Political instability and stock market reaction: The Anglo-Iranian oil nationalisation, 1951

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Abstract

In May 1951, the Iranian government, led by Mohamed Musaddiq, nationalised the assets of the Anglo-Iranian Oil Company (AIOC, now British Petroleum). From the point of view of the AIOC and its shareholders, these events would appear to be unequivocally bad news and to represent a serious failure of corporate policy. Approximately 80% of the company's assets were deployed in Iran and therefore subject to confiscation by the Iranian government. However in the months following nationalisation, the AIOC management, in public pronouncements at least, displayed confidence about the subsequent recoverability of the lost assets. Such confidence was potentially well grounded. Working through international legal and political institutions and in Iran, through the Shah and other institutions, including the parliament (Majlis), the media and police, the AIOC exercised considerable influence in the period prior to nationalisation. As a consequence, the impatience of political groups opposed to its domination of the country's oil resources intensified, providing momentum to Musaddiq's National Front coalition and the passage of the nationalisation act. Behind the scenes meanwhile, the AIOC worked closely through its channels of influence to undermine Musaddiq, including the abortive coup that preceded the successful one organised by the CIA in 1953. Meanwhile in the shorter run, a further reason for the AIOC's confidence was its control of the oil industry through resources not subject to nationalisation legislation, such as technical expertise and control over refining, tankers and other distribution channels.

To assess the potential threat to the AIOC's assets posed by the nationalisation legislation of May 1951, the paper aims to evaluate the relative bargaining strength of the AIOC and Musaddiq governments in economic terms. To do so, it uses an event study

methodology, comparing the stock market response to key events in the political negotiation calendar preceding and subsequent to the nationalisation. The AIOC stock price is used as a barometer to test the extent of belief in the long run durability of the nationalisation act factoring the relative strength of the political positions of both sides. The results suggest that the stock market's reaction was proportionately small relative to the scale of the assets potentially at risk, reflecting a strong endorsement of the political bargaining power of the company. Indeed, following the overthrow of Musaddiq in the CIA sponsored coup of 1953, and the end of an Iranian democratic experiment already thoroughly undermined, the company fully recovered its assets. With respect to the prior literature, the evidence suggests that the strength of Musaddiq's position has probably been overstated, even in 1951 and that in this case at least, the power of big oil remained undiminished in the post-colonial era.

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This paper examines the reaction of the AIOC share prices to the stock market during the company's nationalisation. AIOC operated in Iran on the basis of a concession oil drilling rights granted by the Iranian Government and thus the company had the most noticeable and strongest British government connections because it was dealing with a strategic asset in a strategic area. From 1947 onwards the renegotiation of the concession became a source of dispute between the AIOC and successive Iranian governments. The difficulty in reaching a reasonable solution that satisfies both parties was the precursor to the bill approving to nationalisation of AIOC's major assets by Musaddiq in May 1951. In turn the US government including British support have set the scene for the CIA sponsored coup in 1953 and forced Musaddiq out of his office and reinstated the Shah of Iran to power. By these events, the relationship between Iran and AIOC worsened and the company never regained its influence as before in Iran.

From the point of view of the AIOC and its shareholders, nationalisation would appear to be explicitly bad news and thus implying a serious failure in the company's policy. This article examines how two key events associated with the nationalisation were perceived by the London stock market. These were the nationalisation itself on 1 May 1951 which was a major theme running over a longer course in the 1950s and the publication of the AIOC annual report in 16 November 1951 which influenced the shareholders' confidence regarding their investment in the company. The response of London's stock exchange to nationalisation and to the information content disclosed by Sir William Fraser (1888-1970), the AIOC's chairman (1941-56) to the AIOC investors is important for several reasons. Firstly, this examination provides the opportunity to assess the economic impact of nationalisation within a political context where studies linking stock market reaction to political events are rare. Secondly, this investigation is

useful in evaluating and analysing the information content of annual report disclosure during the company's nationalisation which was by all accounts a major political crisis during that era. Finally, this study gives indications on the level of market efficiency and tests how good the market is at anticipating bad news.

The article proceeds as follows. Section I presents the historical background for the major events leading to significant and insignificant losses in Iran during 1950s. Section II highlights the relevance of the event study methodology with emphasis on the reasons behind its choice. Then it follows with an explanation of the test procedures and the determinants of market efficiency. Section III offers an overview of the available market data used in more detail followed by an explanation of the FT30 Index and AIOC return index. This section also continues to explain the market adjusted model and outlines the hypothesis for testing. Section IV defines the event window and provides statistical evidence illustrating the stock market reaction of AIOC during the political crisis. Finally, section V draws conclusions and summarizes the findings.

I

Iran's investment and growth rate flourished in the second half of the 1940s but the recovery was short-lived due to the high level of political instability during those years as was reflected in frequent demonstrations and strikes as well as the assassination attempt on the Shah.[1] In October 1947, the Iranian government committed to renegotiate the concession and demanded a fair compensation for the British expropriation and was keen on increasing the amount of royalties paid to them. In fact, the Iranian government was largely confined to taxation and minimal

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[1] Esfahani and Pesaran, *Iranian Economy in the Twentieth Century: A global perspective*, pp. 6-7.

maintenance of order due to the influence of internal and external forces resulting from British imperialism.

The worldwide demand for oil increased throughout most of the 1946 to 1951 period which resulted in profit rise for the major oil companies.[2] However, Iran suffered economic decline periods when non-economic concerns became overwhelming during the political turmoil of the first decades of the Twentieth Century or at times of domestic and international conflict (e.g. 1940-5, 1950-3).[3] In the early 1950s, political conditions had changed considerably and new nationalisms started to emerge because the Iranian government wanted to develop policies with which the country could earn higher returns from its oil production. On 7 March 1951, Razmara, the Iranian Prime Minister, was assassinated after his broadcast which seemed to be telling the Iranians to stick with AIOC and continue to produce handicrafts rather than trying to run an oil industry.[4] By this time, nationalism and democracy had become the features of the Iranian political landscape. The nationalisation bill was ratified and had important implications on the performance of AIOC by securing the Iranian government rights to nationalise its resources and avoiding foreigners from exploitation.[5] Consequently, on 9 March 1951, the parliament of Iran had approved the nationalisation of the British-owned AIOC which was one of the largest companies quoted on the Stock Exchange. Nationalisation resulted in a decline in its share price by 3/8 and AIOC share prices were priced as 5 3/8 which was the lowest price for the company

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[2] Unerman, *An investigation into the development of accounting for social, environmental and ethical accountability: a century of corporate social disclosures at Shell,* p. 169.
[3] Esfahani and Pesaran, *Iranian Economy in the Twentieth Century: A global perspective*, p. 2.
[4] Elm, *Oil, Power, and Principle*, p. 80.
[5] Elm, *Oil, Power, and Principle*, p. 48.

to have since 1946.[6] Nationalisation was a special economic event and by all means AIOC stock prices were influenced.[7]

Nationalisation was a living illustration of the structural problems facing the British government and AIOC. The British government was anxious to negotiate to work out a solution with Musaddiq in a reasonable atmosphere.[8] *The Times* reported that nationalisation is "accomplished by one of the most rapidly completed measures ever passed by the often dilatory Persian Parliament".[9] Furthermore, it has been disclosed in *The Times* that the company considers its operation to be vital to Persia's well being as they contribute to their own and "it is natural and right that the Persian people should now take a greater share in the operation of their main industry".[10] The movement to nationalise the oil industry was a major issue and the country came to face an economic embargo from outside and political instability from inside, where oil revenues dropped and brought investment to an end. There were attempts to increase non-oil exports and to keep the level of imports to the minimal level but regardless of this plan the non-oil exports became costly to maintain and imports outpaced exports. Obviously, this kind of ambition naturally generated conflict with the British government which had its own agenda. However, the way the conflict evolved and the kind of actions the Iranian government took were determined by the type of regime each of the nations had. Therefore, it is important to examine the impact of the nationalisation crisis on the value of shareholders' investments and investigate how successful they were in managing their expectations during such a crisis.

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[6] Littlewood, *The Stock Market: 50 years of capitalism at work*, p. 44.
[7] Investors tend to recall stock market events and their outside political and economic influences by reference to the course of a bull or bear market.
[8] *The Times*, 2 May 1951, 6(A), Issue 51990.
[9] *The Times*, 30 April 1951, 4(C), Issue 51988.
[10] *The Times*, 2 May, 1951.

Table 1 below summarises the major events dealing with the negotiations involved between the Iranian government and the AIOC for the revision of the existing concession and introduction of the supplemental agreement to be ratified by the Iranian Majlis. The timeline below started in May 1950 and ended up in May 1951 to provide a complete picture about the major events that took place before the company has been nationalised. This time frame is chosen because it tends to be a crucial build up for nationalisation since negotiations were intensified by the National Front party during May 1950 which finally resulted in the nationalisation of the company's major assets including the world largest refinery in Abadan by Musaddiq on 1 May 1951.

Table 1. *Time line of events for AIOC, for the period May 1950- May 1951*

| Date	Commentary and related events
May 1950	Increased National Front representation on Majlis Oil Committee (MOC) - Elections to Majlis.
June 1950	General Ali Razmara had become Prime Minister and he was in favourite of British and opposes nationalisation.
29 September 1950	In 1950, AIOC offered an increased share of profits to the Iranian Government but not the 50-50 sharing that the Majlis wanted.
26 December 1950	The Supplemental Agreement was not again discussed and was referred to a special Majlis Oil Commission. The Oil Commission reported early in December 1950 that the agreement didn't safeguard Persian rights and in consequence the Persian Government withdrew the Bill on 26th December, 1950. Subsequently, the Oil Commission was approved by the Majlis on 11th January 1951.
10 February 1951	The AIOC informed the Persian Prime Minister that they were ready to negotiate an entirely new agreement based on equal sharing of profits in Persia.
19 February 1951	Dr. Musaddiq, the chairman of the Majlis Oil Commission, formally proposed in the commission that the oil industry throughout Persia should be nationalised.
24 February 1951	Shepherd (His Majesty's Ambassador in Tehran) handed the Persian Prime Minister a note stating that in the view of His Majesty's Government, that the Company's Concession Agreement prevented its legal termination by an act such as nationalisation and added that the company could not negotiate under threat of nationalisation.
28 February 1951	Negotiations between Northcroft and Razmara offers 25 Million and 50:50 share of Iranian profits.
7 March 1951	Assassination of the Prime Minister M. Ali Razmara.
8 March 1951	The day after the assassination of the Prime Minister M. Ali Razmara, the Oil Commission passed a resolution concerning nationalisation.
14 March 1951	His Majesty's Government sent a note to the Persian Government to set out their views and restated the company's readiness to discuss a new agreement on the basis of an equal sharing of profits in Persia.
15 March 1951	The Majlis approved a "**Single Article Bill**" which confirmed the Majlis Oil Commission's decision of 8th March 1951 and approved the extension of the Commission's term of office but this took place before the British note on 14th of March had been communicated to them.

20 March 1951	The senate approved the **"Single Article Bill".**
8 April 1951	The Persian Government replied to the British note sent on 14th March 1951 and maintained that the question of nationalisation lay solely between the Persian Government and the AIOC.
26 April 1951	Shepherd put to the Persian Prime Minister M. Ala, tentative proposals for reaching a settlement and these embraced a new United Kingdom Company to run the oil industry in Persia and to be owned by AIOC but with some Persian directors and the profits of the company to be shared equally between the Persian Government and the Company and if the Persians wished a purely Persian company for the distribution of oil products within Persia. On the same day, the Majlis Oil Commission approved a solution calling for the formation of a mixed board of Senators and Deputies with the Minister of Finance or his deputy to implement the decision of the two Houses of Parliament for oil nationalisation throughout the country and setting out in nine articles the method of this implementation called "**Nine Point Law".**
28 April 1951	AIOC protested to the Persian Government over their intended nationalisation measures.
29 April 1951	Dr. Musaddiq had become the Iranian Prime Minister.
30 April 1951	**"Nine Point Law"** for nationalisation received the approval of both Majlis and Senate.
1 May 1951	**"Nine Point Law"** for nationalisation was promulgated by His Imperial Majesty the Shah.

*Sources***:** Compiled from Cmd 8425, 'Explanatory Memorandum' *Correspondence between His Majesty's Government*; AIOC *Annual Report and Accounts*, 1950, 11-22; Bamberg, *The History of the British Petroleum Company*, ch. 15-18.

As clearly shown in Table 1, due to increased National Front representation on Majlis Oil Committee (MOC) in May 1950, the AIOC offered the supplemental agreement to increase the Iranian share in profits in September 1950 but this wasn't an agreement for an equal division in profits. Consequently, the Oil Commission produced an adverse report in December 1950 explaining that the supplemental agreement didn't safeguard Persian rights and interests and consequently the Persian Government withdrew the Bill on 26 December 1950. During February, the AIOC proposed to negotiate a new agreement based on equal profit sharing but Musaddiq formally proposed to nationalize the oil industry in Iran to safeguard the Iranian rights and interests. Eventually, on 7 March 1951, the Iranian Prime Minister, Razmara, was assassinated

and this induced the Oil Commission to pass a resolution concerning nationalisation. Finally, after Musaddiq became the Iranian Prime Minister on 29 April 1951, nationalisation was approved by both the Majlis and Senate on 30 April 1951. In addition to the time line of events explained above, AIOC share price reaction in relation to the stock market is explained by the following Figures. First, Figure 1 below presents the AIOC share prices along with the FT30 index within May 1950 and May 1951 to illustrate the company's performance in relevance to the market during nationalisation.

Figure 1. *AIOC share prices & FT30 Index for the period 12/05/1950 to 1/05/1951*
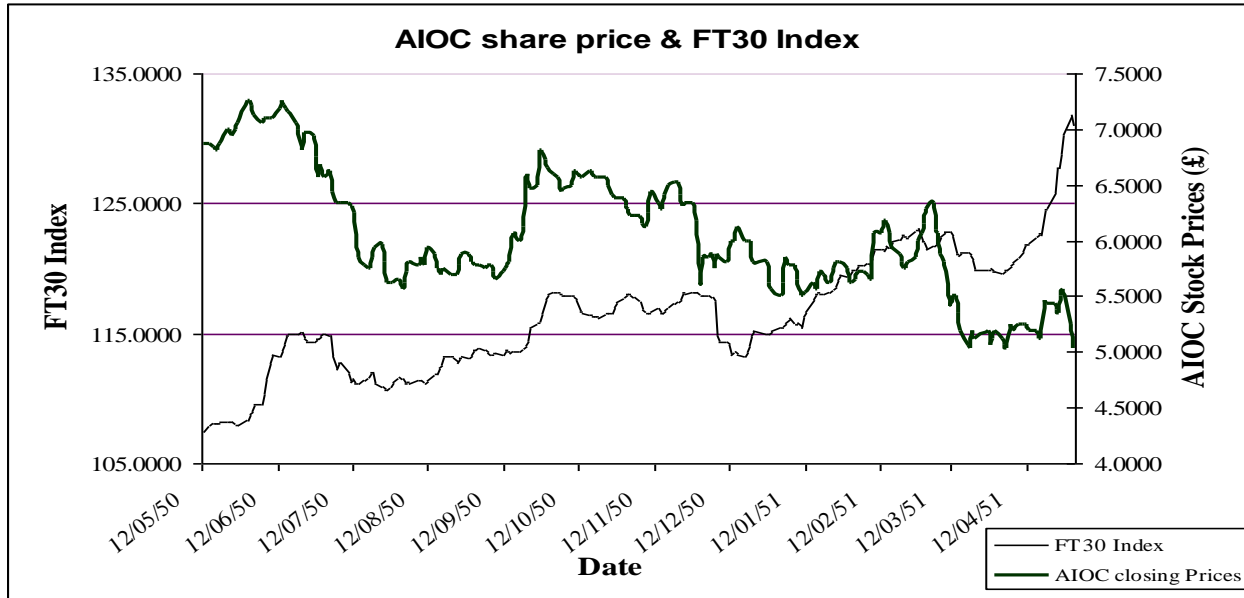
Sources: AIOC stock prices are compiled from *The Times & Manchester Guardian newspapers*; FT30 Index is compiled from Loughborough University Website, see *Appendix*.

Figure 1 illustrates that there is a steep decline in the trading range of the AIOC share prices during May-July 1950 which is most likely attributed to the influential role of the National Front in Iran. The National Front were willing to safeguard the Iranian rights and thus they were in favour of nationalisation. AIOC stock prices started to recover between August and November 1950 reflecting the company's willingness to negotiate an agreement and increase the share of profits to the Iranian government. Finally and most importantly, it can be clearly seen that the AIOC stock prices gradually decreased and reached their minimal value on May 1951. It was at this point that the Majlis first demanded nationalisation and created the MOC headed by Musaddiq and the company lost 80.15 per cent of its operational assets.[11] The mid 1951 showed a version of oil nationalism influenced by the events in Iran and consequently this had a negative

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[11] Geographical distribution of AIOC activity is calculated from 1950 annual report; the Iranian activity 80.15% and non -Iranian activity 19.85%.

impact on the AIOC stock prices. On the other hand, Figure 1 shows that there was a gradual increase in the FT30 index value from May to July 1950, where it rose slightly from 107 to 115, contradicting with the decline in AIOC stock prices that was encountered during this period. Later on in December 1950, the index declined and thus reflecting the collapse of the Supplemental Agreement and revealing the negative impact of the Majlis Oil Commission on the performance of AIOC. Although the events of 1951 were more dramatic, with the assassination of Razmara and the formalisation of the nationalisation legislation, the FT30 index shows an increase in its value and reaching its peak at 130.9 on 1 May 1951.

For further illustration, Figure 2 below demonstrates the abnormal returns calculated for the period May 1950 to May 1951.

Figure 2. *Abnormal returns for the period 12/05/1950 to 1/05/1951*

Abnormal Returns

0.06602853

-0.06590008

-0.06451613

-0.08921564

Figure 2 shows that the abnormal returns fluctuated between May 1950 and May 1951 reflecting the difference between the expected rates of return of AIOC stock and the actual market rates of return computed from the FT30 Index. By December 1950, the abnormal returns declined significantly by almost -0.08 because the AIOC shares had lost their value reflecting the collapse of the supplemental agreement. Also, it can be clearly seen that the abnormal returns steeply increased in February 1951 reflecting the rise in AIOC stock prices perhaps due to the negotiations between the company representatives and the Iranian Prime Minister, Razmara. In

the period immediately prior to nationalisation, March-May 1951, the abnormal returns decreased reflecting the significant decline in AIOC stock returns. It was at this point that the Majlis approved the "Single Article Bill" by the Iranian Senate and consequently nationalisation was headed by Musaddiq on 1 May 1951.

Furthermore, Figure 3 below presents the cumulative abnormal returns calculated for the period May 1950 to May 1951.

Figure 3. *Cumulative abnormal returns for the period 12/05/1950 to 1/05/1951*
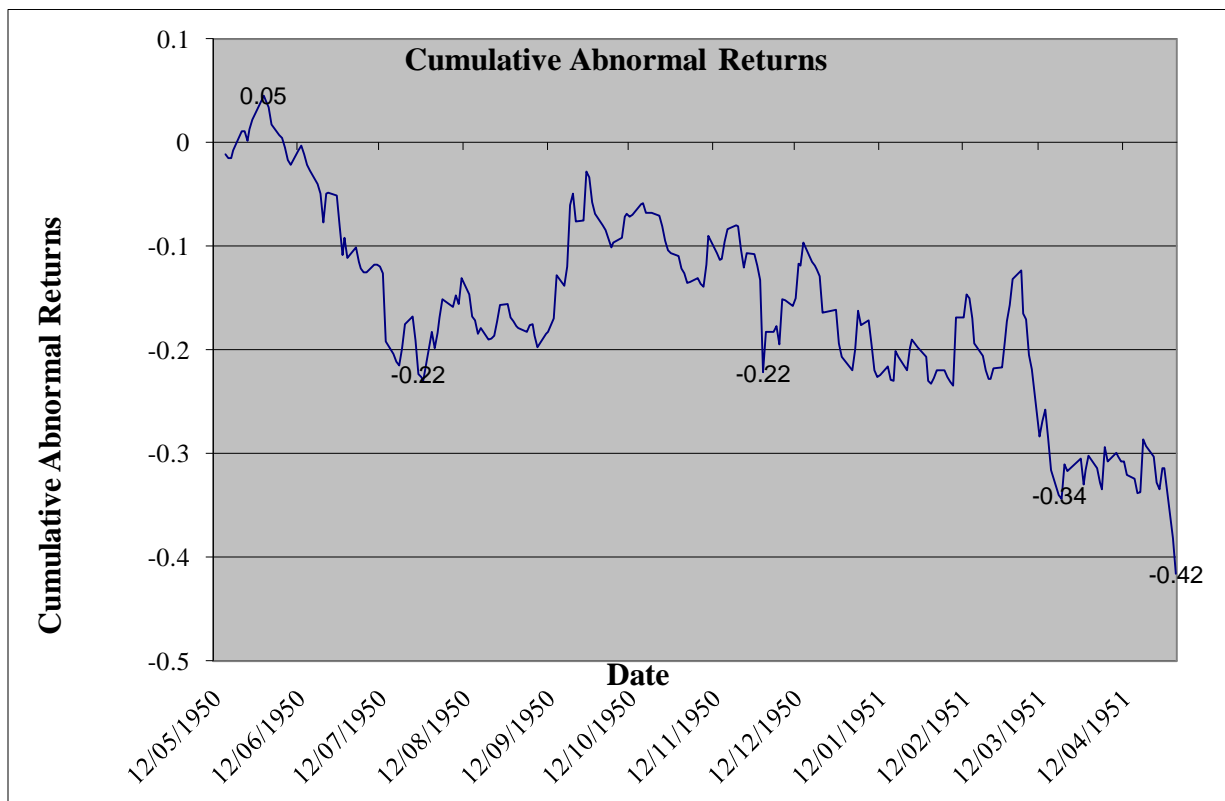
Sources: Calculated from the abnormal returns using AIOC return index and FT30 Return Index- See *Appendix*.

Figure 3 shows that the cumulative abnormal returns were negative throughout 1951 with a marked decrease in the values in March 1951 and in May 1951. This may explain that nationalisation had a negative impact on the investors of AIOC. However, it worth nothing that

notwithstanding the assassination of Razmara in March 1951, the appointment of Musaddiq as prime Minister in May 1951 and the worsening of AIOC trading position following the huge amount of profit for 1950, the reaction was far less than might have been expected.

II

The impact of nationalisation on AIOC has been the subject of considerable debate among different scholars and therefore the main motivation was to study its economic impact on AIOC's security value, market efficiency and social welfare. This section reviews the event study methodology and market efficiency highlighting their importance and the assumptions underlying their application.

Since Ball and Brown (1968) and Fama (1969), event studies have become a major part of empirical research in finance and many other disciplines. For instance, event studies have been used in multiple settings.[12] McWilliams and Siegel (1997) argued that the event study method is a powerful tool that can help researchers assess the financial impact of changes in corporate policy. Therefore, event studies use financial market data to assess the impact of specific events on the value of the security. Moreover, event studies provide an ideal tool for examining the information content of disclosures.[13] In the meantime, event studies provide a direct test of market efficiency.[14] Given the rationality of the efficiency of the market and the immediate impact of an event on security prices, an event's economic impact can be constructed using security prices over a short period of time.[15] The event study method has become popular because it reflects the need to analyze stock prices to reflect the true value of firms by

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[12] For example, in accounting, see Toms, *Information content of earnings in an unregulated market: The cooperative cotton mills of Lancashire 1880-1900;* in management, see McWilliams and Siegel, *Event studies in Management research: Theoretical and Empirical issues;* in economics and finance, see Mackinlay, *Event studies in Economics and Finance.*

[13] Mackinlay, *Event studies in Economics and Finance*, p.16.

[14] Brown and Warner, *Measuring security price performance,* p. 205.

[15] Mackinlay, *Event studies in Economics and Finance,* p. 13.

incorporating all the relevant information. Furthermore, the event study method is relatively easy to implement, because the only data necessary are the names of publicly traded firms, event dates, and stock prices. It is well established that the usefulness of the event study depends heavily on a set of rather strong assumptions.[16]

Market efficiency implies that stock prices should incorporate any financially relevant information that is newly revealed to the market by identifying over which the impact of the event will be measured which is commonly known as the "event window". The second assumption is based on the idea that the market previously did not have information on the event and traders gain information from the announcement. Security prices may not adjust or anticipate the event beforehand and consequently the security prices will not adjust before the event date and may take a longer period to fully reflect the event's information even after the "event date". Therefore, abnormal returns will result from the stock market's reacting to new information. It is crucial to isolate the effect of confounding effects during the event window which is perhaps the most critical assumption of the methodology. For instance, declaration of dividends is considered to be a major confounding event which might have an impact on the share price during an event window. Thus, the event study method was developed to measure the effect of an unanticipated event on stock prices. Using the event analysis method enables the researcher to assess the extent to which security price performance around the time of the event has been abnormal.[17] Therefore, the impact of an event can be investigated by measuring the security's return over the event date to compute the difference between the observed return on the event and the expected return before and after the event date where any significant difference will be interpreted as abnormal return or loss. With the determination of abnormal returns, the researcher can infer the

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[16] Brown and Warner, *Measuring security price performance;* Brown, and Warner, *Using daily stock returns.*
[17] Brown and Warner, *Measuring security price performance*, p. 205.

significance of the event and can assess managerial decisions and prescribe the course of managerial behaviour.[18] In a nutshell, these abnormal returns are assumed to reflect the stock market's reaction to the arrival of new information.

As previously mentioned, the event should be unanticipated and the magnitude of abnormal performance is consistent with market efficiency since it measures the impact of the event on the wealth of the firm's shareholders.[19] Toms[20] argued that testing for market efficiency is an approach that allows the investigator to look behind technical conditions for the reasons why accounting disclosures might or might not have information content. The major role of the capital market is allocation of ownership of the economy's capital stock. The ideal is a market in which firms can make production-investment decisions, and investors can choose among the securities that represent ownership of firms' activities under the assumption that security prices at any time fully reflect all available information.[21] If information fails to be quickly and fully reflected in the stock market prices then the stock market is said to be inefficient because those who had privately gained access to such information can benefit by anticipating the course of such prices. Hence, the lack of efficiency in stock markets doesn't allow mechanism prices to work correctly.

Stock market efficiency is an essential concept in terms of understanding the performance of the capital markets and their contribution of the development of a country's economy. Fama[22] determined the conditions at which the capital market is efficient. The Efficient market

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[18] McWilliams and Siegel, *Event studies in Management research: Theoretical and Empirical issues,* p. 626.

[19] Brown and Warner, *Measuring security price performance,* p. 205.

[20] Toms, *Information content of earnings in an unregulated market: The cooperative cotton mills of Lancashire 1880-1900*, p. 189.

[21] Fama, *Efficient capital markets: A review of theory and empirical work,* p. 383.

[22] First of all, there should be no transaction costs in trading securities. Second, all available information should be costlessly available to all market participants. Finally, all agree on the implications of current information for the current price and distributions of future prices of each security. Hence, in such a market, the stock prices fully reflect available information.

Hypothesis (EMH) assumes that the stock prices adjust rapidly to the arrival of new information, and consequently, current prices fully reflect all available information. Samuelson[23] indicates that the EMH supposes that current stock prices fully reflect all available information and should follow a random walk process which means that stock returns are independently and identically distributed (IID), thus future price changes cannot be forecasted from historical price changes. Additionally, Fama[24] formalized the theoretical and empirical evidence on efficient market hypothesis and divided it into three levels. First, the weak-form EMH, which states that current stock prices fully reflect all historical market information such as: prices, trading volumes, and any market oriented information. Second, the semi-strong form EMH asserts that prices fully reflect not only the historical information but also all public information including non-market information, such as earning and dividend announcements, economic and political news. Finally, the strong-form EMH contends that stock prices reflect all information from historical, public, and private sources, so that no one investor can realize abnormal rate of return. To sum up, the categorization of the tests into weak, semi-strong, and strong form will help in testing the null hypothesis and determining the level of information at which the hypothesis breaks down.

The EMH has significant implications for both investors and authorities. For instance, if the stock market is efficient, the prices will represent the correct values of the stocks and in turn this will serve in a way that benefits both the individual investors and the country's economy as well. The Random Walk Model (RWM) is one of the mathematical models that assumes that consecutive price changes are independent and identically distributed random variables so that future price changes cannot be predicted from historical price changes. A number of statistical tests have been used in the literature to examine the validity of weak-form EMH and the RWM.

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[23] Samuelson, *Proof that properly anticipated prices fluctuate randomly.*
[24] Fama, *Efficient capital markets: A review of theory and empirical work.*

Autocorrelation tests are the most popular ones so this study employs serial correlation to test the statistical independence between rates of return. Serial correlation is a parametric test assuming normality of the stock price time series and hence measures the association between two elements of returns time series separated by a fixed number of time periods. Fama[25] explained that tests enrich our knowledge of the behaviour of returns across securities and through time. Fama[26] explained that stock index returns may show positive autocorrelation if some of the securities in the index trade infrequently. Statistically, the absences of statistical significance in autocorrelations test indicate that the market is efficient at weak-level which implies that the market prices follow a random walk. Thus, the RWM has some testable implications for the weak-form EMH. To test for weak form efficiency, the study employs the random walk model and serial correlation (or autocorrelation)[27] tests to measure the correlation coefficient between a series of returns and lagged returns in the same series. A significant positive serial correlation implies that a trend exists in the series, whereas a negative serial correlation indicates the existence of a reversal in price movements. A return series that is random will have a zero serial correlation coefficient. The beta coefficient from the following regression equation measures the serial correlation of stock i with a lag of K periods:

$$r_{i,t} = \alpha_i + B_i r_{i,t-k} + \varepsilon_{i,t}$$

Where $r_{i,t}$ represents the return of stock *i* at time t, α_i and B_i are constants, $\varepsilon_{i,t}$ represents random error, and k represents different time lags. The serial correlation tests assume normal distribution for the stock price changes (or returns). The independence of increments implies not only that increments are uncorrelated, but that any nonlinear functions of the increments are uncorrelated.

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[25] Fama, *Efficient capital markets: A review of theory and empirical work,* p.1577.
[26] Fama, *The behaviour of stock market prices.*
[27] An autocorrelation is the slope in a regression of the current return on a past return.

Changes in stock price are used as the dependent variable in linear regression while one lag of change in stock price was the independent variables. Semi-strong form tests of efficient market models are concerned with whether current prices "fully reflect" all publicly available information. The test is concerned with the adjustment of security prices to one kind of information generating event (e.g. publication of AIOC annual reports on 16 November 1951 and announcement of nationalisation on 30 April 1951). Hence, the test brings supporting evidence for the impact of the release of information on the current stock prices.

III

The study will focus on AIOC return index and the daily security return index for 30 firms in the FT30 Industrial Index over the period from May 1950 to May 1951. This period was chosen for two reasons. Firstly, May 1950 was a major foundation for nationalisation so this period covers the influential events leading up to nationalisation and ending by the nationalisation event itself on 1 May 1951. Secondly, this period is essential because it assists in defining the control period which is needed for undertaking the event study methodology. Bearing in mind that the market price during the control period was before any nationalisation would have roamed. The process of data collection involving the AIOC index and FT30 index will be explained thoroughly in this section.

The daily prices of AIOC employed in this event study are generally "closing" prices which represent the prices at which the last transaction occurred during the trading day. The company's stock price quoted on the stock exchange is assumed to present the "fair" value of the stock and when the stock exchange values all the stocks fairly then it is considered as an "efficient market". The dividends paid are assumed to convey important information to the market concerning the management's policy and dividend paying potential. In view of this

expectation, AIOC return index is adjusted with the dividends paid to the shareholders during the period because it might be expected to have stock market information content. It must be noted that the AIOC left its dividend unchanged for a period of five years from 1947-51 where the annual net payment to the shareholders was 16 pence per share in these years.[28]

Thus, the stock price daily returns for AIOC are calculated as follows,

$$R_{it} = \frac{P_{it}+D_{it}}{P_{it-1}} \text{-1,}$$ (1)

Where, R_{it} is daily stock price return stock i on day t, P_{it} is price of stock i on day t, P_{it-1} is price of stock i on t-1, D_{it} is dividend payment for stock i associated with day t.

The stock exchange has been progressive in disclosing information from the companies whose shares are quoted and traded where its record for the disclosed information about the marketplace activities remain so for many years.[29] The Stock exchange publishes a daily "Official List" that printed for all shares the different prices at which bargains had been struck during the previous business day.[30] The Financial Times Industrial Ordinary Shares Index (FT30) was the first major UK share index on the London Stock Exchange and its computation began on the 1 July 1935.[31] The index consists of 30 heavily trade securities chosen to provide almost 30 per cent of the market value of the securities quoted on the London stock Exchange and to this extent they reflect movements of the whole market quite effectively. The principle purpose of the index was to measure market movements over the short term and not to provide any estimates of market return or to act as a benchmark portfolio. Nonetheless, the FT30 index has the advantage that it is the only one which readily available, it has a small base and thus this

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[28] Bamberg, *British Petroleum and Global Oil 1950-1975*, p. 40.
[29] Littlewood, *The Stock Market: 50 years of capitalism at work*, p. 13.
[30] Littlewood, *The Stock Market: 50 years of capitalism at work*, p. 13
[31] Arsad and Coutts, *Security price anomalies in the London International Stock Exchange: a 60 year perspective,* p. 456.

may potentially lead to some inaccuracy. However, AIOC tends to be one company out of 30

companies from the list and for any price increase the difference computed will be relatively

very small.[32] The FT30 index was initially adopted from Loughborough University[33] and for the

purpose of this research it was modified by defining the corresponding dates for the Index values

and also by excluding weekends and public holidays from the index for the period under study.[34]

Using daily data takes into account the market's daily reaction to the signal during the event

month. Daily returns for FT30 index are calculated as follows,

$$R_{mt} = \frac{P_{it}}{P_{it-1}} \text{-}1,$$ (2)

Where, R_{mt} is the daily return on market portfolio, P_{it} is price index of stock i on day t, P_{it}-1 is

price index of stock i on t-1.

Comparing the AIOC's Return Index (RI) with the FT30 will provide a clear picture

about the performance of AIOC in relevance to the market which is very useful for assessment of

the company.[35] Therefore, the FT30 index is ideal for investigating the performance of AIOC

during its nationalisation.

There are three different models used in event study literature to estimate *ex ante*

expected return[36]. These are *Mean Adjusted Returns*, *Market Adjusted Returns* and *Market and*

Risk Adjusted Returns. The *Mean Adjusted Returns* assumes that the *ex ante* expected return E

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[32] FT30 includes 29 companies in addition to AIOC. Thus, when prices increase by 10% this means that 0.1/30= 0.0003 will correspond to AIOC's proportion. Obviously, the computed value is very small and will have a minor impact and won't lead to biasness and inaccuracy.

[33] For review of FT30 index, see Terence and Raphael, *The Econometric Modelling of Financial Time series, Data Appendix*.

[34] For review, see *Appendices 1and 2*.

[35] FT30 did not contain information about dividend payments due to the unavailability of the data in the London Stock Exchange but any dividend bias which occurs from not employing dividend adjusted returns will relatively be small and will not have an impact on the statistical significance of any results. However, sensitivity tests were conducted for AIOC return including and excluding dividend payments and there was relatively a very small difference in the results.

[36] For more details about these models, see, for example, Mackinlay , *Event studies in Economics and Finance;* Brown and Warner , *Measuring security price performance & Using daily stock returns.*

(R_{it}) is constant for each security over time however it differs across securities.[37] It assumes that the return on security i at any point of time is a function of the average past time series of returns. The *Mean Adjusted model* is consistent with the Capital asset Pricing Model (CAPM) which assumes that the stock has a constant systematic risk and thus the expected return is constant. Whereas, the *Market Adjusted Returns* assumes that the *ex ante* expected returns are constant across securities but not necessarily constant over time for a given security since all securities in the sample are assumed to be equal in terms of the size and the risk. The *ex ante* expected returns for any security at a point of time $E(R_{it})$ equals the expected market return at that particular point of time, i.e. $E(R_{mt}) = \Sigma R_{it}$, where t = [1,2,3…,T].[38] Finally, the *Market and Risk Adjusted Returns* model is based upon the market model estimates for each security in the sample and the abnormal returns are calculated as the difference between the actual stock return and the expected return relative to the market. Abnormal returns result when an event is unanticipated.

Brown and Warner (1980) argued that there are a variety of ways of measuring abnormal returns under different warrants of Asset Pricing model. They asserted that the *Market Model* and *Market Adjusted Model* had the same power where the specification and power of the actual tests for abnormal performance is similar to that obtained with the OLS market model.[39] They explained that *Market Adjusted Model* takes into account market wide movements which occurred at the same time when the firm experienced the event. Moreover, they asserted that the *Market Adjusted Model* is also consistent with the Asset Pricing model if all securities have systematic risk of unity. When the return on a security and the return on the market index are each measured over a different trading interval, ordinary least squares (OLS) estimates of market

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[37] Campbell *et al., The Econometrics of Financial Market,* p. 151.
[38] Campbell *et al., The Econometrics of Financial Market,* p. 151.
[39] Brown and Warner, *Using daily stock returns*, p. 25.

model parameters are biased and inconsistent.[40] Furthermore, OLS estimates of market model β might be biased and inconsistent due to non-synchronous trading. By constructing OLS residuals for a security sum to zero in the estimation period so that a bias in the estimate of β is compensated for by a bias in α.[41] Therefore, they assume that there is a stable linear relationship between the market return and the security return where market model parameters are adjusted as $\alpha=0$ & $\beta=1$ assuming the same risk level among the market and sample security. Thus, the expected value of the difference between the return on a security and the return on market index should in an asset pricing model framework be equal to zero which indicates that the expected return is equal to the market return.

Appraisal of the event's impact requires a measure of the abnormal return. A security's price performance is considered to be abnormal relative to a particular benchmark.[42] The abnormal return for a given security in any time period t is defined as the actual *ex post* return of the security minus the normal return of the firm over the event window. Estimates of daily abnormal returns (AR) for the $_i$th firm will be calculated as follows:

$$AR_{it} = R_{it} - R_{mt} \tag{3}$$

Where, R_{it} is daily stock price return stock i on day t *and* R_{mt} is the daily return on market portfolio. In this context, the variable of interest is the difference between the return on the individual security and the corresponding market return on the index. The abnormal returns (AR_{it}) represent returns earned by the firm after the analyst has adjusted for the "normal" return process. Any significant difference is considered to be an abnormal, or "excess return".

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[40] Brown and Warner, *Using daily stock returns*, p. 5.
[41] Brown and Warner, *Using daily stock returns*, p. 16.
[42] Brown and Warner, *Measuring security price performance*, p. 207.

Therefore, (AR_{it}) is the difference between the actual and expected rates of return on the security at time (t) during the event window (t_0 to $t+T$).

Cumulative average abnormal returns (CAR) are then calculated by aggregating the abnormal returns over the event period whilst dividends aren't ignored.

$$CARi = \sum_{t=I_1}^{I_2} AR_{it} \tag{4}$$

Where, CAR_i is the ith stock's cumulative abnormal return, I_1 is the start date of the event window and I_2 is the end date of the event window. The basis for inference in event studies is a test statistic for the significance of the empirical results and there is no general agreement on the *t*-test formula. Therefore, the statistical significance of short term CARs over the event window applied in this study are adopted from Dodd and Warner[43], Kothari and Warner[44] and Goergen and Renneboog[45] whom computed the test statistic as the ratio of the mean of CAR to the estimated standard deviation of abnormal returns over the estimation window as follows:,

$$t = \frac{\overline{CAR}}{\sigma(AR)} \tag{5}$$

Where, $\overline{CAR}$ is the mean of CAR and σ (AR) is the estimated standard deviation of abnormal returns which was computed using estimation period (-244 days to -6 days) as follows:

$$\sigma(AR) = \sqrt{\sum_{t=-244}^{t=-6}(AR_t - \overline{AR})^2 \Big/ 238} \quad , \tag{6}$$

$$\overline{AR} = \frac{1}{239} \sum_{t=-244}^{t=-6} AR_t \tag{7}$$

[43] Dodd and Warner, *On corporate governance- a study of proxy contests*, p. 437.
[44] Kothari and Warner, *Measuring long-horizon security price performance,* p. 308.
[45] Goergen and Renneboog, *Shareholder wealth effects of European Domestic and Cross-border takeover bids*, p. 18.

Brown and Warner (1985) explained the above t-statistic for testing one day abnormal return. However, if the event window has multi day intervals, then the t-statistics will be calculated differently by multiplying the standard deviation of abnormal returns by the square root of the number of event windows as follows:

$$t = \frac{\overline{CAR}}{\sigma(AR)\sqrt{T}} \; , \tag{8}$$

Where, T is the number of days in the event window and other terms are explained above. It is important to aggregate the abnormal returns for the event window and across observations of the event. The aggregation should be considered through time without any overlap in the event windows of the included security.

This section proposes three related and alternative hypotheses to be examined using a data set of historical quantitative variables. The first hypothesis involves investigating the economic impact of nationalisation on AIOC investors by comparing the loss in market value with the book value of the assets nationalised as disclosed in the 1950 AIOC Annual report and Accounts. Thus, the null and alternative hypotheses are:

H_0: Nationalisation event has no economic impact on the AIOC investors

H_1: Nationalisation event has an economic impact on the AIOC investors

The second hypothesis involves testing the impact of announcement of nationalisation in 30 April 1951 on AIOC investors.

H_0: Announcement of nationalisation has no information impact on AIOC investors

H_1: Announcement of nationalisation has an information impact on AIOC investors

The third, and related, hypothesis involves testing the impact of the publication of the AIOC annual report in November 1951 on AIOC investors.

H_0: There was no information content of annual report disclosure during the publication of

AIOC report

H_1: There was information content of annual report disclosure during the publication of AIOC

report

Finally, a subsequent and essential hypothesis arising from the previous hypotheses, involves testing whether the Market is weak and semi strongly efficient during both events or not.

H_0: Market was inefficient at weak-form and semi strong level

H_1: Market was efficient at weak-form and semi strong level

These hypotheses follow from the clear features of the capital market that was earlier discussed in the previous section. To test the information content hypotheses, the event study is employed as a tool to investigate the impact of nationalisation on AIOC investors by measuring their abnormal returns and to test whether they can anticipate bad news. Abnormal returns are calculated with reference to day t_0. Daily returns are used to compute abnormal returns. Abnormal returns are measured in circumstances where the availability of data is restricted by using the market adjusted return model rather than the market model.[46] Consequently, this study aims to measure the short-term wealth effects for AIOC shareholders using the *Market Adjusted Model*. Meanwhile, this study intends to examine the response of the stock market to the information content disclosed by Fraser in the published AIOC annual report in 16 November 1951. Finally, this study will test for weak form efficiency and semi strong efficiency.

The AIOC share price is compared with the first major UK stock market index, the Financial Times Industrial Ordinary Shares index (FT30), over the period 1950 through to 1951.

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[46] Campbell *et al., The Econometrics of Financial Market*, p. 156.

Comparing the AIOC's Return Index (RI) with the FT30 will provide a clear picture about the performance of AIOC in relevance to the market which is very useful for assessing AIOC's security prices reaction to nationalisation event. In the interim, this study examines the efficiency of the UK stock exchange at the weak-level and semi-strong level for the AIOC stock listed in the market by using daily observations of the FT30 index. Parametric test will be used to test for serial dependence in the AIOC returns. The event study involves various procedures. First of all, it starts by defining the event. Second, it entails specifying the event date. Then, it follows with estimating the expected returns within the event window. Fourth, it requires observing the realised returns within the event window. Fifth, it involves measuring the abnormal return (AR) which refers to the shareholder return over and above the average return on the market. Finally, it ends by aggregating the abnormal returns over the event window (CAR). In order to define the event window, a historical analysis including a timeline of events has to be defined to present the background to the nationalisation crisis.

IV

Defining the event of interest and identifying the event window is an important issue to examine the period over which the security prices of AIOC involved in the event respond to the new information released to the market. It is important to note that there is no consensus regarding the definition of the event and about the start of the period for the measurement of the short term wealth effects. It is assumed that the event date can be identified with certainty but using narrow windows might lead to significant error if there was a leakage of information before the first mention in the press. In this case, the event window is defined as the period from the transaction itself (t_0) which is the event date through the presumable dates after the event date (t+T) to

investigate the period beyond the disclosure dates. For instance, Mackinlay[47], Ajlouni & Toms[48] suggested that the common approach to handle this matter of uncertain event date is to define the event window to be larger than the specific period of interest to examine the periods surrounding the event whilst controlling for other event effects.

The event date in this study will be 30 April 1951 when nationalisation was approved by the Majlis and Senate and this was denoted as (t_0). It worth noting that the news about nationalisation was released and announced by the *Times* on 30 April 1951 confirming that the AIOC under Persian law have become the property of the Persian nation[49]. This study extends the event window long enough beyond the event date whilst controlling for other events such as the announcement of dividends to test the impact of news releases on the investors and test the effect of nationalisation on the price of securities of AIOC. Thus, the control period will start 240 trading days before the event date, 12 May 1950 to 20 April 1951, to capture the impact of nationalisation on the shareholders. It worth indicating that the control period will cover transactions by the AIOC before its nationalisation and will include the announcement of nationalisation. For instance, it will include the point when the Majlis first demanded nationalisation and created the Majlis Oil Committee headed by Musaddiq in 19 February 1951 and the announcement of nationalisation by the Majlis in March 1951. The discussion above has several implications for empirical testing. Given the data availability and the history of AIOC, empirical evidence is reported in this section to explain the reaction of the AIOC share price to political events in Iran in relevance to the stock market. The empirical results will lead to

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[47] Mackinlay, *Event studies in Economics and Finance*, p.14.
[48] Ajlouni and Toms, *Signalling characteristics and information content of directors' dealings on the London Stock exchange.*
[49] *The Times*, 30 April 1951, 4(C), Issue 51988.

insights relating to understanding the sources and causes of the effects of nationalisation on the AIOC stock prices.

Table 2 panel (A) calculates the geographical distribution of AIOC activity in 1950[50]. Meanwhile Table 2 panel (B) computes a more detailed analysis of the Market value and Book value of AIOC assets during nationalisation from the 1950 AIOC Annual Report to examine the long run effects and economic value impact of nationalisation on AIOC investors.

Table 2 (A) *Geographical distribution of AIOC activity in 1950*

Country	Crude production (Tons)	Refined (Tons)	Total (Tons)	%
Iran	31750	24050	55800	80.15%
Kuwait	7367	1054	8421	12.10%
Iraq	1681		1681	2.41%
Qatar	380		380	0.55%
UK	46	3291	3337	4.79%
Total	41224	28395	69619	100.00%

As shown above in Table 2 panel (A), the estimated 80.15% of the profit and other figures are attributed to Iranian activities in AIOC whereas 19.85% of the profit is attributed to non- Iranian activities in 1950.

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[50] AIOC, *Annual Report and Accounts*, 1950. The publication of the 1950 report was delayed until November 1951. In all cases the annual report is referred to in the narrative by calendar year of publication rather than accounting fiscal year, which fell one year earlier.

Table 2 (B) *Market Value and Book Value of AIOC assets during nationalisation*

B) Loss of Market value due to nationalisation				
Explanation	**Date**	**Book Value (£)**	**Market Price (£)**	**Market value reflected permanent nationalisation**
Value of share before nationalisation	12/05/1950	5.35	6.88	6.88
Value of share after nationalisation	01/05/1951	1.06	5.03	1.37****
Loss of value per share		4.29	1.85	5.51
		£'000	**£'000**	**£'000**
Capital before nationalisation	12/05/1950	107.72	138.49**	138.49
Capital after nationalisation	01/05/1951	21.34*	101.25***	27.58*****
Loss of value for capital		86.38	37.08	110.91
Loss of value in %		80.19%	26.89%	80.09%

Sources: Annual Report, 1950; The *Times* and *The Manchester Guardian.*

Notes:

Book value of AIOC capital is £107,719,810 as disclosed in the notes to the accounts, Annual report 1950 & 1951.

Ordinary Stock is £20,137,500 as disclosed in the notes to the accounts, Annual Report 1950& 1951.

Book Value per share =107,719,810 / 20,137500= £5.35

Geographical distribution of AIOC activity is calculated from
1950 annual report as illustrated previously in chapter 4; the Iranian activity 80.15% and non -Iranian activity 19.85%.

Book Value per share after AIOC assets were nationalised= 5.35* 19.85%= £1.06

* Book value of AIOC capital after nationalisation=1.06*20.13=21.34

Market price of AIOC share prices were compiled from *The Times newspapers and The Manchester Guardian* newspapers during 12 May 1950- 1st May 1951.

** Market price of AIOC capital after nationalisation=5.03*20.13=101.25

Market value per share reflected permanent nationalisation=6.88*19.85%=1.37

*** Market value of AIOC capital reflected permanent nationalisation= 1.37*20.13=27.58

As shown in Table 2, the book value per share dramatically declined from £5.35 to £1.06 after AIOC's nationalisation which is most likely attributed to the loss of 80.15% of the profits arising from Iranian activity. As a consequence, the AIOC's capital declined dramatically after nationalisation and amounted to £21.34 million. As mentioned above in the notes, the market prices of AIOC stocks were compiled from *The Times* and *The Manchester Guardian* newspapers and the value of capital was calculated accordingly. Quite clearly, the loss in market value of £37.08 million is substantially less than the book value of the assets nationalised of £86.38 million. However, if the market price is adjusted to reflect the impact of nationalisation and the loss of 80.15 per cent of the company's assets then the loss in Market value would have been £110.91 million. In similar vein, the percentage loss reflecting the impact of nationalisation would have been 80.09 per cent instead of a loss of only 26.89 per cent. Consequently, this explains that there is the possibility that the market priced shares according to sources beyond those immediately communicated by the company and the financial press and as a result the market was ascribing greater value to other factors such as the value of private information. Therefore, those with a detailed knowledge of the company's operation and diplomatic situation might have concluded that the Musaddiq's position was very weak, notwithstanding the popular reaction in Iran to the nationalisation event itself.

Empirical tests are done in this section to investigate the correlation between the release of information to the market place and the observed change of the AIOC stock prices as a response to the event. Moreover, empirical findings in relation to the research hypothesis are examined. The tests are devised to test for information content in nationalisation and in the publication of AIOC annual reports to test for changes through time in weak form and semi-strong form market efficiency. Hence, the study aims to compare relative efficiency at two

different points in time by varying the length of the event window. To test for weak form efficiency, the serial correlation for AIOC stock and FT30 are computed between rates of return to measure the association between two elements of returns time series separated by a fixed number of time periods. Table (3) shows the serial correlation for AIOC stock and FT30 index for time period t-1. In absolute terms the measured serial correlations are always close to zero.

Table 3. *Serial Correlation for AIOC & FT30 stock for one time lag*

	Time Lags	*Correlation*	*t-statistics*
AIOC	*One Day*	-0.0268	-0.18
FT30	*One Day*	-0.0051	-0.03

Sources: The AIOC return index for the control period & one time lag within the publication of AIOC annual report

The results from Table 3 shows that the serial correlation is consistently negative but also consistently close to zero at t-1 which is one day prior to the publication of annual reports by Fraser in 16 November 1951. Thus, the serial correlation tests revealed that the daily returns of AIOC and FT30 are efficient at the weak-form which in turn implies that we can rely on the market data and that the shares were not thinly traded.

To test for semi-strong efficiency, cumulative abnormal returns are calculated in varying event windows to explore the impact of nationalisation and publication of annual reports on the investors. For instance, cumulative abnormal returns are calculated with reference to the publication date (t_0) of the annual reports of AIOC, for the period surrounding the announcement t-n, t+n. Moreover, cumulative abnormal returns are calculated with reference to nationalisation of AIOC, for the period surrounding the event t-n, t+n. To extend the tests to a longer event window, the above tests are repeated for days between t_0, t-5, t+5 and t+10. Since nationalisation was announced on 30 of April 1951 to the public, it was possible to specify the exact date of the

disclosure for the event. The estimated standard deviation of abnormal returns is computed using the control period (12 May 1950 to 20 April 1951) as previously explained in equations (6) and (7) so that it would not overlap in the event windows of the included security. Then, to examine the statistical significance of the CAR during the event period, the test statistics is computed. The interval is set to one day, thus daily stocks are used. Tables (4) and (5) below report the CARs over 10 days before and after the event date and report their significance at a one-tailed significance level.

Table 4. *Cumulative Abnormal Returns and Test Statistic for nationalisation-Semi-strong market efficiency*

	Pre-announcement tests	Post announcement tests	Full Period
t-5, t$_0$	-0.0415		
	(-0.9087)		
t-1, t$_0$	-0.0672***		
	(-2.5499)		
t+1, t$_0$		-0.1025***	
		(-3.8912)	
t+5, t$_0$		-0.1015**	
		(-2.2239)	
t+10, t$_0$		-0.0861*	
		(-1.3935)	
t-1, t+5			-0.0954**
			(-1.9343)
t-1, t+10			-0.084*
			(-1.3005)
t-5,t+10			-0.0851
			(-1.1423)
t-5,t+5			-0.08191*
			(-1.32548)
t-1,t+1			-0.0846***
			(-2.6217)

Notes: Mean of the cumulative abnormal returns (CARs) are reported for different event windows. Moreover, T statistics are reported in parentheses illustrating the significance of the results. *** indicates significance at the 0.01 level, ** indicates significance at the 0.05 level, *significant at the 0.1 level (applying one-tailed tests according to the hypothesis).

The results in Table 4 illustrates that the mid 1951 showed a version of oil nationalism influenced by the events in Iran and consequently this had a negative impact on the AIOC stock price. A summary of the above extensive body of empirical evidence shows that there is an

abnormal return on the day prior to nationalisation, which is cumulatively significant at about 6.7 per cent in the period t-1. Thus, the results suggest the market is pricing in an abnormal return at t-1 of about 6.7 per cent as bad news prior to nationalisation which suggest semi-strong efficiency because stock prices responded to the announcement of nationalisation. Meanwhile, the results show that nationalisation yield significant and persistent cumulative abnormal returns (CARs) immediately after the event, at the end of the assumed day of disclosure (t+1) and this finding is consistent with the event definition. Hence, as Fama[51] argued that the typical result in event studies on daily data is that stock prices seem to adjust within a day to event announcements, the market recognized nationalisation and reflected the signal as soon as it has been disclosed. CARs are also significant at (t+5, t_0), (t+10, t_0), (t-1, t+5), (t-1, t+10), (t-5, t+5) and (t-1, t+1).

It is important to note that shareholders holding their investments until 1 May 1951 would have suffered a negative cumulative return of 10.25 per cent Meanwhile, shareholders holding their investment until 5 May 1951 would have suffered a negative cumulative return of 10.15 per cent and negative cumulative return of 8.6 per cent respectively if they kept their investment until 10 May 1951. This may in turn explains that nationalisation had a negative impact on the investors of AIOC as illustrated in their negative cumulative returns and AIOC stock prices were affected by the launch of a new period of more problematic relations between the company and the host country communicated via diplomatic channels that intimidated the investors. However, the reaction by the stock market was far less than might have been predicted.

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[51] Fama, *Efficient capital markets: II*, p. 1601.

Table 5. *Cumulative Abnormal Returns and Test Statistic for publication of annual reports- Semi-strong market efficiency*

	Pre-announcement tests	Post announcement tests	Full Period
t-10, t_0	0.0084		
	(0.1360)		
t-5, t_0	-0.0087		
	(-0.1922)		
t-1, t_0	0.0459**		
	(1.7412)		
t+1, t_0		0.0349*	
		(1.3235)	
t+5, t_0		0.0408	
		(0.8950)	
t+10, t_0		0.0553	
		(0.8943)	
t-10,t+10			0.0342
			(0.4009)
t-5,t+5			0.0067
			(0.1089)
t-1,t+1			0.0474*
			(1.4687)

Notes: Mean of the cumulative abnormal returns (CARs) are reported for different event windows. Moreover, T statistics are reported in parentheses illustrating the significance of the results. ** indicates significance at the 0.05 level, * significant at the 0.1 level (applying one-tailed tests according to the hypothesis).

The results from Table 5 imply that the publication of the annual report in 1951 was received positively and the market anticipated its contents. A summary of the above extensive body of empirical evidence shows that there is an abnormal return on the day before the annual

report is published, which is cumulatively significant by 4.5 per cent in the period t-1. Thus, the results suggest that the market is pricing in an abnormal return at t-1 of about 4.5 per cent as good news prior to publication of AIOC annual reports which suggest that there is information content in Fraser's announcement and semi-strong efficiency because stock prices reflected the publication of annual reports. Furthermore, the results show that CARs are cumulatively significant after the event, at the end of the assumed day of disclosure (t+1) but none of the returns are significant during the remaining days. In general, the longer the event window, the more difficult is to detect relationships between CARs and the results tended to be insignificant. In the shorter t-2 window, the market adjusted model was significant. Obviously, Fraser was concerned to protect British interests in Persia and maintain the confidence of the stockholders because he was aware of the fact that the interests of stockholders were paramount.[52] Fraser used the British press to promote shareholders' confidence, thus he asserted in the *Times*[53], after the publication and release of the company's annual reports in 19 November 1951 that the results for the year are of "great prosperity in the oil industry and of full operation of the Persian properties".[54] Furthermore, to maintain shareholders' confidence at the time of crisis for the company, he emphasised in the *Times* that:

> One-quarter of the company's trading activities were based
> on supplies of oil from non-Persian sources, and naturally a
> much larger proportion than that was earned outside Persia by
> virtue of the company's widespread shipping, refining, and
> marketing activities[55].
>
> 1951 had the benefit of a superlatively good trading period
> during the first half of the year, while the company was

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[52] Elm, *Oil, Power, and principle*, p.66.
[53] *The Times*, 28 November 1951, 9(C), Issue 52170.
[54] *The Times*, 28 November 1951, 9(C), Issue 52170.
[55] *The Times*, 28 November 1951, 9(C), Issue 52170.

operating in Persia as usual. And the extra cost imposed by
sudden changes will gradually diminish[56].

Not only that but to in order to align the performance of AIOC with the behaviour of British interests, Fraser disclosed in his statement to the public[57] as well as the *Times*[58] that "unless there is some wholly unforeseen happening in the remaining few weeks of this year, the company will be in a position to pay the same rate of dividend on the ordinary stock for 1951 as has been paid for some years past". It worth noting that Fraser was eager to increase the dividends paid to the ordinary shareholders even within the nationalisation crisis. Meanwhile, the British government didn't reject Fraser's opinion and was also interested in adopting the company's dividend policy since the company's activities could affect Britain's foreign relations and economic position.[59] Hence, the British government was willing to show the public that AIOC "genuinely desire to see a reasonable settlement reached between the company and the Persian government which takes fully into account not only the rights of the company but also the wish of the Persians to take a fuller part in the development of the industry".[60] Furthermore, Fraser undertook a review of the company's supply position which can reflect the growing confrontation of Britain over Iran's oil industry.[61] He established the Future Programme Committee in July 1951 to study and plan alternative marketing outlets, such as Kuwait, Iraq and Qatar, to supply oil instead of those forgone by Iran. Obviously, Fraser aimed to increase production from other Middle Eastern countries to offset the loss of Iranian oil during nationalisation and thus prove to "the Iranians and to other potential miscreants that they could

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[56] *The Times*, 28 November 1951, 9(C), Issue 52170.
[57] AIOC *Annual Report and Accounts*, November 16, 1951.
[58] *The Times*, 28 November 1951.
[59] Bamberg, *British Petroleum and Global Oil 1950-1975*, p. 41.
[60] *The Times*, 1 May 1951, 4(E), Issue 51989.
[61] Bamberg, *British Petroleum and Global Oil 1950-1975*, p.20.

quite well do without their oil".[62] Since Fraser's role became into sharp focus as the subject of claims and counter-claims from the AIOC board and Iranian nationalist opinion, this study presents an empirical investigation of AIOC's daily stock returns to examine their behavior during the company's nationalisation.

Finally, 1950 reports of AIOC Annual General Meetings, at which the chairman presented the published statement, appeared in different local newspapers such as the *Economist* and the *Times*.[63] Meanwhile, Fraser's statement was produced in full elsewhere and was conciliatory and restrained in tone, it burns no bridges but it builds up a strong factual defence against Persian.[64] For instance, the *New York Times*, the *New York Herald Tribune,* and the *Wall Street Journal* were among the newspapers that which "carried the full text –in 12 columns- of the statement to the shareholders of the Anglo Iranian Oil Company by Sir William Fraser, the Chairman".[65] Given Frasers' involvement, it might be expected that extensive publication of 1950 annual report and press discussion of accounting data and results might have lead to a closer relationship with the stockholders'.

In a nut shell, the empirical results clearly and significantly reject the null hypotheses that nationalisation event and information disclosed in the published AIOC annual reports have no impact on the AIOC investors and stock prices didn't respond to the event. Instead, the test results suggest that with respect to AIOC specific events, the market is semi strongly efficient and discounted not only the short run negative impact of nationalisation, but also explained the political value of the AIOC's control of the Iranian oil industry value chain beyond mere drilling, refining and distribution, and revealed the weak medium term position of the Iranian government

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[62] Sampson, *The Seven Sisters: The Great Oil Companies and the world they made*, pp.135-6.
[63] The AIOC 1950 statement for instance appeared in *The Economist* 1 December 1951, 59-65; *The Times*, 28 November 1951, 8(A), Issue 52170.
[64] *The Times*, 28 November 1951.
[65] *The Times*, 29 November 1951, 3(D), Issue 52171.

from a diplomatic and political point of view. Nationalisation episode tends to be more damaging British pride than to the stock market.

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V

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Oil with its enormous geographical spread and political consequences had been a major source of influence and gave AIOC the power of control over the Iranian resources. In fact, the introduction of nationalisation resulted in short episodes of high growth and AIOC policies were not geared towards maintaining the momentum. Hence, the AIOC feared that the political situation in Iran during 1951 could threaten the flow of oil from Iran which will negatively affect the production and exports of the company and considered nationalisation as a potential threat. Therefore, Fraser and the AIOC board aimed to fight for the control of Iran without destroying their industry and by maintaining a flourishing and progressive picture for AIOC during nationalisation. Moreover, they took great risks with the shareholders' assets and tried all their best to hide the true nature of the political situation in Iran and defend themselves against the Iranian claims. In short, Fraser and the AIOC board were taking great risks with the shareholders' assets, yet the shareholders were kept in ignorance of the true nature of the political situation in Iran. It is possible that investors were misled by the British press, which shared many of the pre-conceived colonial attitudes of the AIOC. It is possible that they shared these attitudes and the complacency that accompanied them. By promoting ignorance, Fraser had the ability to manipulate facts to promote shareholder confidence, and in this respect at least, he was successful.

Since the impact of specific events on the security prices of the affected firms has been the subject of great deal in number of studies.[66] This study examines the behaviour of AIOC

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[66] Brown and Warner, *Measuring security price performance*, p. 205.

stock prices during different event windows. For instance, it examines the impact of nationalisation and management of information on the AIOC investors over 1950 and 1951, employing an event study methodology to measure Cumulative Abnormal Returns. As previously mentioned, the event study continued to be a valuable and widely used tool in accounting and finance. Using the *Market Adjusted Model*, the results reveal that nationalisation had a negative impact on the shareholders and there is an impressive body of empirical evidence which indicates that the market adjusts rapidly to new information as soon as it is disclosed. Within the above context, the event study has shown that the AIOC daily stock data responded to nationalisation and publication of the company's annual reports.

Three important conclusions are suggested by the above statistical and historical analysis. These are first that disclosure and announcement of nationalisation resulted in negative cumulative abnormal returns for the investors immediately after the event. Second, announcement of nationalisation produced significant statistical results at earlier days of the event window whilst controlling confounding events which leans me toward the suggestion that the market reacts significantly sooner and faster to bad news. Third, the statistical analysis for market efficiency suggests that the market is efficient at the weak and semi strong form which in turn implies that we can rely on the market data.

To conclude, event studies are popular in various fields including accounting, finance and management, nevertheless not been widely applied in historical research. Nonetheless, historical analysis should feature prominently in empirical accounting research and this was a major motivation behind this analysis.

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APPENDIX 1: AIOC INDEX VALUES FOR THE PERIOD 12/05/1950-16/11/1951

Date	AIOC Closing prices	Dividends	AIOC daily return
12/05/1950	6.8750	0.0000	
15/05/1950	6.8750	0.0000	0.0000
16/05/1950	6.8438	0.0000	-0.0045
17/05/1950	6.8125	0.0000	-0.0046
18/05/1950	6.8125	0.0000	0.0000
19/05/1950	6.8750	0.0000	0.0092
22/05/1950	7.0000	0.0000	0.0182
23/05/1950	7.0000	0.0000	0.0000
24/05/1950	6.9375	0.0000	-0.0089
25/05/1950	7.0000	0.0000	0.0090
26/05/1950	7.0625	0.0000	0.0089
30/05/1950	7.2500	0.0000	0.0265
31/05/1950	7.2500	0.0000	0.0000
01/06/1950	7.2188	0.0000	-0.0043
02/06/1950	7.1250	0.0000	-0.0130
05/06/1950	7.0625	0.0000	-0.0088
06/06/1950	7.0938	0.0000	0.0044
07/06/1950	7.0938	0.0000	0.0000
08/06/1950	7.0938	0.0000	0.0000
09/06/1950	7.0938	0.0000	0.0000
12/06/1950	7.1875	0.0000	0.0132
13/06/1950	7.2500	0.0000	0.0087
14/06/1950	7.2188	0.0000	-0.0043
15/06/1950	7.1875	0.0000	-0.0043

16/06/1950	7.1563	0.0000	-0.0043
19/06/1950	7.0625	0.0000	-0.0131
20/06/1950	7.0000	0.0000	-0.0088
21/06/1950	6.8125	0.0000	-0.0268
22/06/1950	6.9688	0.0000	0.0229
23/06/1950	6.9688	0.0000	0.0000
26/06/1950	6.9375	0.0000	-0.0045
27/06/1950	6.7500	0.0000	-0.0270
28/06/1950	6.5625	0.0000	-0.0278
29/06/1950	6.6875	0.0000	0.0190
30/06/1950	6.5625	0.0000	-0.0187
03/07/1950	6.6250	0.0000	0.0095
04/07/1950	6.4375	0.0000	-0.0283
05/07/1950	6.3438	0.0000	-0.0146
06/07/1950	6.3438	0.0000	0.0000
07/07/1950	6.3438	0.0000	0.0000
10/07/1950	6.3438	0.0000	0.0000
11/07/1950	6.3125	0.0000	-0.0049
12/07/1950	6.3125	0.0000	0.0000
13/07/1950	6.2500	0.0000	-0.0099
14/07/1950	5.8438	0.0000	-0.0650
17/07/1950	5.7813	0.0000	-0.0107
18/07/1950	5.7500	0.0000	-0.0054
19/07/1950	5.7500	0.0000	0.0000
20/07/1950	5.8438	0.0000	0.0163
21/07/1950	5.9375	0.0000	0.0160
24/07/1950	5.9688	0.0000	0.0053
25/07/1950	5.8125	0.0000	-0.0262
26/07/1950	5.6250	0.0000	-0.0323

27/07/1950	5.6250	0.0000	0.0000
28/07/1950	5.6250	0.0000	0.0000
31/07/1950	5.6563	0.2500	0.0500
01/08/1950	5.5625	0.0000	-0.0166
02/08/1950	5.6250	0.0000	0.0112
03/08/1950	5.7188	0.0000	0.0167
04/08/1950	5.8125	0.0000	0.0164
08/08/1950	5.7813	0.0000	-0.0054
09/08/1950	5.8438	0.0000	0.0108
10/08/1950	5.7813	0.0000	-0.0107
11/08/1950	5.9375	0.0000	0.0270
14/08/1950	5.8750	0.0000	-0.0105
15/08/1950	5.7500	0.0000	-0.0213
16/08/1950	5.7500	0.0000	0.0000
17/08/1950	5.6875	0.0000	-0.0109
18/08/1950	5.7500	0.0000	0.0110
21/08/1950	5.6875	0.0000	-0.0109
22/08/1950	5.6875	0.0000	0.0000
23/08/1950	5.6875	0.0000	0.0000
24/08/1950	5.7813	0.0000	0.0165
25/08/1950	5.8750	0.0000	0.0162
28/08/1950	5.8750	0.0000	0.0000
29/08/1950	5.8125	0.0000	-0.0106
30/08/1950	5.8125	0.0000	0.0000
31/08/1950	5.7813	0.0000	-0.0054
01/09/1950	5.7813	0.0000	0.0000
04/09/1950	5.7500	0.0000	-0.0054
05/09/1950	5.7813	0.0000	0.0054
06/09/1950	5.7813	0.0000	0.0000

07/09/1950	5.7188	0.0000	-0.0108
08/09/1950	5.6563	0.0000	-0.0109
11/09/1950	5.7188	0.0000	0.0110
12/09/1950	5.7500	0.0000	0.0055
13/09/1950	5.7813	0.0000	0.0054
14/09/1950	5.8125	0.0000	0.0054
15/09/1950	6.0625	0.0000	0.0430
18/09/1950	6.0000	0.0000	-0.0103
19/09/1950	6.1250	0.0000	0.0208
20/09/1950	6.5000	0.0000	0.0612
21/09/1950	6.5938	0.0000	0.0144
22/09/1950	6.4688	0.0000	-0.0190
25/09/1950	6.5000	0.0000	0.0048
26/09/1950	6.8125	0.0000	0.0481
27/09/1950	6.8125	0.0000	0.0000
28/09/1950	6.7188	0.0000	-0.0138
29/09/1950	6.6563	0.0000	-0.0093
02/10/1950	6.5938	0.0000	-0.0094
03/10/1950	6.5625	0.0000	-0.0047
04/10/1950	6.5000	0.0000	-0.0095
05/10/1950	6.4375	0.0000	-0.0096
06/10/1950	6.4688	0.0000	0.0049
09/10/1950	6.5000	0.0000	0.0048
10/10/1950	6.6250	0.0000	0.0192
11/10/1950	6.6250	0.0000	0.0000
12/10/1950	6.5625	0.0000	-0.0094
13/10/1950	6.5625	0.0000	0.0000
16/10/1950	6.6250	0.0000	0.0095
17/10/1950	6.6250	0.0000	0.0000

18/10/1950	6.5625	0.0000	-0.0094
19/10/1950	6.5625	0.0000	0.0000
20/10/1950	6.5625	0.0000	0.0000
23/10/1950	6.5625	0.0000	0.0000
24/10/1950	6.5000	0.0000	-0.0095
25/10/1950	6.4063	0.0000	-0.0144
26/10/1950	6.3750	0.0000	-0.0049
27/10/1950	6.3750	0.0000	0.0000
30/10/1950	6.3750	0.0000	0.0000
31/10/1950	6.3125	0.0000	-0.0098
01/11/1950	6.2813	0.0000	-0.0050
02/11/1950	6.2188	0.0000	-0.0100
03/11/1950	6.2188	0.0000	0.0000
06/11/1950	6.2188	0.0000	0.0000
07/11/1950	6.1563	0.0000	-0.0101
08/11/1950	6.1250	0.0000	-0.0051
09/11/1950	6.2500	0.0000	0.0204
10/11/1950	6.4375	0.0000	0.0300
13/11/1950	6.3438	0.0000	-0.0146
14/11/1950	6.2813	0.0000	-0.0099
15/11/1950	6.2813	0.0000	0.0000
16/11/1950	6.4063	0.0000	0.0199
17/11/1950	6.5000	0.0000	0.0146
20/11/1950	6.5313	0.0000	0.0048
21/11/1950	6.5313	0.0000	0.0000
22/11/1950	6.4063	0.0000	-0.0191
23/11/1950	6.3125	0.0000	-0.0146
24/11/1950	6.3438	0.0500	0.0129
27/11/1950	6.3438	0.0000	0.0000

28/11/1950	6.2813	0.0000	-0.0099
29/11/1950	6.1875	0.0000	-0.0149
30/11/1950	5.6250	0.0000	-0.0909
01/12/1950	5.8438	0.0000	0.0389
04/12/1950	5.8438	0.0000	0.0000
05/12/1950	5.8750	0.0000	0.0053
06/12/1950	5.7500	0.0000	-0.0213
07/12/1950	5.8750	0.0000	0.0217
08/12/1950	5.8438	0.0000	-0.0053
11/12/1950	5.8125	0.0000	-0.0053
12/12/1950	5.8438	0.0000	0.0054
13/12/1950	6.0000	0.0000	0.0267
14/12/1950	6.0000	0.0000	0.0000
15/12/1950	6.1250	0.0000	0.0208
18/12/1950	6.0000	0.0000	-0.0204
19/12/1950	6.0000	0.0000	0.0000
20/12/1950	6.0000	0.0000	0.0000
21/12/1950	6.0000	0.0000	0.0000
22/12/1950	5.8125	0.0000	-0.0313
27/12/1950	5.8125	0.0000	0.0000
28/12/1950	5.6250	0.0000	-0.0323
29/12/1950	5.5625	0.0000	-0.0111
02/01/1951	5.5000	0.0000	-0.0112
03/01/1951	5.6250	0.0000	0.0227
04/01/1951	5.8438	0.0000	0.0389
05/01/1951	5.7813	0.0000	-0.0107
08/01/1951	5.7813	0.0000	0.0000
09/01/1951	5.6563	0.0000	-0.0216
10/01/1951	5.5000	0.0000	-0.0276

11/01/1951	5.5000	0.0000	0.0000
12/01/1951	5.5313	0.0000	0.0057
15/01/1951	5.6250	0.0000	0.0169
16/01/1951	5.5625	0.0000	-0.0111
17/01/1951	5.5625	0.0000	0.0000
18/01/1951	5.7188	0.0000	0.0281
19/01/1951	5.6875	0.0000	-0.0055
22/01/1951	5.6250	0.0000	-0.0110
23/01/1951	5.7500	0.0000	0.0222
24/01/1951	5.8125	0.0000	0.0109
25/01/1951	5.8125	0.0000	0.0000
26/01/1951	5.8125	0.0000	0.0000
29/01/1951	5.7500	0.0000	-0.0108
30/01/1951	5.6250	0.0000	-0.0217
31/01/1951	5.6250	0.0000	0.0000
01/02/1951	5.6563	0.0000	0.0056
02/02/1951	5.7188	0.0000	0.0110
05/02/1951	5.7188	0.0000	0.0000
06/02/1951	5.6875	0.0000	-0.0055
07/02/1951	5.6563	0.0000	-0.0055
08/02/1951	5.6563	0.0000	0.0000
09/02/1951	6.0625	0.0000	0.0718
12/02/1951	6.0625	0.0000	0.0000
13/02/1951	6.1875	0.0000	0.0206
14/02/1951	6.1875	0.0000	0.0000
15/02/1951	6.0625	0.0000	-0.0202
16/02/1951	5.9375	0.0000	-0.0206
19/02/1951	5.8750	0.0000	-0.0105
20/02/1951	5.8125	0.0000	-0.0106

21/02/1951	5.7500	0.0000	-0.0108
22/02/1951	5.7500	0.0000	0.0000
23/02/1951	5.8125	0.0000	0.0109
26/02/1951	5.8438	0.0000	0.0054
27/02/1951	6.0000	0.0000	0.0267
28/02/1951	6.0625	0.0000	0.0104
01/03/1951	6.1563	0.0000	0.0155
02/03/1951	6.2813	0.0000	0.0203
05/03/1951	6.3438	0.0000	0.0100
06/03/1951	6.0938	0.0000	-0.0394
07/03/1951	6.0625	0.0000	-0.0051
08/03/1951	5.8750	0.0000	-0.0309
09/03/1951	5.8125	0.0000	-0.0106
12/03/1951	5.4375	0.0000	-0.0645
13/03/1951	5.5000	0.0000	0.0115
14/03/1951	5.5000	0.0000	0.0000
15/03/1951	5.3438	0.0000	-0.0284
16/03/1951	5.1875	0.0000	-0.0292
19/03/1951	5.0625	0.0000	-0.0241
20/03/1951	5.0385	0.0000	-0.0047
21/03/1951	5.1875	0.0000	0.0296
22/03/1951	5.1250	0.0000	-0.0120
27/03/1951	5.1875	0.0000	0.0122
28/03/1951	5.0625	0.0000	-0.0241
29/03/1951	5.1250	0.0000	0.0123
30/03/1951	5.1875	0.0000	0.0122
02/04/1951	5.1250	0.0000	-0.0120
03/04/1951	5.0625	0.0000	-0.0122
04/04/1951	5.0313	0.0000	-0.0062

05/04/1951	5.2500	0.0000	0.0435
06/04/1951	5.1875	0.0000	-0.0119
09/04/1951	5.2500	0.0000	0.0120
10/04/1951	5.2500	0.0000	0.0000
11/04/1951	5.2500	0.0000	0.0000
12/04/1951	5.2500	0.0000	0.0000
13/04/1951	5.1875	0.0000	-0.0119
16/04/1951	5.1875	0.0000	0.0000
17/04/1951	5.1250	0.0000	-0.0120
18/04/1951	5.1250	0.0000	0.0000
19/04/1951	5.4688	0.0000	0.0671
20/04/1951	5.4375	0.0000	-0.0057
23/04/1951	5.4375	0.0000	0.0000
24/04/1951	5.3750	0.0000	-0.0115
25/04/1951	5.3438	0.0000	-0.0058
26/04/1951	5.5000	0.0000	0.0292
27/04/1951	5.5625	0.0000	0.0114
30/04/1951	5.2500	0.0000	-0.0562
01/05/1951	5.0313	0.0000	-0.0417
02/05/1951	5.0625	0.0000	0.0062
03/05/1951	5.0313	0.0000	-0.0062
04/05/1951	5.0625	0.0000	0.0062
07/05/1951	5.1250	0.0000	0.0123
08/05/1951	5.2500	0.0000	0.0244
09/05/1951	5.3750	0.0000	0.0238
10/05/1951	5.3750	0.0000	0.0000
11/05/1951	5.3750	0.0000	0.0000
15/05/1951	5.3125	0.0000	-0.0116
16/05/1951	5.1563	0.0000	-0.0294

17/05/1951	5.1563	0.0000	0.0000
18/05/1951	5.0625	0.0000	-0.0182
21/05/1951	5.0000	0.0000	-0.0123
22/05/1951	4.8750	0.0000	-0.0250
23/05/1951	4.8750	0.0000	0.0000
24/05/1951	5.0000	0.0000	0.0256
25/05/1951	5.0000	0.0000	0.0000
28/05/1951	5.0938	0.0000	0.0188
29/05/1951	5.1250	0.0000	0.0061
30/05/1951	5.1875	0.0000	0.0122
31/05/1951	5.2500	0.0000	0.0120
01/06/1951	5.3438	0.0000	0.0179
04/06/1951	5.2500	0.0000	-0.0175
05/06/1951	5.4375	0.0000	0.0357
06/06/1951	5.5000	0.0000	0.0115
07/06/1951	5.5625	0.0000	0.0114
08/06/1951	5.5625	0.0000	0.0000
11/06/1951	5.7188	0.0000	0.0281
12/06/1951	5.5938	0.0000	-0.0219
13/06/1951	5.5938	0.0000	0.0000
14/06/1951	5.5000	0.0000	-0.0168
15/06/1951	5.3750	0.0000	-0.0227
18/06/1951	5.2500	0.0000	-0.0233
19/06/1951	5.1250	0.0000	-0.0238
20/06/1951	5.0313	0.0000	-0.0183
21/06/1951	5.1250	0.0000	0.0186
22/06/1951	5.2188	0.0000	0.0183
25/06/1951	5.1250	0.0000	-0.0180
26/06/1951	5.1250	0.0000	0.0000

27/06/1951	5.0938	0.0000	-0.0061
28/06/1951	5.1875	0.0000	0.0184
29/06/1951	5.5000	0.0000	0.0602
02/07/1951	5.5000	0.0000	0.0000
03/07/1951	5.4688	0.0000	-0.0057
04/07/1951	5.5000	0.0000	0.0057
05/07/1951	5.4375	0.0000	-0.0114
06/07/1951	5.4375	0.0000	0.0000
09/07/1951	5.4063	0.0000	-0.0057
10/07/1951	5.2500	0.0000	-0.0289
11/07/1951	5.3125	0.0000	0.0119
12/07/1951	5.2813	0.0000	-0.0059
13/07/1951	5.4375	0.0000	0.0296
16/07/1951	5.3438	0.0000	-0.0172
17/07/1951	5.3125	0.0000	-0.0058
18/07/1951	5.3125	0.0000	0.0000
19/07/1951	5.2500	0.0000	-0.0118
20/07/1951	5.1875	0.0000	-0.0119
23/07/1951	5.0625	0.0000	-0.0241
24/07/1951	5.3125	0.0000	0.0494
25/07/1951	5.4063	0.0000	0.0176
26/07/1951	5.4688	0.0000	0.0116
27/07/1951	5.4688	0.0000	0.0000
30/07/1951	5.4375	0.0000	-0.0057
31/07/1951	5.4375	0.2500	0.0460
01/08/1951	5.3125	0.0000	-0.0230
02/08/1951	5.3125	0.0000	0.0000
03/08/1951	5.3438	0.0000	0.0059
07/08/1951	5.3438	0.0000	0.0000

08/08/1951	5.3125	0.0000	-0.0058
09/08/1951	5.3125	0.0000	0.0000
10/08/1951	5.3750	0.0000	0.0118
13/08/1951	5.5313	0.0000	0.0291
14/08/1951	5.6563	0.0000	0.0226
15/08/1951	5.6875	0.0000	0.0055
16/08/1951	5.5938	0.0000	-0.0165
17/08/1951	5.5938	0.0000	0.0000
20/08/1951	5.5000	0.0000	-0.0168
21/08/1951	5.4688	0.0000	-0.0057
22/08/1951	5.4063	0.0000	-0.0114
23/08/1951	5.4063	0.0000	0.0000
24/08/1951	5.2813	0.0000	-0.0231
27/08/1951	5.2500	0.0000	-0.0059
28/08/1951	5.2188	0.0000	-0.0060
29/08/1951	5.3438	0.0000	0.0240
30/08/1951	5.5000	0.0000	0.0292
31/08/1951	5.5625	0.0000	0.0114
03/09/1951	5.5313	0.0000	-0.0056
04/09/1951	5.5000	0.0000	-0.0056
05/09/1951	5.4688	0.0000	-0.0057
06/09/1951	5.4688	0.0000	0.0000
07/09/1951	5.4063	0.0000	-0.0114
10/09/1951	5.3750	0.0000	-0.0058
11/09/1951	5.3750	0.0000	0.0000
12/09/1951	5.5000	0.0000	0.0233
13/09/1951	5.5000	0.0000	0.0000
14/09/1951	5.4688	0.0000	-0.0057
17/09/1951	5.4063	0.0000	-0.0114

18/09/1951	5.4063	0.0000	0.0000
19/09/1951	5.3750	0.0000	-0.0058
20/09/1951	5.3125	0.0000	-0.0116
21/09/1951	5.4375	0.0000	0.0235
24/09/1951	5.5000	0.0000	0.0115
25/09/1951	5.4375	0.0000	-0.0114
26/09/1951	5.4063	0.0000	-0.0057
27/09/1951	5.3438	0.0000	-0.0116
28/09/1951	5.3125	0.0000	-0.0058
01/10/1951	5.3125	0.0000	0.0000
02/10/1951	5.2813	0.0000	-0.0059
03/10/1951	5.2813	0.0000	0.0000
04/10/1951	5.3125	0.0000	0.0059
05/10/1951	5.4063	0.0000	0.0176
08/10/1951	5.5625	0.0000	0.0289
09/10/1951	5.6250	0.0000	0.0112
10/10/1951	5.5938	0.0000	-0.0056
11/10/1951	5.6250	0.0000	0.0056
12/10/1951	5.5938	0.0000	-0.0056
15/10/1951	5.5625	0.0000	-0.0056
16/10/1951	5.5313	0.0000	-0.0056
17/10/1951	5.4688	0.0000	-0.0113
18/10/1951	5.4063	0.0000	-0.0114
19/10/1951	5.4063	0.0000	0.0000
22/10/1951	5.4063	0.0000	0.0000
23/10/1951	5.4375	0.0000	0.0058
24/10/1951	5.4375	0.0000	0.0000
25/10/1951	5.5313	0.0000	0.0172
26/10/1951	5.7188	0.0000	0.0339

29/10/1951	5.7188	0.0000	0.0000
30/10/1951	5.7500	0.0000	0.0055
31/10/1951	5.6875	0.0000	-0.0109
01/11/1951	5.6250	0.0000	-0.0110
02/11/1951	5.5000	0.0000	-0.0222
05/11/1951	5.4063	0.0000	-0.0170
06/11/1951	5.5000	0.0000	0.0173
07/11/1951	5.5625	0.0000	0.0114
08/11/1951	5.5313	0.0000	-0.0056
09/11/1951	5.5313	0.0000	0.0000
12/11/1951	5.4688	0.0000	-0.0113
13/11/1951	5.3750	0.0000	-0.0171
14/11/1951	5.3125	0.0000	-0.0116
15/11/1951	5.3750	0.0000	0.0118
16/11/1951	5.5625	0.0000	0.0349

APPENDIX 2: FT30 INDEX VALUES FOR THE PERIOD 12/05/1950-16/11/1951

Date	FT30 Index	FT30 Daily return
12/05/1950	107.4000	
15/05/1950	108.0000	0.0056
16/05/1950	108.1000	0.0009
17/05/1950	108.1000	0.0000
18/05/1950	108.1000	0.0000
19/05/1950	108.2000	0.0009
22/05/1950	108.2000	0.0000
23/05/1950	108.2000	0.0000
24/05/1950	108.2000	0.0000
25/05/1950	108.0000	-0.0018
26/05/1950	108.0000	0.0000
30/05/1950	108.3000	0.0028
31/05/1950	108.8000	0.0046
01/06/1950	109.1000	0.0028
02/06/1950	109.5000	0.0037
05/06/1950	109.6000	0.0009
06/06/1950	110.4000	0.0073
07/06/1950	111.5000	0.0100
08/06/1950	112.8000	0.0117
09/06/1950	113.3000	0.0044
12/06/1950	113.2000	-0.0009
13/06/1950	113.7000	0.0044
14/06/1950	114.2000	0.0044
15/06/1950	114.8000	0.0053
16/06/1950	115.0000	0.0017
19/06/1950	114.9000	-0.0009

20/06/1950	115.0000	0.0009
21/06/1950	115.1000	0.0009
22/06/1950	114.6000	-0.0043
23/06/1950	114.4000	-0.0017
26/06/1950	114.3000	-0.0009
27/06/1950	114.6000	0.0026
28/06/1950	114.6000	0.0000
29/06/1950	114.8000	0.0017
30/06/1950	114.9000	0.0009
03/07/1950	114.8000	-0.0009
04/07/1950	113.2000	-0.0139
05/07/1950	112.3000	-0.0080
06/07/1950	112.7000	0.0036
07/07/1950	112.7000	0.0000
10/07/1950	111.9000	-0.0071
11/07/1950	111.3000	-0.0054
12/07/1950	111.5000	0.0018
13/07/1950	111.1000	-0.0036
14/07/1950	111.2000	0.0009
17/07/1950	111.4000	0.0018
18/07/1950	111.6000	0.0018
19/07/1950	112.0000	0.0036
20/07/1950	112.0000	0.0000
21/07/1950	111.2000	-0.0071
24/07/1950	110.9000	-0.0027
25/07/1950	110.6000	-0.0027
26/07/1950	110.6000	0.0000
27/07/1950	110.9000	0.0027
28/07/1950	111.3000	0.0036

31/07/1950	111.6000	0.0027
01/08/1950	111.5000	-0.0009
02/08/1950	111.1000	-0.0036
03/08/1950	111.3000	0.0018
04/08/1950	111.2000	-0.0009
08/08/1950	111.4000	0.0018
09/08/1950	111.4000	0.0000
10/08/1950	111.1000	-0.0027
11/08/1950	111.4000	0.0027
14/08/1950	111.9000	0.0045
15/08/1950	111.9000	0.0000
16/08/1950	112.4000	0.0045
17/08/1950	112.6000	0.0018
18/08/1950	113.2000	0.0053
21/08/1950	113.2000	0.0000
22/08/1950	113.1000	-0.0009
23/08/1950	112.8000	-0.0027
24/08/1950	113.1000	0.0027
25/08/1950	113.2000	0.0009
28/08/1950	113.1000	-0.0009
29/08/1950	113.3000	0.0018
30/08/1950	113.7000	0.0035
31/08/1950	113.7000	0.0000
01/09/1950	113.9000	0.0018
04/09/1950	113.7000	-0.0018
05/09/1950	113.5000	-0.0018
06/09/1950	113.4000	-0.0009
07/09/1950	113.5000	0.0009
08/09/1950	113.5000	0.0000

11/09/1950	113.3000	-0.0018
12/09/1950	113.7000	0.0035
13/09/1950	113.6000	-0.0009
14/09/1950	113.5000	-0.0009
15/09/1950	113.6000	0.0009
18/09/1950	113.6000	0.0000
19/09/1950	113.9000	0.0026
20/09/1950	114.1000	0.0018
21/09/1950	114.5000	0.0035
22/09/1950	115.4000	0.0079
25/09/1950	115.8000	0.0035
26/09/1950	115.9000	0.0009
27/09/1950	116.6000	0.0060
28/09/1950	117.7000	0.0094
29/09/1950	118.0000	0.0025
02/10/1950	118.2000	0.0017
03/10/1950	118.1000	-0.0008
04/10/1950	118.0000	-0.0008
05/10/1950	117.9000	-0.0008
06/10/1950	117.9000	0.0000
09/10/1950	117.9000	0.0000
10/10/1950	117.8000	-0.0008
11/10/1950	117.5000	-0.0025
12/10/1950	116.7000	-0.0068
13/10/1950	116.5000	-0.0017
16/10/1950	116.4000	-0.0009
17/10/1950	116.3000	-0.0009
18/10/1950	116.3000	0.0000
19/10/1950	116.3000	0.0000

20/10/1950	116.2000	-0.0009
23/10/1950	116.6000	0.0034
24/10/1950	116.6000	0.0000
25/10/1950	116.6000	0.0000
26/10/1950	117.1000	0.0043
27/10/1950	117.4000	0.0026
30/10/1950	117.8000	0.0034
31/10/1950	118.0000	0.0017
01/11/1950	118.0000	0.0000
02/11/1950	117.9000	-0.0008
03/11/1950	117.8000	-0.0008
06/11/1950	117.4000	-0.0034
07/11/1950	116.8000	-0.0051
08/11/1950	116.6000	-0.0017
09/11/1950	116.5000	-0.0009
10/11/1950	116.7000	0.0017
13/11/1950	116.9000	0.0017
14/11/1950	116.6000	-0.0026
15/11/1950	116.5000	-0.0009
16/11/1950	116.8000	0.0026
17/11/1950	117.1000	0.0026
20/11/1950	117.3000	0.0017
21/11/1950	117.4000	0.0009
22/11/1950	117.7000	0.0026
23/11/1950	118.1000	0.0034
24/11/1950	118.0000	-0.0008
27/11/1950	118.1000	0.0008
28/11/1950	118.2000	0.0008
29/11/1950	118.1000	-0.0008

30/11/1950	117.9000	-0.0017
01/12/1950	117.9000	0.0000
04/12/1950	117.9000	0.0000
05/12/1950	117.8000	-0.0008
06/12/1950	117.4000	-0.0034
07/12/1950	114.8000	-0.0221
08/12/1950	114.3000	-0.0044
11/12/1950	114.4000	0.0009
12/12/1950	114.1000	-0.0026
13/12/1950	113.4000	-0.0061
14/12/1950	113.6000	0.0018
15/12/1950	113.4000	-0.0018
18/12/1950	113.2000	-0.0018
19/12/1950	113.6000	0.0035
20/12/1950	114.1000	0.0044
21/12/1950	114.8000	0.0061
22/12/1950	115.2000	0.0035
27/12/1950	114.9000	-0.0026
28/12/1950	114.9000	0.0000
29/12/1950	115.2000	0.0026
02/01/1951	115.4000	0.0017
03/01/1951	115.6000	0.0017
04/01/1951	115.8000	0.0017
05/01/1951	116.2000	0.0035
08/01/1951	115.7000	-0.0043
09/01/1951	115.8000	0.0009
10/01/1951	115.5000	-0.0026
11/01/1951	116.3000	0.0069
12/01/1951	116.7000	0.0034

15/01/1951	117.7000	0.0086
16/01/1951	118.0000	0.0025
17/01/1951	118.1000	0.0008
18/01/1951	118.0000	-0.0008
19/01/1951	118.0000	0.0000
22/01/1951	118.2000	0.0017
23/01/1951	118.4000	0.0017
24/01/1951	118.7000	0.0025
25/01/1951	119.1000	0.0034
26/01/1951	119.5000	0.0034
29/01/1951	119.4000	-0.0008
30/01/1951	119.5000	0.0008
31/01/1951	119.9000	0.0033
01/02/1951	119.9000	0.0000
02/02/1951	120.3000	0.0033
05/02/1951	120.3000	0.0000
06/02/1951	120.4000	0.0008
07/02/1951	120.3000	-0.0008
08/02/1951	120.8000	0.0042
09/02/1951	121.5000	0.0058
12/02/1951	121.5000	0.0000
13/02/1951	121.3000	-0.0016
14/02/1951	121.7000	0.0033
15/02/1951	121.6000	-0.0008
16/02/1951	122.1000	0.0041
19/02/1951	122.2000	0.0008
20/02/1951	122.6000	0.0033
21/02/1951	122.4000	-0.0016
22/02/1951	122.3000	-0.0008

23/02/1951	122.4000	0.0008
26/02/1951	123.0000	0.0049
27/02/1951	123.1000	0.0008
28/02/1951	122.1000	-0.0081
01/03/1951	122.0000	-0.0008
02/03/1951	121.5000	-0.0041
05/03/1951	121.7000	0.0016
06/03/1951	122.0000	0.0025
07/03/1951	122.0000	0.0000
08/03/1951	122.4000	0.0033
09/03/1951	122.8000	0.0033
12/03/1951	122.8000	0.0000
13/03/1951	122.4000	-0.0033
14/03/1951	121.1000	-0.0106
15/03/1951	121.0000	-0.0008
16/03/1951	121.2000	0.0017
19/03/1951	121.2000	0.0000
20/03/1951	121.0000	-0.0017
21/03/1951	120.6000	-0.0033
22/03/1951	119.9000	-0.0058
27/03/1951	119.9000	0.0000
28/03/1951	120.0000	0.0008
29/03/1951	119.8000	-0.0017
30/03/1951	119.7000	-0.0008
02/04/1951	119.6000	-0.0008
03/04/1951	119.9000	0.0025
04/04/1951	119.9000	0.0000
05/04/1951	120.2000	0.0025
06/04/1951	120.5000	0.0025

09/04/1951	120.9000	0.0033
10/04/1951	121.3000	0.0033
11/04/1951	121.9000	0.0049
12/04/1951	121.9000	0.0000
13/04/1951	122.0000	0.0008
16/04/1951	122.5000	0.0041
17/04/1951	122.7000	0.0016
18/04/1951	122.6000	-0.0008
19/04/1951	124.6000	0.0163
20/04/1951	124.7000	0.0008
23/04/1951	125.9000	0.0096
24/04/1951	127.7000	0.0143
25/04/1951	127.7000	0.0000
26/04/1951	128.9000	0.0094
27/04/1951	130.3000	0.0109
30/04/1951	131.8000	0.0115
01/05/1951	130.9000	-0.0068
02/05/1951	131.2000	0.0023
03/05/1951	131.1000	-0.0008
04/05/1951	131.8000	0.0053
07/05/1951	132.9000	0.0083
08/05/1951	132.9000	0.0000
09/05/1951	133.5000	0.0045
10/05/1951	134.3000	0.0060
11/05/1951	135.5000	0.0089
15/05/1951	136.8000	0.0096
16/05/1951	137.1000	0.0022
17/05/1951	136.3000	-0.0058
18/05/1951	136.4000	0.0007

21/05/1951	137.0000	0.0044
22/05/1951	137.2000	0.0015
23/05/1951	136.8000	-0.0029
24/05/1951	136.2000	-0.0044
25/05/1951	134.9000	-0.0095
28/05/1951	135.0000	0.0007
29/05/1951	134.6000	-0.0030
30/05/1951	135.4000	0.0059
31/05/1951	136.0000	0.0044
01/06/1951	136.3000	0.0022
04/06/1951	136.6000	0.0022
05/06/1951	136.6000	0.0000
06/06/1951	136.7000	0.0007
07/06/1951	136.7000	0.0000
08/06/1951	137.2000	0.0037
11/06/1951	137.4000	0.0015
12/06/1951	137.9000	0.0036
13/06/1951	138.1000	0.0015
14/06/1951	138.7000	0.0043
15/06/1951	139.1000	0.0029
18/06/1951	139.7000	0.0043
19/06/1951	140.2000	0.0036
20/06/1951	140.3000	0.0007
21/06/1951	140.4000	0.0007
22/06/1951	140.4000	0.0000
25/06/1951	139.8000	-0.0043
26/06/1951	138.7000	-0.0079
27/06/1951	137.3000	-0.0101
28/06/1951	136.3000	-0.0073

29/06/1951	136.9000	0.0044
02/07/1951	136.6000	-0.0022
03/07/1951	136.6000	0.0000
04/07/1951	135.8000	-0.0059
05/07/1951	135.6000	-0.0015
06/07/1951	135.7000	0.0007
09/07/1951	135.8000	0.0007
10/07/1951	135.8000	0.0000
11/07/1951	135.9000	0.0007
12/07/1951	135.8000	-0.0007
13/07/1951	135.7000	-0.0007
16/07/1951	135.8000	0.0007
17/07/1951	135.7000	-0.0007
18/07/1951	135.7000	0.0000
19/07/1951	135.9000	0.0015
20/07/1951	136.3000	0.0029
23/07/1951	136.7000	0.0029
24/07/1951	136.8000	0.0007
25/07/1951	136.8000	0.0000
26/07/1951	136.2000	-0.0044
27/07/1951	135.6000	-0.0044
30/07/1951	133.9000	-0.0125
31/07/1951	132.7000	-0.0090
01/08/1951	132.7000	0.0000
02/08/1951	132.7000	0.0000
03/08/1951	132.9000	0.0015
07/08/1951	128.3000	-0.0346
08/08/1951	128.3000	0.0000
09/08/1951	127.1000	-0.0094

10/08/1951	127.1000	0.0000
13/08/1951	127.7000	0.0047
14/08/1951	129.9000	0.0172
15/08/1951	130.7000	0.0062
16/08/1951	130.8000	0.0008
17/08/1951	131.9000	0.0084
20/08/1951	132.3000	0.0030
21/08/1951	132.6000	0.0023
22/08/1951	133.0000	0.0030
23/08/1951	133.6000	0.0045
24/08/1951	133.6000	0.0000
27/08/1951	133.1000	-0.0037
28/08/1951	133.2000	0.0008
29/08/1951	132.8000	-0.0030
30/08/1951	132.6000	-0.0015
31/08/1951	132.3000	-0.0023
03/09/1951	131.9000	-0.0030
04/09/1951	131.7000	-0.0015
05/09/1951	132.2000	0.0038
06/09/1951	132.4000	0.0015
07/09/1951	133.0000	0.0045
10/09/1951	133.0000	0.0000
11/09/1951	133.0000	0.0000
12/09/1951	132.9000	-0.0008
13/09/1951	132.8000	-0.0008
14/09/1951	132.8000	0.0000
17/09/1951	132.9000	0.0008
18/09/1951	132.8000	-0.0008
19/09/1951	133.0000	0.0015

20/09/1951	133.2000	0.0015
21/09/1951	133.1000	-0.0008
24/09/1951	133.2000	0.0008
25/09/1951	133.7000	0.0038
26/09/1951	133.6000	-0.0007
27/09/1951	135.3000	0.0127
28/09/1951	138.6000	0.0244
01/10/1951	138.2000	-0.0029
02/10/1951	137.4000	-0.0058
03/10/1951	136.4000	-0.0073
04/10/1951	135.4000	-0.0073
05/10/1951	134.8000	-0.0044
08/10/1951	134.6000	-0.0015
09/10/1951	134.5000	-0.0007
10/10/1951	134.4000	-0.0007
11/10/1951	135.5000	0.0082
12/10/1951	135.8000	0.0022
15/10/1951	135.8000	0.0000
16/10/1951	136.2000	0.0029
17/10/1951	136.8000	0.0044
18/10/1951	137.5000	0.0051
19/10/1951	137.9000	0.0029
22/10/1951	137.4000	-0.0036
23/10/1951	136.9000	-0.0036
24/10/1951	136.3000	-0.0044
25/10/1951	136.6000	0.0022
26/10/1951	136.7000	0.0007
29/10/1951	136.5000	-0.0015
30/10/1951	137.1000	0.0044

31/10/1951	137.4000	0.0022
01/11/1951	138.1000	0.0051
02/11/1951	138.3000	0.0014
05/11/1951	138.2000	-0.0007
06/11/1951	136.6000	-0.0116
07/11/1951	135.1000	-0.0110
08/11/1951	132.7000	-0.0178
09/11/1951	132.2000	-0.0038
12/11/1951	130.2000	-0.0151
13/11/1951	130.7000	0.0038
14/11/1951	131.7000	0.0077
15/11/1951	131.4000	-0.0023
16/11/1951	131.8000	0.0030