter(1984b) and Keasey and Short(1992).

Table 12. Initial Return and Long-Run Performance by Standard Deviation

SD	AARI	CAAR			Sample Size		
		Year1	Year2	Year3	AARI & Yr1	Yr2	Yr3
0.46-1.49	1.38	0.90	-11.55	-7.85	94	88	74
1.50-1.99	4.01	6.83	-3.49	-15.24	72	68	62
2.00-2.45	5.73	-2.70	-1.33	0.74	75	69	57
2.50-3.45	8.69	-3.86	-4.68	-2.24	84	81	69
3.51-4.99	14.35	5.29	-0.75	-12.55	80	79	70
5.10-9.94	29.20	3.28	-9.24	-16.73	86	86	78
over 10.00	64.60	8.66	-22.48	-70.99	21	21	19
Total	12.88	1.83	-6.20	-12.05	512	492	429

been used. The standard deviation of daily market adjusted returns over 25 days from first trading was chosen as a surrogate of uncertainty of the issuing companies. As reported in Table 12, in the short-run, standard deviation could be a factor to shed light on the relation between uncertainty and underpricing. However, in the long-run, it is difficult to find a certain relationship between standard deviation and aftermarket performance.

Nonetheless, it is notable that the group with the highest underpricing shows the smallest $CAAR_{36}$.

(5) Aftermarket Performance by Year of Issuance

As examined in the above section(see Table 4), the magnitude of underpricing of IPOs is different according to the year in which firms went public. Table 13 reports the long-run performance of IPOs by year matched with first day return. By the month 36, 1985 and 1986 show positive cumulative average abnormal returns, but the remainder exhibit negative cumulative returns. This phenomenon might be associated with the situation of the overall stock market, for from the middle for 1980 the UK stock market was on a rise in a steady curve in terms of the FTA index up to stock market crash of October 1987.

Riter(1991) documented the negative relation between the long-run performance and annual volume of IPOs, which is consistent with the proposition that companies tend to go to the market when ivestors are willing to pay high multiples reflecting optimistic assessments for the future cash flow. Through Table 13, the reverse relation between the long-run performance and annual volume could be mildly confirmed in the UK. In particular, the theory on investors overreaction might be one possible explanation of the opposite phenomenon in the magnitude of first day excess returns and long run performance. This evidence could be confirmed by observing the pronounced inverse relation between initial return

Table 13.Initial Return and Long-Run Performance by Year

Year	AARI	CAAR			Sample Size			Actual No. of Firms Going Public[1)]
		Year1	Year2	Year3	AARI & Yr1	Yr2	Yr3	
1985	8.3	-6.3	2.7	11.3	102	102	102	196
1986	7.74	30.6	35.9	17.4	117	117	117	263
1987	27.1	11.8	-1.95	-31.8	109	109	109	299
1988	9.84	-6.1	-33.4	-48.6	101	101	101	293
1989	12.6	-31.0	-62.7	-	63	63	-	259
1990	5.37	-35.6	-	-	20	-	-	216
Total	12.9	1.8	-6.20	-12.1	512	492	429	1,526

Note:1) In addition to the main market and USM, a number of companies going to third market which existed from 1987 to 1990 is included.

and CAAR36 in 1987 and 1988. Compared to other years, in 1987 and 1988 many companies were allowed to enter the market.

Ⅵ. The Existence of Hot Issue Market

In general, a hot issue can be defined as a new security issue that has risen from its offer price to higher than average return in the aftermarket. Usually this big increase in price might be caused by the investment demand exceeding stocks available in the issue. And hot issue markets[19)] are generally defined as periods in which average initial returns of new issues appear substantially great. In the US the studies on hot issue markets have been conducted by the securities and Exchange Commission (1963), by Ibbotson and Jaffe (1975) and by Ritter (1984) in the US. The investigation of hot issue market in the UK was partially carried out by Trundle and Jenkinson (1990), Levis (1993) and Jenkinson and Espenlaub (1991).

In our estimate of underpricing of initial public offerings in the UK new issues market, we found that there appears a particular period which showed abnormally high initial market adjusted returns. Table 14 shows that the magnitude of underpricing of initial public offerings differs according to year of issuance.

19) The notion of a hot issue market is different from a hot market. The hot issue market is the concept to be used for the IPOs market, while the hot market is a definition to describe the mood of the entire stock market.

Table 14. Descriptive Statistics of Initial Return by Year

Year	AAR	MEDI AN	STD	MIN	MAX	Q1	Q3
1985	8.3(5.9)	3.2	14.06	-14.23	64.12	-0.39	13.07
1986	7.74(7.3)	6.74	11.49	-16.75	58.56	-0.92	13.38
1987	27.05(12.9)	22.4	21.9	-0.11	101.04	11.59	35.65
1988	9.84(9.7)	8.23	10.16	-15.58	59.62	3.86	14.82
1989	12.6(5.2)	9.85	19.31	-44.29	102.24	3.5	16.04
1990	5.37(4.4)	5.02	5.43	-5.78	15.13	1.73	9.66
Total	12.88(17.0)	8.85	17.15	-44.29	102.24	2.08	19.04

In particular, the underpricing of new issues in 1987 is exceptionally high (27.05%) and its magnitude is at least two to five times that of companies going public over the remainder of the sample period. As displayed in Table 14, in both 1986 and 1990 the extent of underpricing (of 7.74% and 5.37% respectively) is relatively smaller. As reported in Table 4, in 1987 corresponding to a hot issue market period, only one company showed a negative initial return on the first trading day. in contrast, in 1986, 34 IPOs showed negative returns. These findings imply that a hot issue market also appears in the UK issues market. This presence of a hot issue market in 1987[20] is consistent with the findings of the existing studies in the UK.

The hot issue of 1987 began after Big Bang of October 1986 and ended in the October 1987 stock market crash[21]. As examined above, during this hot issue period IPOs in the UK showed abnormally high initial returns over their offer price and in addition to these large realised premia of IPOs, seasoned share prices also rose rapidly[22]. Therefore it is more difficult to set an offer price precisely and to estimate the demand during this period of high fluctuation, compared to a less volatile market period.

Ⅶ. Conclusions

We investigated the short-run and long-run aftermarket performance of initial public offerings. First, the average market adjusted return on the first day of trading appears to be underpriced to degree of approx-

20) In the US such hot issue markets have been observed during the periods 1959-61, 1968-69 and 1980-early 1981. IPOs during these periods have traded at exceptionally great returns over their offer prices. In particular, the hot issue market phenomenon in 1980 is found to be almost exclusively with issues of firms in the natural resources industry(Ritter(1984)).

21) See Jenkinson and Espenlaub(1991) for more details.

22) The FTA ALL Share Index had risen by 42.4% between December 1986 and 15 October 1987.

imately 13% across firms. This extent of underpricing has statistical significance at the conventional level. Our findings on the short-run underpricing phenomenon is consistent with the results of the previous empirical studies including Levis (1993) on the UK market. Also the size of underpricing of new issues is smaller than that of US IPOs of 16.37% computed by Ibbotson, Sindelar, and Ritter (1988) from 8,667 companies which went public between 1960 and 1987 inclusive.

The distribution of first day returns has quite positive skewness and this skewness could be confirmed from the fact that a small percentage (17.3%) of the entire sample firms showed a negative market adjusted return on the first day of trading. It is noteworthy that the abnormal returns realised on the first trading day are immediately starting to reduce with length of time from the beginning of trading. The presence of initial excess returns might not contradict the efficient market hypothesis.

The phenomenon that in the short-run initial public offerings are underpriced appears to be the opposite in the long-run performance. In the long-term, new issues are overpriced, showing negative cumulative average market adjusted return. A detailed inspection of this underperformance phenomenon has been conducted through examining cross-sectional and time-series patterns by various classifications of some important variables. In the investigation by categories, the group with the relatively high initial return appears to show relatively worse performance in the long-run(by year 3). Our findings on the long-run underperformance are consistent with Ritter (1991) and Levis (1993). In particular, Levis (1993) found that the group of IPOs with the highest initial returns shows the worst performance in the long-term. The reverse relation of initial return and long-run performance might shed light on the market overreaction hypothesis or the theories of fads.

Finally we explored the appearance of hot issue markets in the UK IPOs market through observing abnormally high initial excess return in 1987. This hot issue market appears after the Big Bang of October 1986. The Big Bang might have affected the mood of the overall market and also encouraged privately-owned firms to go public. Furthermore such reform might also have caused investors to be optimistic for the future market.

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